

Original Article

Problematic of Credit Repayment in the Decentralized Financial Systems in Togo

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Abstract - In this paper, we sought to assess the factors explaining the repayment of loans by borrowers in SFDs in Togo using a Logit model. A regression analysis of data collected on a sample of 157 loan files shows that older borrowers and those more distant from the institution have a higher credit repayment score, while gender and the amount of credit received by the borrower negatively influence the credit repayment rate. Even if the credit repayment score does not depend on the activity that the borrower has undertaken or wants to undertake, it would be desirable for the SFDs to finance more commercial activities because they favor a rapid turnover of capital.

Keywords - Repayment, Borrower, SFD.

1. Introduction

The inability of the formal system to meet the financing needs of the vast majority of economic agents (illiterate, poor, etc.) who develop formal and informal activities is one of the causes that justify the birth and multiplication of Decentralized Financial Systems (DFS) (Mayoukou & Kertous, 2015). These SFDs are an alternative way to promote wider access to credit for this majority, often rationed by the traditional banking system (Lobez & Villanova, 2006). DFSs, whose main activity is to offer quality financial services at low cost to many low-income people, owe their existence to their clients, who are their *raison d'être*. Poor management of customer operations is a recipe for the institution's demise (Mayoukou & Kertous, 2015). Thus, good repayment performance is crucial for the sustainability of liberal options and expanding access to financial services for the disadvantaged (Honlonkou & al. 2001). Moreover, the number of clients served and the amount of credit granted¹ is sufficient evidence of the role played by these structures in improving the living conditions of the most disadvantaged (Mowu, 2019).

In the information context characteristic of African countries, and more precisely in the West African Economic and Monetary Union (WAEMU), loans granted by decentralized financial systems are increasingly risky. The cascade of bankruptcies facing this sector is revealing (the bankruptcy of IDH in the 2000s in Togo). Even if the natural aim of these institutions is to provide financial services (loans, savings, money transfers, etc.) to people in extreme poverty and excluded from "financial links" (Vallée, 2013), it is clear that this objective is not always

achieved. It is due to several reasons, including poor governance and difficulties in repaying loans granted (Tuedem-Waffo & al. 2016), which compromise these institutions' viability and sustainability. This is likely to increase the costs associated with defaults and the fragility of the financing structures with consequent deterioration of the portfolios of these structures as they face the problems of poor credit repayment performance. Holonkou & al (2001) note that the repayment rate has deteriorated considerably in some large DFSs. In the literature, several factors influence the repayment of loans, notably the inefficiency of the institution's operations (Godquin, 2004), the management characteristics of the funds, the type of activity financed, and the characteristics of the clients (Honlonkou & al., 2006). While many phenomena can lead to the non-sustainability of DFSs, preventing them from achieving their objectives, the problem of repayment is recurrent and deserves investigation to find a solution. Thus, we answer the following question:

1.1. What are the determinants of loan repayment in decentralized financial systems in Togo?

This paper aims to identify the determinants of loan repayment in decentralized financial systems in Togo. Research on loan repayment in some DFSs has given us a rough idea of the determinants of repayment but not a precise idea for our context, especially since the environment may differ from one institution (or context) to another. This paper is divided into three sections: the first one presents the literature review, the second specifies the methodology, and the third presents the results obtained and their discussion. This work is part of the research on the viability and sustainability of SFDs, as knowledge of these determinants will make it possible to put in place preventive measures, which are likely to guarantee this sustainability.

¹ According to the BCEAO (2021), at the end of December 2020, the WAEMU will have 521 SFDs, offering financial services to 15,949,136 people through 4,299 points of service spread across the Union's Member States.



2. Literature Review

The need to define the concept of the study identifying the determinants of credit repayment in DFSs requires a review of its definitional outline.

2.1. Definition of Decentralized Financial Systems (DFS)

DFSs are defined as the provision of small-scale financial services on commercial terms to a potentially solvent clientele traditionally ignored by the mainstream financial system (Lesaffre, 2000). According to the BCEAO (2021), DFSs or microfinance institutions (MFIs) include institutions other than banks and financial institutions that offer financial services to populations on the fringes of the traditional banking system (savings and credit cooperatives or mutuals, non-governmental organizations that collect savings and distribute credit, and credit projects). Among the financial products offered by the DFS, there are essentially 3 products:

- Micro-credit: Micro-credit is a small loan, generally with a short repayment period, that MFIs grant to their clients to undertake activities. Despite the diligence and problems that accompany it, micro-credit is a powerful tool in terms of DFS marketing policy. In Togo, clients are very elastic to the micro-credit terms and conditions offered by lenders, a growing phenomenon with the current saturation of the microfinance market in Togo (BCEAO, 2021)².
- Micro-savings are deposit services that allow an individual to save small amounts of money for future use. Often lacking minimal credit, savings accounts allow households to put money aside to meet unexpected expenses or plan for future investments (Tankpe, 2017).

The latter products are closely linked in the activity of DFSs since micro-savings are the 'parent' of micro-credit.

- Microinsurance is a system whereby an individual or an organization makes a payment (premium) at regular intervals to share risk. In Togo, this product is currently only present in some SFDs.

2.2. Determinants of Credit Repayment in DFSs

Access to finance is crucial to fund the growth of its business. However, the presence of distortions in the credit market in Africa hinders the efficient functioning of DFS. While loans granted to borrowers have different repayment scores, it is interesting to shed light on the determinants that influence credit repayment.

In Benin, Honlonkou & al (2001) conducted a study on the problem of credit repayment in decentralized financial systems (DFS) and loan guarantees for small economic operators and found that the repayment performance of MFIs is related to both the characteristics

of the funds (characteristics of the manager, adequate supervision after obtaining credit), the financial activities and the characteristics of the clients (gender, geographical proximity of the fund, type of guarantee, volume of activities, accumulated expertise in the activity to be financed and the size of the loan). Ndour (2011) studied the determinants of long-term repayment performance in the extension of microcredit supply in developing countries (the case of Senegal). The estimates concluded that repayment performance is determined and influenced by financial variables (outstanding loans, outstanding savings, and overdue loans) and social variables (domestic product per capita and the number of service points), and the financial partnership variable (placement of funds in commercial banks).

Indeed, Montalieu (2002) defines long-term repayment performance as a financial objective to be reached for the financial and institutional viability of the DFS. The author focuses his analysis on three categories of measurement variables that influence repayment performance: financial, social, and partnership. Thus, the financial measure of the long-term repayment performance of MFIs is expressed, on the one hand, by the amount of equity, outstanding savings, and microcredit available to the credit institution and, on the other hand, by indicators that make it possible to determine the decline in outstanding loans or unpaid loans. Social variables include the active population, gender, number of clients, GDP per capita, and number of service points (or geographical proximity). The partnership influence on repayment performance is measured by variables that reveal collaborative strategies between DFSs and commercial banks: refinancing, placement of funds, and subsidies with commercial banks.

Despite the development of DFS in Africa in recent years (with financial liberalization), the agricultural sector is often undermined. The financing of agriculture in Africa has become a concern and intensified, especially with the food crisis of 2008 (Zahoui & Roche, 2016). To demystify the problem of agricultural financing in Africa, the authors conducted a study on the "problem of credit repayment in decentralized financial systems: the case of loans to farmers in the southwestern part of the Ivory Coast." With a sample of 576 farmer clients, the studies concluded that credit repayment performance is explained by age, whether rubber or oil palm is the main crop, household size, the interest rate on credit, the form of loan, the purpose of credit, quality of the institution, the collateral used, the amount obtained and rank of credit. In contrast, the duration of the credit, the size of the main plot, distance, agricultural experience, access to other income, credit rationing, and education level did not significantly affect repayment performance.

In the Tunisian context, Elloumi & Kammoun (2013), through a binary logistic regression, have shown that variables related to the characteristics of the loan (amount of credit and the borrower's experience with the DFS)

²BCEAO (2021) Situation of microfinance in WAMU as of December 31, 2020.

affect the repayment rate. The amount of credit increases the probability of default. On the other hand, the risk of default decreases when the borrower's experience with the DFS increases. In addition, a relationship between the sector of activity and late payment was not verified. The variables relating to the borrower's characteristics, age, education level, and family situation seem to affect the relationship between default risk and the amount of credit. The impact of the amount of credit on default decreases as age and education level increase. This effect is stronger for married people than for single people. With regard to gender, the effect of maturity on default risk is not the same for male and female borrowers. It was found that men have lower repayment rates as maturity increases than women.

Finally, in Togo, Hudon & Ouro-Koura (2006) have shown that even if group lending is a guarantee of repayment, individual lending is not as timely; on the other hand, the proximity of the borrower to the institution favors repayment, whereas loans for handicraft or motorbike taxi purposes disadvantage it.

Currently, DFSs have developed strategies to minimize transaction costs and risks related to microcredit (Mayoukou, 2007; Montalieu, 2002, Godquin, 2006). In order to grant or not grant credit, certain factors are generally taken into account by the DFS to minimize the risks of non-repayment (Honlonkou & al., 2006). For us, these are not only factors related to the borrowers (age, gender, and residential proximity), those related to the institution (the amount of credit) but also the characteristics of the credit (the activity financed). The present study attempts to determine the effects of these criteria on the repayment performance of borrowers in Togo.

3. Methodology

All research aims to contribute either to controlling a real phenomenon or understanding or predicting it (Pras & Summers, 1978). The choice of sampling, the definition of variables, and the statistical tool are presented in this section.

3.1. Sample Selection and Data Collection

The base of two³ SFDs was used and concerned a sample of 157 borrowers who had taken out credit at least twice in a row in the last three years before 2022 and who had repaid it or not. This choice is justified because borrowers with a good repayment history for the first loan have easy access to the next and more important one (Zahuoi & Roche, 2016). The loans in question are

individual loans (granted to either men or women) because we agree with Cull & al. (2007) that DFS that individual grant loans are more profitable and sustainable. Data is collected from company records and the credit database. Interviews provide additional data with each facility's sales agents and the credit manager.

3.2. Description of Variables

3.2.1. Explained Variable

Reimbursement rate (**RR**) is a qualitative and binary variable that takes the value 1= actual reimbursement, 0= if not.

3.2.2. Explanatory Variables

Gender of the borrower (**GENDER**): Repayment performance may vary depending on whether the borrower is male (1) or female (0). Thus, the influence of gender is included in our model as it may well be a determinant of loan repayment rates in decentralized financial systems (Nanayakkara and Stewart (2015).

Borrower's activity or occupation (**ACTIV**): Given the trend in the Togolese economy, two sectors of activity (trade and service) predominate⁴. Thus, the trader borrower (value =1) will have a periodic (daily) cash flow and will be able to demonstrate good repayment more than the service provider (value=0), who will not always have this opportunity.

Age of the borrower (**AGE**): at the time of the loan release, it is expressed in the number of years. Although the expected effect of this variable on repayment performance is not always known (Godquin, 2004), the individual acquires more education, skill, experience, and maturity with age. It is, therefore, logical to assume that experience works in the borrower's favor and to expect a lower repayment rate for younger borrowers.

Credit amount (**MCRED**): This variable can have two possible effects on repayment performance (Zahuoi & Roche, 2016). On the one hand, a high credit amount can lead the beneficiary to hide the results of the project and not repay (Ahlin & Townsend, 2007); on the other hand, low credit amounts are generally requested by the poorest with a very low return and an insufficient repayment rate on these credits. Depending on whether it is the first or the second effect that predominates, the variable can have a negative or positive impact on repayment performance.

The number of kilometers between the client's home and the institution's office (**DIST**): The proximity of the borrower may give him/her a boost in the willingness to repay as the institution will find it easier to pursue the credit. Conversely, the borrower's distance from the institution could negatively affect timely repayment (Honlonkou et al., 2006).

³The first two SFDs according to the ranking (in terms of outstanding loans) of the APSFD-Togo (2022) (Professional Association of Decentralized Financial Systems) of Togo, a structure for the supervision and promotion of the microfinance sector that groups together the Decentralized Financial Systems (SFDs) approved by the Ministry of the Economy and Finance (MEF)

⁴ Data from studies by the Togolese office of recipe (OTR, 2020)

3.3. Empirical Model

The Logit model was estimated to identify the determinants of the reimbursement rate (Variable to be explained), a qualitative variable. The estimated theoretical model is:

$$TR = c + \sum_{i=0}^n C_i X_i + \mu$$

RR = Reimbursement rate; *i* = index of the explanatory variable, *n* = number of explanatory variables, *X_i* = explanatory variable *i*, *C_i* = parameters, *μ*= error term and *c* = constant term.

This choice is justified by the binary character of the dependent variable, whereas the explanatory variables are continuous or binary. Godquin (2006) also used this econometric method to analyze repayment performance. The empirical model is:

$$TR = c + c_1 SEXE + c_2 ACTIV + c_3 AGE + c_4 MCRED + c_5 DIST + \mu$$

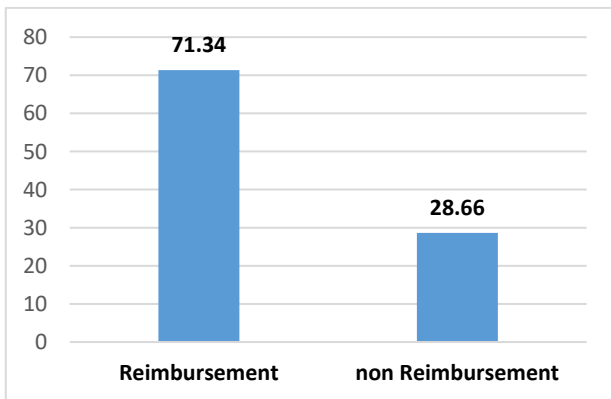
4. Results: Analysis and Interpretation

The main purpose is to present, analyze and interpret our study's various descriptive and empirical results.

4.1. Descriptive Results

To better identify the determinants of the loan repayment rate, the characteristics of the clients in our sample are outlined.

The results of the repayment of credits are presented in graph 1 below:

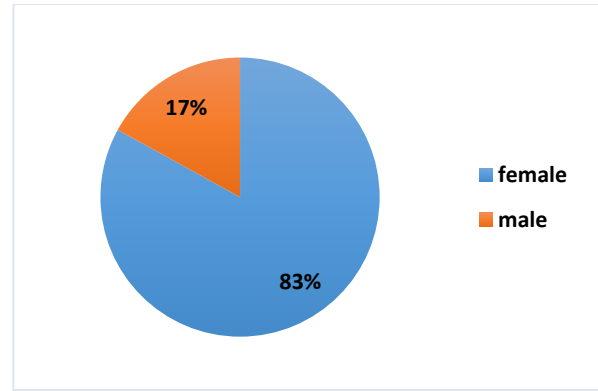


Source: Author (2022)

Graph 1. Percentage of Reimbursement

The graph above shows that 71.34% of the clients in our sample have made an effective repayment compared to 28.66% who are in arrears.

We highlight the gender (male or female) of the borrowers in the sample through the following graph 2:

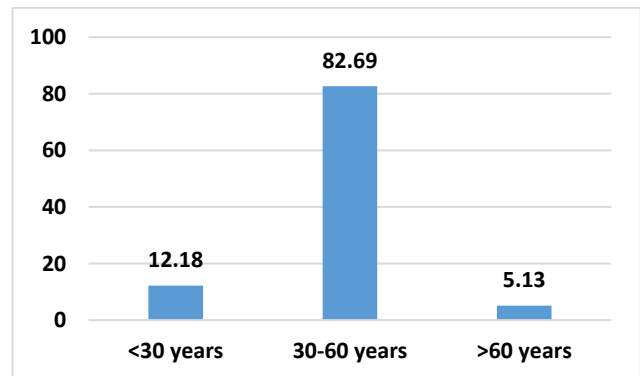


Source: Author (2022)

Graph 2. Borrowers by Gender

The microfinance sector has a majority of female clients (83%) compared to 17% of male clients in our sample (graph above). It could be explained by the fact that women are the ones who undertake most of the income-generating microenterprises for family needs. Thus, they resort to the DFS to take out credit to maintain their activity.

The third characteristic is the age of the borrowers, the results of which are shown in the following graph 3:



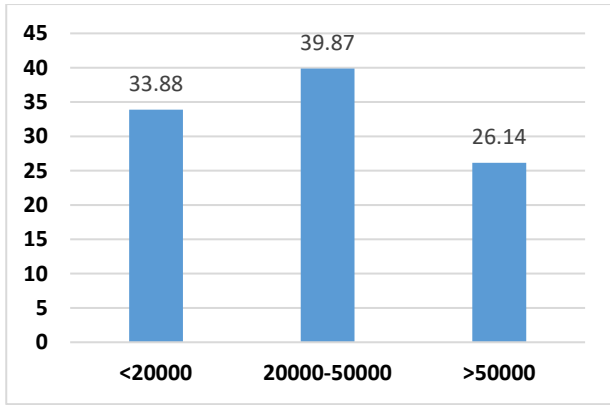
Source: Author (2022)

Graph 3. Borrowers by age

Chart 3 shows a high density in the 30 to 60 age group (82.69%). Older people (over 60) are much less represented (5.13%) than younger people under 30, who represent 12.18% of borrowers. These results could be explained by the fact that from the age of 30⁵, an age that can be qualified as maturity, young people who have finished their studies start to become entrepreneurs to be able to take care of the family. These young people turn to the SFDs for a start-up fund.

Since the SFDs are the bank of the poor, it seems interesting to us to analyze the amount of money this segment of the population requests about the means at their disposal.

⁵ After several years of searching for work without success.



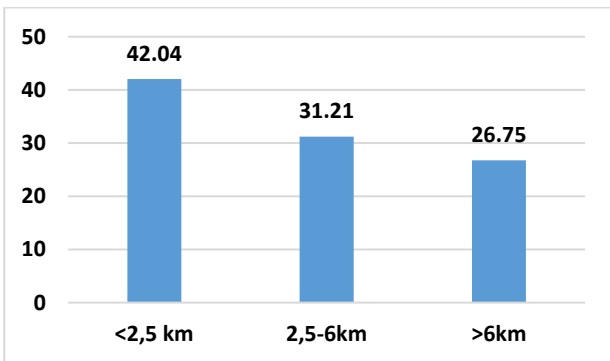
Source: Author (2022)

Graph 4. Amount of credit granted

On analysis of the above graph, the major part (39.87%) of the amount of credit granted ranges from 20,000 FCFA to 50,000 FCFA. Borrowers who receive a credit of more than CFAF 50,000 represent 26.14% against 33.88% of those who have less than CFAF 20,000.

The generally low amount of credit that the SFDs grant to clients intrinsically describes the low standard of living of this segment of the population, which only needs a minimum to undertake and maintain its activity.

By highlighting the distance between the borrowers' residence and the institution, we obtain the results of the following graph 4:



Source: Author (2022).

In view of the analysis in Graph 4, 42.04% of the borrowers have their home within 2.5 km (close proximity), and 31.21% have it more than 2.5 km and less than 6 km away. Only 26.75% live more than 6 km from the institution. These results can be explained by the fact that the borrower who is closer to the institution feels obliged to honor his commitment to gain its trust. An analysis of the activity carried out by the clients reveals the results in Table 1:

The analysis of the results in Table 1 shows that the majority of borrowers (64.15%) are engaged in trade and 35.85% in services. The modest start-up funds that

commercial entrepreneurship would require would explain this trend.

Table 1. Borrowers by type of activity

Borrower activity	Workforce	Percentage
Trade	101	64,33
Service	56	35,67
Total	157	100

Source: Author (2022)

4.2. Econometric Results

To show the impact of each variable on credit repayment in a multiple analysis, we first check the validity of our model through the goodness-of-fit test and the ROC curve of the estimated Logit model.

4.2.1. Validity of the Model

Goodness of fit test of the model: Pearson's test. The results of the goodness-of-fit test of the model are shown in Table 2 below.

Table 2. Pearson goodness-of-fit test

Number of observations	157
Number of covariates Pearson Chi2 (895)	149
Prob > chi2	198.82**
	0.0014

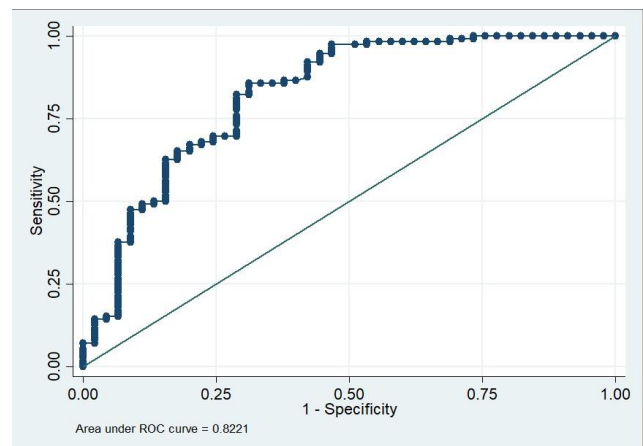
** 5% significance level

Source: Author (2022).

The test reveals that the number of observations (157) is greater than the number of covariates (149). It means that the model has a good quality fit. This is confirmed by the chi2 value (198.82) which is significant at the 5% level (prob > chi2 = 0.0014).

- Model specificity test (the ROC curve).

The results of the model specificity test are summarized in Figure 5 below:



Source: Author (2022).

Fig. 6 ROC curve of the estimated Logit model

The area under the ROC curve is estimated at 0.8221 (close to 1). The discrimination is considered exceptional with high predictive power. It reflects the ability of the model to differentiate between high and low-risk borrowers.

4.2.2. Estimation of the Model

Considering the validity tests carried out above, the Logit model is adequate for estimating the parameters. The coefficients of this model are used to define the variables' significance and expected signs. The interpretation in terms of probability is done by estimating the marginal effects. The analyses of the coefficients and marginal effects of the Logit model regression gave the results in Table 3 below.

Table 3. Estimated coefficients and marginal effects of the Logit model (Annexes)

Variables	Coefficients	Marginal effects
Gender	-1.620 (-2.86) ***	-0.2270482
Activity	0.296 (0.06)	0.004143
Age	0.064 (2.60) ***	0.0089488
Log (MCRED)	-1.227 (-3.15) ***	-0.1719182
Distance	0.389 (3.58) ***	0.0546501
Constant	10.253 (2.52) **	
Observation	157	157

*** Significant at the 1% threshold; ** at the 5% threshold

Source: Author (2022)

Five variables were identified that could influence the loan repayment rate in the DFS in Togo. According to the test results, the loan repayment rate is statistically and significantly explained by gender, age, loan amount, and the distance between the borrower and the institution. In contrast, the activity carried out by the borrower does not significantly influence the loan repayment.

Gender variable: the coefficient is significant and negative (-1.620***). Depending on whether one goes from female to male, the probability of repayment of the loan drops by 22.7% at a significance level of 1%. In other words, women's repayment rate is higher than men's. These results can be explained by the discipline of women in the face of the expectations of the SFD (Montalieu, 2002) and that they make the maximum effort to be faithful to their institution so that the latter starts by trusting them⁶. These results confirm those found in Malaysia (Mokhtar & al., 2012) and Sri Lanka (Nanayakkara & Stewart, 2015),... which find that women have better credit repayment rates than men. However, our results do not align with some studies, such as Holonkou & al. (2001), who showed the positive effect of the male gender on repayment, i.e., men repay better than women.

Our results reveal statistically that the borrower's age positively influences (0.064***) the loan repayment. The increase in age by one unit favors repayment by 0.89% at a significance level of 1%. This influence of age can be explained by the increased family responsibility, business experience, and maturity that the borrower acquires. These results support Honlonkou & al (2006) and Ndour (2011), who also find that older borrowers repay loans better than younger ones. But they are contrary to the work of Godquin (2006). Indeed, Godquin, in his study on rural finance in Bangladesh, shows that older borrowers are less committed to maintaining their relationship with DFS.

The activity variable "ACTIV" coefficient is not significant (0.296^{ns}). The activity financed by the DFS does not significantly influence the repayment of the loan. However, it was found that borrowers who engage in commercial activities have a 0.4% higher probability of repayment than a service provider borrower. It was confirmed by the studies of Hudon & Ouro-Koura (2006). They opt for financing commercial activities as they conclude that they provide a better repayment rate and favor a rapid capital turnover. But Roslan & Karim (2009) showed that service-providing companies offer a better credit repayment score.

The amount of credit (MCRED) is associated with a significant negative coefficient. This negative sign is logical because a high credit amount extends over a relatively long period with a high probability of occurrence of unforeseen events. These results can also be explained by moral hazard (Coming, 2000), for which large credits are perhaps allocated to objects other than those provided for in the contract (inadequacy of the amount of credit to needs), which explains their difficulties in being repaid. These conclusions are in line with those of Sharma & Zeller (1997), Godquin (2006), and Elloumi & Kammoun (2013), who have shown that a high credit amount increases the probability of default.

The coefficient associated with the distance in kilometers separating the borrower's residence from the facility is significantly and positively (0.389 ***) correlated with the probability of loan repayment. We note that, at the 1% threshold, an increase of one kilometer in this distance increases the probability of repayment by 5.46%. These results, against all expectations⁷, can be explained by the fact that a distant borrower is more closely monitored and controlled with rigorous pressure than a closer borrower with whom the institution creates proximity and familiarity by exerting less pressure. Our results partly confirm those of Honlonkou & al (2001), who have the same results but for men. However, they are opposed to those of Hudon & Oura-Koura (2006), who found a positive effect of the borrower's proximity on credit repayment.

⁶ Women did not enjoy the same level of trust in DFS as men.

⁷ This is because the supervisory capacities of the fund collectors are greater when the borrower's residence is closer.

5. Conclusion

As the "bank of the poor," as they may be called, DFSs have carved out an important place in the world of finance. In developing economies, they play an important role in poverty reduction. To continue their mission, they need to be sustainable. But this sustainability is only possible if the loans they grant are repaid. Unfortunately, in practice, the problem of credit repayment is still very much present in DFSs, thus weakening their operating system. This paper aims to identify the predictive characteristics of loan repayment by borrowers in these institutions. The results show that repayment performance in Togo is positively related to the age of the borrower (older borrowers repay better than younger ones) and the distance in kilometers from the borrower's residence to the

institution (borrowers near the institution do not repay better) and negatively related to the gender (women repay better than men) of the borrower and the amount of credit the borrower received. The credit repayment score does not depend on the activity that the borrower has undertaken or wants to undertake, but DFSs should finance more commercial activities as they favor a rapid turnover of capital

Finally, despite the results found, this article could not specify the level at which the positive or negative effect of the variables on the repayment of loans fades and integrate the social variables (social status, number of children, etc.) in the estimated model.

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Annexes

Annex 1: Estimation of the coefficients of the logit model

Iteration 0: log likelihood = -94.058906
 Iteration 1: log likelihood = -69.910493
 Iteration 2: log likelihood = -68.341602
 Iteration 3: log likelihood = -68.329998
 Iteration 4: log likelihood = -68.329993

Logistic regression	Number of obs = 157	LR chi2(5) = 51.46	
		Prob > chi2 = 0.0000	
Log likelihood = -68.329993	Pseudo R2 = 0.2735		

Trem coef.	Std. Err.	z	p> z	[95% Conf. Interval]
Sexe	-1.620243	.5673969	-2.86	0.004 -2.73232 -.5081652
Activ	.0295649	.4933666	0.06	0.952 -.9374159 .9965458
Age	.06386	.0245783	2.60	0.009 .0156874 .1120327
logMcr	-1.226829	.3890376	-3.15	0.002 -1.989328 -.4643291
distance	.3899897	.108904	3.58	0.000 .1765418 .6034376
_cons	10.25255	4.076549	2.52	0.012 2.262663 18.24244

Annex 2: Estimation of marginal effects of the logit model

Average marginal effects Number of obs = 157
 Model VCE: OIM

Expression : Pr(Trem), predict()
 Dy/dx w.r.t. : Sexe Activ Age logMcr distance

Delta-method					
dy/dx	Std. Err.	z	p> z	[95% Conf. Interval]	
Sexe	-.2270482	.0717833	-3.16	0.002	-.3677408 -.0863556
Activ	.004143	.0691388	0.06	0.952	-.1313666 .1396525
Age	.0089488	.0031915	2.80	0.005	.0026937 .015204
logMcr	-.1719182	.0488421	-3.52	0.000	-.2676471 -.0761894
distance	.0546501	.0132281	4.13	0.000	.0287234 .0805768
