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WORKING PAPER SERIES

Working Paper

2013-025

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Microfinance efficiency in the West African economic and monetary union: have reforms promoted sustainability or outreach?

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Abstract:

This study assesses whether the undertaken reforms in the microfinance industry in the West African Economic and Monetary Union (WAEMU) have promoted sustainability or outreach. To this purpose we use a data envelopment analysis (DEA) to measure the social efficiency on the one hand and the financial efficiency on the other hand. Our results show that social efficiency decreases, while financial efficiency increases. Moreover, reforms have a negative impact on social efficiency. Indeed, prudential ratios and accounting standards that were implemented led MFIs to abandon their social role.

JEL codes: C23, C61, C67, G21, O16, O55.

Key words: microfinance efficiency, outreach and sustainability, regulatory programs, WAEMU.

I. Introduction

In developing countries, the microfinance industry has expanded rapidly in recent years. Microfinance institutions now reach more than 100 million clients, with appreciable repayment rates on loans, Cull et al., 2009. WAEMU¹ is not protected from this development of the microfinance industry. In fact, the number of beneficiaries of these institutions has increased from 3.08 million to 11.66 million from 2002 to 2011. To frame this evolution, the financial authorities of this area conducted in late 1990s and during the 2000s several reform programs intended to regulate the sector. Indeed, before these programs microfinance institutions (MFIs) had evolved into a legal framework that was ill-defined and poorly regulated, i.e. essentially very informal. Furthermore, the microfinance industry was subject to several failures such as lack of financial monitoring, mismanagement, and lack of capabilities. The enforcement programs were especially designed to address these weaknesses. Projects for regulatory support (PARMEC) and the monitoring (PASMEC) of MFIs were implemented. The first program was designed to promote the effective implementation of specific regulations and to strengthen the institutionalisation of the industry. The second program promoted information and experience exchange as well as capacity building. These two projects were then followed by PRAFIDE (2005-2009), which aimed to address shortcomings and flaws in the sector, as well as ensure stability. However, this regulation of the microfinance sector raises the issue of whether complying with regulation and the associated prudential supervision can especially be costly for microfinance institutions, Cull and al., 2011. All factors that cause an increase in costs will tend to encourage an increase in the average loan per borrower and/or interest rates. In the end, the less wealthy

¹ WAEMU member states are: Benin, Burkina Faso, Côte d'Ivoire, Guinea Bissau, Mali, Niger, Senegal, Togo.

borrowers are likely to be abandoned in favor of wealthier borrowers. This implies that microfinance institutions that comply with regulations may do so, but at the expense of their outreach mission. Indeed, several studies have shown how the regulation of the banking system was costly for banks, Elliehausen, 1998. Microfinance institutions are also financial institutions; therefore we can assume that such reforms will increase their costs and turn them away from lending to the poorest. This question is particularly relevant because these institutions face a constant dilemma which is the choice between their outreach mission and financial sustainability.

This dilemma also calls for the hefty debate between the welfarists who focus on outreach (Hashemi and Rosenberg, 2006; Montgomery and Weiss, 2005; Woller, 2002) and the institutionalists who focus on sustainability and efficiency (Christen, 2001; Isern and Porteous, 2005; Rhyne, 1998). A debate to which Hermes and al., 2011 answer that MFIs with low average loan balance and/or that lend more to women (as measures of the depth of the outreach) are the least efficient. This may signal bad news as MFIs in WAEMU are regulated and must therefore meet certain prudential ratios, which are designed to ensure the stability of the sector. MFIs under regulation have the opportunity to increase their resources as they can borrow. However, regulation may lead to mission drift if prudential rules (this is possibly the case of capital adequacy ratio) turn away MFIs from their first aim which is fighting poverty. Again, regulation can also slow down the innovation in pro-poor lending procedures. Mission drift, which is the idea that the individual-based MFIs increasingly focus on wealthier clients, could become a more acute problem for MFIs in WAEMU, Mersland and Strom, 2010. Thus, to comply with regulation, MFIs may look more and more for clients with stronger repayment capacity. Precisely, Cull and al., 2011 show using a sample of 245 unregulated and regulated MFIs, that

regulated MFIs could react in two different ways: MFIs that are profit-oriented will tend to respond to regulation maintaining their profit level while reducing their outreach tendency, and MFIs that are outreach oriented will emphasize outreach at the expense of profit. Hartarska and Nadolnyak, 2007 use a sample of 114 MFIs in 62 countries and show that regulation has no direct impact on MFIs. However, there is an indirect effect *via* deposits, since the regulation is the only way for MFIs to obtain savings. Indeed, the ability of MFIs to collect deposits allows them to play an outreach role as depositors who are the wealthiest customers bear fixed costs. Lastly, another study by Roberts, 2013, shows that regulated MFIs tend to have lower effective interest rate. Moreover, the author's conclusion is that profit oriented MFIs will display higher personnel and operating expenses. This result is explained by the fact that these institutions do not have access to less expensive credit or socially oriented pools of labor, given their profit-orientation. To summarize, all these studies on the impact of regulation have produced mitigated results. In our study we propose to assess the impact of regulatory programs in WAEMU microfinance industry. Unlike previous cited studies, our sample is made up with only regulated MFIs. And we consider those MFIs before and after the implementation of regulatory programs. Our approach is to assess the impact of PARMEC and PRAFIDE programs on social and financial efficiencies of microfinance institutions calculated with data envelopment analysis (DEA). The model used to this purpose is a double truncated Tobit model, as DEA indices are bounded by 0 and 1. Unlike the previously cited studies that use as a proxy for MFIs' financial and social performance, variables such as financial self-sufficiency, adjusted return on assets and average loan size; our study uses a composite index, calculated with DEA. This composite index is reported in several studies as fully capturing all aspects of MFIs social and financial efficiencies, Gutiérrez-Nieto et al., 2007, 2009 and 2010. Our study is the first one addressing the evaluation of those reforms

programs in WAEMU area, and even in Africa. Our results show that the social efficiency decreases over the studied period, for the considered sample. Moreover, these programs aiming at regulating the microfinance industry had a negative impact on social efficiency. Such results may appear disturbing for WAEMU countries, that are least developed countries and whose poverty headcount ratio at national poverty line lies between 33 and 62% of the population.

The remainder of the paper is organised as follows. Section 2 presents the evolution of microfinance industry in WAEMU. In Section 3 we set out the research methodology, while Section 4 is devoted to the presentation of the data. Section 5 presents results. Lastly, we will conclude after a discussion on the implication of our results for the microfinance industry in WAEMU and the overall financial system.

II. Evolution of the microfinance industry in WAEMU

In WAEMU, the oldest MFIs were created in the late 60s and are commonly called “systèmes financiers décentralisés” (financial decentralized systems _FDS_) to stress their specificity of financial institutions very closed to populations deprived from financial services. These alternative financial structures aimed to promote small savings collection as well as finance agriculture, small and medium enterprises and handicrafts in rural and urban areas. They then flourished in the late 80s and 90s. Therefore, monetary authorities in WAEMU found it necessary to draw the regulatory framework in order to give legal status to such institutions.

In WAEMU, microfinance regulation intends to frame the industry by defining the scope of the microfinance financial activities and frameworks. Microfinance regulation also aims to provide oversight and monitoring through prudential standards. To this end, MFIs are subject to a

particular method of accounting and provisioning for their nonperforming loans. MFIs are also subject to specified financial ratios and prudential management to avert potential crises in the industry and to ensure the protection of depositors. The so called law: "loi cadre portant réglementation des IMCEC of 17 December 1993" defines the legal statute of MFIs operating in WAEMU². There are three types of MFIs: those with savings and credit as principal activity (approximately 366), those with direct credit as a principal activity (twenty-four) and those with a credit component (sixteen). In addition, two support projects (PARMEC and PASMEC) were established to foster the emergence and development of those nearby financing structures.

The PARMEC (the Support Project for the Regulation of Mutual Institutions for Savings and Loans) was implemented in two phases: from 1992 to 1996 and from 1997 to 2002. The main objectives of the project were to protect depositors, financial operations safety, and financial sustainability. The latter one was made through the introduction of prudential ratios like capital adequacy ratio, liquidity as well as risk ratios. As for the PASMEC (the Support Project for the Monitoring of Mutual Institutions for Savings and Loans), it aimed to promote information dissemination among microfinance institutions (MFIs). It lasted from 1992 to 2000. Despite the implementation of PARMEC and PASMEC, some dysfunctions still persist: non-compliance with regulations, the failure of information system management and weak internal and external mechanisms for monitoring. Therefore, PRAFIDE (Regional Program of Support to Decentralised Financial Systems) was implemented over the 2005-2009 period and was designed to encourage the resource protection of depositors and to maintain the integrity and stability of the financial system in WAEMU. There is thus an improvement in the legal environment for

² This law defines legal and regulatory conditions for operating as a Financial Decentralised System (FDS), a Microfinance Institution (MFI) or a mutual savings and credit cooperative institution (IMCEC) in all WAEMU member states.

MFIs, a strengthening of monitoring and surveillance (by the Central Bank and the Banking Commission), as well as an improvement in the financial information provided by MFIs. Indeed, new accounting standards specific to MFIs lead to standardized practices, with more reliable information to supervisory authorities. Lastly, the microfinance industry is becoming more professional, with organised training programs that are adapted to microfinance specificities in WAEMU.

It is in this context that the microfinance industry grew rapidly, as shown by the strong growth in the supply of local financial services, as well as financial and outreach statistics of the industry. Indeed, between 1993 and 2006, the number of MFIs was multiplied by six to reach 673, among which 406 are regulated. More than 15% of the WAEMU population has access to financial services offered by those institutions, whose loans represent 8% of bank financing in 2006 against less than 1% in 1996. Despite the economic difficulties that struck member countries, there has been an increase in the number of branches from 2549 to 2906. With this increased proximity, the number of beneficiaries rose from 3.08 million in 2002 to approximately 4.87 million in 2006. The amount of deposits has almost doubled during this same period from 166.12 to 317.08 billion FCFA, and the total amount loaned has increased from 190.57 to 385.46 billion. Regarding performance management, the share of equity to total assets decreased from 19.63 % to 14.9 %, indicating a decline in the capacity of MFIs' financing. This decrease was not offset by subsidies, which increased in absolute terms but decreased in terms of their share of assets from 3.25 % to 1.93%. Lastly, the nonperforming loans increased from 10.15 to 18.64 billion, but declined as a share of total loans from 5.33 % to 4.84 %. This shows an improvement of credit risk management by MFIs. However, the number of MFIs fell sharply, from 2004 to 2006. In all

countries except Ivory Coast, there is a reduction of more than one third of the number of MFIs. This reduction is due to the merger in some large networks, and the foreclosures of small savings and credit mutual fund cooperative groups as well as other savings and credit institutions. This development may indicate that the most efficient MFIs were able to stay on the market. Indeed, one of the major flaws in the microfinance sector is the poor ability to assess client needs and to anticipate market developments. Most of the time, microfinance products are not very diversified and do not always meet market needs. Financial products are similar; there are not many differences between them in terms of their conditions and forms. However, since 2007, several institutions have been engaged in developing new products or improving existing products to better satisfy customers but also to meet the pressure of competition between MFIs and banks UNDP (2007)³. Given these mitigated stylised facts, the remaining of the paper attempts to assess the impact of regulatory programs.

III. Methodology

Efficiency measurement

Our idea is to consider the MFIs' financial intermediation and social roles separately while measuring their efficiency. In the literature, there are two main methods for efficiency measurement: the non parametric method, DEA and the parametric method, stochastic frontier analysis (SFA). We rely on DEA to measure our social and financial efficiency scores. Indeed, if the indicators of financial intermediation are expressed in monetary values, the outreach indicators are not. Therefore, we will be able to consider in the production function variables that

³ Diagnostic approfondi du secteur de la microfinance au Bénin, PNUD, 2007 (Thorough diagnosis of microfinance industry in Benin, PNUD, 2007)

are not expressed in monetary unit. What stochastic frontier analysis does not allow. DEA is an approach that estimates the efficiency frontier using mathematical nonparametric linear programming. DEA provides an analysis based on an assessment of relative efficiency in multiple input /output situations, taking into account each MFI and measuring its performance relative to an outer surface composed of the best practice MFIs. The linear mathematical program used to calculate efficiency scores under the assumption of constant returns to scale is as follows:

$$\text{Max}_{u,v}(u'y_i/v'x_i),$$

$$\text{St } u'y_j/v'x_j \leq 1, j = 1, 2, \dots, N$$

$$u, v \geq 0$$

with x_i as the vector of inputs' matrix $K \times N$ of MFI I ; y_i as the vector of the output matrix $M \times N$ of MFI i ; and u' and v' are $M \times 1$ and $K \times 1$ vectors of the input and output weights, respectively.

To avoid an infinite number of solutions, the constraint $v'x_i = 1$ is imposed, which provides

$$\text{Max}_{u,v}(u'y_i),$$

$$\text{St } u'y_j - v'x_j \leq 0, j = 1, 2, \dots, N$$

$$u, v \geq 0$$

Because solving the problem in this form would be difficult, one can use the duality in linear programming and derive an equivalent form of this problem:

$$\text{Min}_{\theta, \lambda} \theta,$$

$$\text{St } -y_i + Y\lambda \geq 0,$$

$$\theta x_i - X\lambda \geq 0,$$

$$\lambda \geq 0,$$

where θ is a scalar and λ is an $N \times 1$ vector of constants.

The value of θ obtained will be the efficiency score for the i -th MFI.

To take into account changes in scale economies, the convexity constraint $N1' \lambda = 1$ can be added to provide the following program:

$$\text{Min}_{\theta, \lambda} \theta, \text{Min}_{\theta, \lambda} \theta,$$

$$St - y_i + Y\lambda \geq 0,$$

$$\theta x_i - X\lambda \geq 0,$$

$$N1' \lambda = 1,$$

$$\lambda \geq 0,$$

where $N1$ is an $N \times 1$ vector of 1.

To implement DEA we need to choose inputs and outputs of MFIs in their production and distribution of financial services as well as outreach. To this purpose we opt for the production approach as opposed to the intermediation approach. The former approach allows us to integrate non-financial products precisely, and that precision is what we would like to insist on. The latter approach presents MFIs as institutions that collect deposits while simultaneously offering credits. Another reason for choosing the production approach is because the data on deposits are not available for most MFIs in our sample.

The inputs that we choose are the following. The first is financial expenditures (FIEXP), which consist of interest payments on deposits and MFIs' borrowing as well as other financial charges. The second input is capital (CAP), measured by equity. Finally, we consider the number of the

MFIs' workers (PERS). We do not consider physical capital due to data limitations. As for outputs, we selected four. The first is an output reflecting the role of financial intermediation: gross loan portfolio (GLP). The other three outputs reflect MFIs' outreach. The number of active borrowers (NAB) allows outreach to be taken into account in the sense that an MFI makes loans to individuals who are generally excluded from the traditional banking system. The more that an MFI lends to a significant number of people, the more it fills the social role that banks fail to complete.

The third output is a poverty index. We calculated it using the average loan per borrower (ALB). Hermes et al., 2011, used ALB because it includes the idea that MFIs lend to the poor. Thus, the lower the indicator is, the more poor people the MFI covers. These MFIs participate in financing poor people and in poverty alleviation. However, this indicator does not allow differences in living standards in a cross-country analysis to be taken into account. To solve this problem, we divided ALB by GNI per capita. In particular, Gutiérrez-Nieto et al., 2009, calculate an index of poverty (POV) based on this ratio.

$$POV = 1 - \frac{\frac{ALB}{GNIc} - \min(\frac{ALB}{GNIc})}{\max(\frac{ALB}{GNIc}) - \min(\frac{ALB}{GNIc})}$$

with ALB/GNIc equal to the average loan per borrower for MFI i divided by the per capita Gross National Income. Min(ALB/GNIc) is the minimum of this variable per year and Max(ALB/GNIc) is the maximum. This new variable does not change the statistical properties of the variable ALB/GNIc, but instead allows its standardisation as a poverty index. Thus, the closer the POV is to 1, the more MFI i lends to poor people, and it is the opposite when the index is close to 0.

Finally, the percentage of women borrowers measures the propensity of the MFIs to promote women because they represent the portion of the population most affected by poverty. Statistics are presented in Table 2.

We measure the efficiency assuming alternatively: variable and constant returns to scale, (VRS) and (CRS). The first assumption corresponds better to the environment of imperfect competition in which MFIs operate and prevents bad specifications. The second compares the large to the small MFIs, avoiding the Large MFIs to artificially appear efficient, Berg and al. 1993. Lastly, we opt for an input-oriented efficiency measurement that considers that MFIs use as few inputs as the production of outputs requires.

Finally, the 2 estimated models are as follow:

$(GLP) = f(FIEXP, CAP, PERS)$ for financial efficiency

$(NAB, POV, PWOB) = f(FIEXP, CAP, PERS)$ for social efficiency

Assessing the impact of regulation on MFI social and financial efficiency

The second step of our study consists in relating social and financial efficiencies to variables that are likely to explain these. To this purpose we use a double truncated Tobit model. Indeed, efficiency scores are bounded by 0 and 1. Therefore, this model seems the most adapted one to assess variables which influence efficiency. Otherwise, standard regression method like OLS will lead to biased results. Our main variable of interest in this second step, are dummies related to

PARMEC and PRAFIDE⁴. We consider two dummies for each program: the first and second dummies take the value 1 during the implementation period and 0 elsewhere (called PARMEC and PRAFIDE); the third and the fourth dummies take the value 1 after period of implementation and 0 elsewhere (called APARMEC and APRAFIDE). To avoid colinearity PARMEC is dropped from the regression. Therefore, we only have three dummy programs left. Indeed, those programs take time to be effective, because some MFIs can be reluctant to respect the implied regulation. That's why financial authorities define a period of implementation for those programs. Besides, other variables are considered as MFI's efficiency determinants. Variables related to the MFIs' specificities and their technology for financial product distribution also impact their efficiency. Among these variables, we note the type of MFI. The data from the MIX market database allows us to classify the MFIs into three categories: those that are related to non-governmental organisations (NGOs), cooperatives (COOP) and finally those that are subsidiaries of banks (NBFIs). We use only two dummies for COOP and NBFIs to avoid the problem of singularity. The MFIs' size (SIZE) can lead to economies of scale in the distribution of financial products, where size is measured by the logarithm of total assets. We expect a positive sign for both financial and social efficiencies, as economies of scale could foster financial and social efficiencies. The number of years of experience (EXP) can also positively affect the MFIs' efficiency through the learning by doing effect. We consider a dummy variable (TRAINING), which is supposed to take into account the fact that MFIs provide training or consultation to their clients to promote the better use of their loan. Indeed, this type of product is intended to increase productive loans by the development of successful "very small businesses". If these training and consultations are not too expensive, the MFIs strengthen their social role. We expect a positive

⁴ We weren't able to encompass in our study the impact of PASMEC, because of data availability.

sign for social efficiency. However, in the event that this training and consultation costs too much, it negatively affects financial efficiency. Lastly, we introduce in the regression the level of development as measured by the GDP per capita (GDPc) to capture the positive impact of a healthy economic environment. Again, country-dummies are introduced, to take into account countries' specificities.

Variables of financial management and risk have been considered for efficiency explanation. However, they raise problem of circularity as they can themselves be used to measure financial efficiency. Therefore in our regression we will only consider the above mentioned variables.

Data. We use the MIX market database, which provides financial statements and outreach indicators for MFIs around the world. Our sample is composed of 104 WAEMU's MFIs over the period 2000-2010. Sampled MFIs represent one quarter of the 406 regulated MFIs that provide financial statements to BCEAO (the Central Bank). Our sample is an unbalanced panel. Table 1 presents the number of MFIs whose data are available, per year and per country. As can be seen from Table 1, we have 13, 28 and 32 observations respectively in 2000, 2001 and 2010. Between 2001 and 2010, the number of observations represents almost half of our MFIs sample. There are 7 MFIs for which we have data for the entire 2000-2010 period. Table 2 presents statistics for the variables used for the DEA estimates. Regarding GDP per capita, we will use the Global Development Indicators.

Table 1. Availability of data for WAEMU's MFI per country and per year.

Pays	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Benin	3	10	16	15	11	12	11	10	9	8	4
Burkina Faso	0	1	3	3	2	2	3	6	9	8	6
Ivory Coast	1	2	6	6	2	3	4	4	4	4	2
Guinea Bissau	0	0	0	0	1	3	4	3	1	1	0
Mali	2	4	8	9	11	14	16	15	14	9	4
Niger	0	0	0	3	3	5	5	5	5	4	3
Senegal	3	6	12	12	10	11	12	13	14	9	8
Togo	4	5	4	4	5	9	10	10	7	6	5
WAEMU	13	28	49	52	45	59	65	66	63	49	32

Table 2. Statistics for the inputs and outputs used for the estimate of the efficiency scores with DEA

Variable	Mean	Standard Deviation	Minimum	Maximum
FIEXP*	1.22E+08	2.53E+08	0	2.03E+09
OPEXP*	8.51E+08	1.88E+09	659377.8	1.77E+10
PERS	123.04	200.205	2	1005
POV	0.8548	0.211	0	1
NAB	15384.68	22822.78	16	112166
GLP*	5.06E+09	1.06E+10	68416.65	7.88E+10
PWOB	0.5895	0.2725	0.0075	11.937

*Monetary values are expressed in CFA Francs.

IV. Results

The average value of financial efficiency during the studied period is 39.33% under the CRS assumption (50.65% under the VRS), against 28.67% for social efficiency using CRS (43.29% with VRS). A mean difference test shows that the average social efficiency score is different from the average financial efficiency score, Table 4 in the appendix. Moreover, MFIs' financial efficiency increases while their social efficiency decreases over the studied period, see Fig. 1.

However, we stay cautious in interpreting this evolution of financial efficiency compared to social efficiency, as the number of MFIs considered varies per year. Indeed, the restructuration of the sector has led to many foreclosures. This means, that MFIs that stayed in the sector were the most competitive ones. Information about our sample doesn't allow us to know with precision which of those MFIs left the market, or which ones merged with another. However, average outreach variables in several countries of the WAEMU have tended to deteriorate during the studied period as stated in section 2. This may confirm the decreasing trend of MFIs outreach in the region. Therefore, in a second step of analysis, we question how reforms program impact social and financial efficiency of MFIs in WAEMU.

As already said in the methodology, we run a double truncated Tobit model, to take into account the fact that efficiency scores range between 0 and 1. Our model perform well in terms of social efficiency, but poorly for financial efficiency, indeed for the latter dependent variable, there is no evidence of an impact of dummies related to regulatory programs on financial efficiency, and most of our explanatory variables are not significant. However, for social efficiency, dummies related to regulation programs are statistically significant. When regulation was strengthened and the microfinance industry was institutionalized, MFIs social efficiency decreased. Other control variables like GDP per capita and years of experience (EXP) have the expected signs when they are significant. More experienced MFIs tend to have a higher social efficiency; the process of learning by doing seems to work, with social efficiency. However, when a microfinance institution is a cooperative, there tends to be a reduction in its social efficiency. This finding can be explained by the functioning of these types of MFIs, which lend prior to their members.

Table 3. Tobit regression with explanatory variables for financial and social efficiency scores under CRS and VRS

Dependent variable	Social efficiency				Financial efficiency			
	DEA scores with CRS hypothesis	DEA scores with CRS hypothesis	DEA scores with VRS hypothesis	DEA scores with VRS hypothesis	DEA scores with CRS hypothesis	DEA scores with CRS hypothesis	DEA scores with VRS hypothesis	DEA scores with VRS hypothesis
SIZE	-.0011	-.0134	.0212	.0030	.0408	.0316	.0139	.0029
	.0292	.0297	.0335	.0332	.0284	.0285	.0305	.0305
TRAINING	-.0569	-.0484	-.0382	-.0336	-.0282	-.0170	-.0473	-.0361
	.0399	.0397	.0464	.0449	.0284	.0295	.0301	.0313
EXP	.0873***	.0819**	.0945**	.0976**	-.0402	-.0313	-.0232	-.0139
	.0327	.0332	.0384	.0381	.0294	.0298	.0314	.0317
GDPc	.2153*	.2154*	.2474*	.2457*	-.0153	.0226	.0437	.0723
	.1137	.1144	.1343	.1328	.1658	.1646	.1831	.1830
NBFI		-.0440		-.0775		.0231		.0001
		.0862		.0973		.0654		.0698
COOP		-.0602		-.1057*		-.0222		-.0140
		.0501		.0574		.0364		.0384
APARMEC	-.0201	-.0209	-.0720**	-.0734**	.0608	.0609	.0142	.0150
	.0283	.0284	.0336	.0332	.0414	.0410	.0457	.0454
APRAFIDE	-.1330***	-.1343***	-.1341**	-.1326**	.0040	-.0005	-.0632	-.0644
	.0464	.0467	.0548	.0541	.0660	.0655	.0728	.0725
PRAFIDE	-.0721***	-.0738***	-.0848***	-.0850***	-.0130	-.0213	-.0430	-.0503
	.0229	.0231	.0271	.0268	.0327	.0324	.0360	.0360
BENIN	.3828**	.3609**	.4238**	.3935**	-.0262	.0088	.1278**	.2062
	.1568	.1600	.1839	.1832	.1905	.1913	.0613	.2114
BURKINA FASO	.3946**	.4158	.5017***	.5295***	.1825*	.1565	.1897*	.2360
	.1591	.1613	.1845	.1841	.1018	.1814	.1101	.1999
COTE D'IVOIRE	-.0362	-.0117	-.0148	.0239	-.0195	-.0161	-.0064	-.1229*
	.1168	.1150	.1337	.1300	.1008	.1045	.1093	.0654
MALI	.2836*	.2879*	.3317*	.3334*	.0757	.1070	.1647	.2000
	.1578	.1570	.1835	.1805	.1903	.1907	.2093	.2109
NIGER	.4638***	.4927***	.5112**	.5496***	.0760	.1203	.1982	.2478
	.1742	.1729	.2017	.1973	.1990	.1992	.2184	.2197
SENEGAL	.2354**	.2633**	.2342*	.2763**	-.0466	-.0331	.0826	.1073
	.1083	.1064	.1238	.1203	.0918	.0956	.0993	.1039
TOGO	.2286	.2052	.2899	.2481	-.0009	.0214	.1033	.1290
	.1625	.1625	.1889	.1874	.1931	.1939	.2122	.2142
Constant	.2280	.2657*	.3224*	.3942**	.3581*	.3311*	.4239**	.3882*
	.1527	.1585	.1781	.1819	.1901	.1921	.2093	.2124
Log likelihood	87.69	86.95	24.84	31.79	-14.41	-9.02	-51.72	-47.15

Number of observations	394	382	394	382	394	382	394	382
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*, **, *** denote test statistic significance at the 10, 5 and 1% levels, respectively.

V. Discussion and conclusion

The results of the present study show that MFIs' social efficiency is negatively impacted by reforms. Indeed, the reforms programs examined were implemented to regulate the sector, which until then was operating in an informal environment. These reforms have institutionalised the industry to enable it to effectively play the role of complementary players to banks in the financial system. However, those reforms come at the expense of MFIs' social efficiency. This is a very problematic outcome for MFI industry in countries where one third to more than half of the population live under national poverty line. The literature already pinpoints the trade-off between financial sustainability and outreach of MFIs. This debate draws attention to what Mersland and Strom, 2010 named mission-drift. In addition, if regulation of the micro-finance industry accentuates this tendency, this could result in the diversion of WAEMU MFIs from their first mission to lend to the poor. Indeed, prudential regulation for MFIs in WAEMU is certainly different from prudential regulation in the banking system, but they are comparable in many ways (prudential ratio, financial sustainability, capital adequacy ratio...). When MFIs regulatory environment is transformed in order to meet supervisory conditions and accounting standards, they try to comply with regulation at the expense of social efficiency. Indeed, because this regulation brings MFIs to focus on their financial intermediation role and sustainability, they will less stress their social role. Therefore, the issue of regulation for the stability of the sector is solved, but at the expense of the original role of MFIs, which is lending to the poorest people. This tendency is confirmed by restructuration of the sector that has led to many

foreclosures and mergers⁵. Thus, MFIs that stayed on the market were able to do so because they decreased their outreach tendency. Indeed, outreach variables in several countries of the WAEMU have tended to deteriorate, i.e., the average loan per borrower has increased from F CFA 254 000 to 450 000 from 2002 to 2006.

APARMEC, APRAFIDE and PRAFIDE are shown to have a negative impact on social efficiency. This is not surprising given the fact that the stated objectives of these programs (financial autonomy, solvency ratio, security of depositors) tend to foster MFIs lending more to people with a stronger capacity repayment. Thus, although the issue of microfinance industry regulation is solved, it comes at the expense of a lower level of outreach and social efficiency as well as a lower tendency to find innovation which can allow reaching the poorest people at lower costs. Indeed, the real issue in this debate becomes how to find a middle ground; that is, how to regulate and stabilize the sector while encouraging lending to the poorest. Roberts, 2013 pinpoints the fact that, even more than the issue of MFIs' profit-orientation, cost-efficiency will play an important role in fostering MFIs to lend more to the poorest people. This means that for MFIs in WAEMU, attention should be given to any process that leads to cost reduction.

According to Aryeetey and Fenny, 2010 technological innovations are one of the ways to reduce transaction costs. At this purpose, one can take the example of Cashpor a MFI in Uttar Pradesh, India, which replaces the paper-based data entry with real-time mobile entry and reconciliation. The result is a saving of one entire day of work per week. The possible outcome of interest rate reduction will probably foster the MFI to reach poorest people. Many other technological innovations can be applied to MFIs and allow them to reduce their costs and access people in

⁵ Monographie des systèmes financiers décentralisés, 2006.

rural area, which use to be costly. Therefore, technological innovations should be fostered in order to allow the unbanked segments of the market to be reached at a low expense.

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Appendix

Tables

Table 4. Mean difference test for financial efficiency scores and social efficiency scores

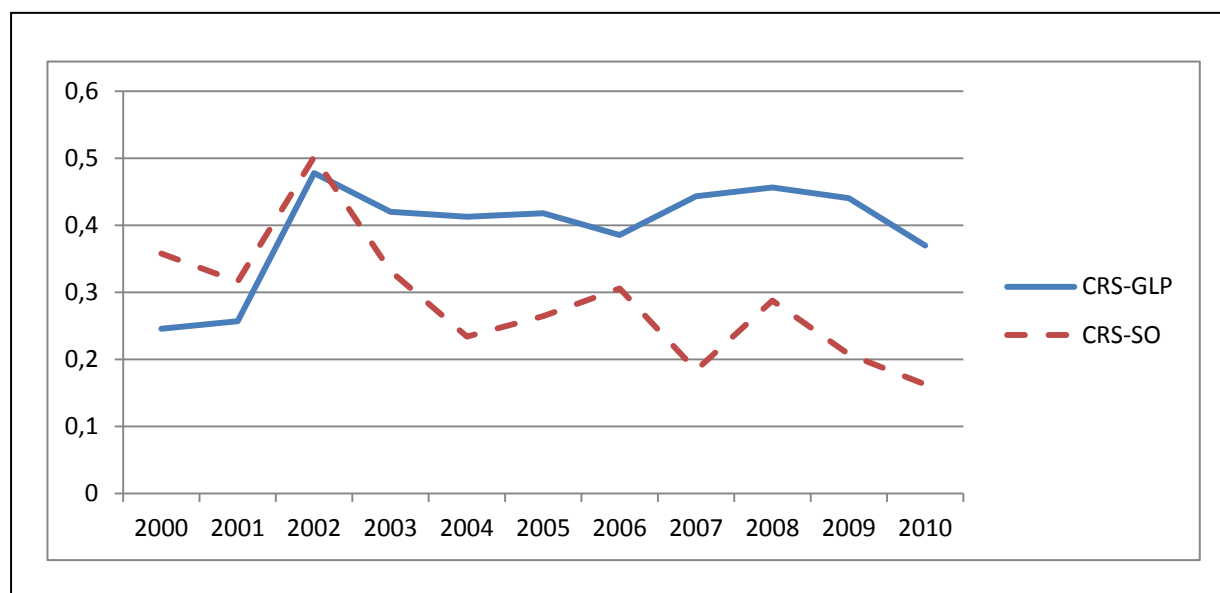
a. CRS estimate:

Variable	Observations	Mean	standard deviation	standard error	95% confidence interval	
Financial efficiency	396	.4016	.0131	.2611	.3758	.4274
Social efficiency	396	.2992	.0136	.2710	.2724	.3259
Difference	396	.1023	.0186	.3704	.0657	.1389

b. VRS estimate

Variable	Observations	Mean	Standard error	Standard Deviation	95% Confidence Interval	
Financial efficiency	396	.5304	.0141	.2815	.5026	.5582
Social efficiency	396	.4306	.0164	.3282	.3982	.4630
Difference	396	.0997	.0186	.3707	.0631	.13638

Fig. 1. The trade-off between social efficiency and financial efficiency of MFIs in the WAEMU



CRS-GLP: financial efficiency, CRS-SO: social efficiency

