

## **Determinants of credit default in Burundian Microfinance Institutions**

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**Summary:** *In recent years, the microfinance sector in Burundi has experienced a financial underperformance linked to the low loan repayment rate. This was materialized by the closure of some microfinance institutions by the Central Bank (Bank of the Republic of Burundi). This article aims at studying the determinants of the default rate in microfinance institutions in Burundi. Based on a logistic regression on data collected from clients of Burundian microfinance institutions, the analysis shows that the rate of default may be due either to factors related to borrowers such as level of study, sector of activity, poor management of the microenterprise, bad faith of the borrower, or to the institution as the type of guarantee required, lack of follow-up, interest rate, the distance of the institution from its customers. Thus the knowledge of sources of unpaid debts for the leaders of microfinance institutions allows them to establish sound direction and management policies in order to ensure the financial performance of their institutions. This monitoring will have as a corollary, positive effects on financial inclusion in Burundi.*

**Keywords:** *Microenterprises, default rate, MFI, microentrepreneurship, Burundi.*

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### **I. Introduction**

The experience of microfinance institutions (MFIs) in Burundi began with the first cooperatives (COOPECs) in the Mirwa region in the years 1984. Other experiences of MFIs emerged later and especially from the years 1993. So from about five MFIs before 1993, we recorded more than twenty after this period [1].

But the remarkable increase in MFIs was noted especially after 2006 with the adoption of a law regulating the microfinance sector (MF).

All these MFIs are characterized by a growing offer of financial services (savings and credits) and some non-financial services such as training, support for beneficiaries of microcredits.

Currently, the MF sector has 39 MFIs with more than 350 service points throughout the territory.

In addition to this growth, there is also a diversity of MFIs in Burundi. Indeed, according to the decree on microfinance of 2006, MFIs are classified into three categories, namely cooperatives or mutuals which constitute the first category, public limited companies which form the second category and microcredit projects or programs which make up the last category [2].

According to this same law, only the MFIs of the first category are authorized to collect the savings of its members.

According to data from the Bank of the Republic of Burundi, all these MFIs do not have the same weight on the financial market. For example, public limited companies occupied 53.85% of the microfinance market in 2016 and collected 15,779.5 million francs bu. During this same period, the supply of credit was dominated by cooperatives, which occupied only 43.59% with 117,380 million in savings. Programs and projects with a microfinance component (NGO) for their part occupied only a very small market share at all levels (2.56%). All these MFIs have enabled a growing number of the population that was once excluded to access financial services. For example, from 536,741 members and/or clients in 2012, this number was 728,155 in 2015. Similarly, from 143,541 active borrowers of MFIs at the end of 2012, this number was 200,638 at the end of 2015 [3].

Despite these interesting figures of the beneficiaries of ever-increasing microfinance services, we have noted the withdrawal of authorization for 5 MFIs in recent months. Thus, the social, economic and financial weight represented by microfinance in Burundi and the considerable progress it has made in recent years, as well as the withdrawal of authorization to operate from certain MFIs, justify the interest of reflections on the mechanisms of the management of credit portfolios within these institutions.

This shows that the effective management of a portfolio in a financial institution must be carried out jointly by both the lending institution and the customers.

From the above, this article aims to study the issue of credit portfolio management of MFIs in Burundi from a sample of MFI clients in Burundi. In other words, what are the causes of non-payment in Burundian MFIs? It is then a question of identifying the effects of the behavior of each of these two actors on the risk of loan repayment in Burundian microfinance institutions.

Thus, this article is structured in four sections. The first section shows the theoretical foundations of portfolio management in financial institutions. The second section presents the methodology used for the loan repayment risk analysis in microfinance institutions in Burundi. The third section analyzes the determinants of non-repayment of loans in Burundian MFIs. The fourth section concludes by formulating economic policy recommendations to improve the portfolio management system in Burundian MFIs.

## **II. Literature review on credit repayment performance**

### **1.1. Theoretical review.**

The risk of non-repayment in financial institutions is explained by the asymmetry of information. It takes the form of moral hazard and adverse selection between the lender and the borrower. This situation is due to the hidden actions available to the borrower and which he is not required to reveal to his creditor when applying for credit [4] [5]. For this, we can say that the effective management of credits in a lending institution would be the result not only of the institution but also of its customers. Indeed, studies on the risks of credit for self-employed workers in the case of Canada reveal that the granting of credit must comply with certain conditions. These include, for example, the character, capital capacity, market conditions and the presence of collateral [6]. According to these authors, these conditions make it possible to ensure the ability to repay loans in order to reduce default.

In the Cameroonian case, the analyzes show that certain factors of non-reimbursement of loans are linked to the lending institution, others are inherent to the customers [7]. Among the factors related to the institution, the authors mention the procedures for releasing funds, the frequency of customer follow-up, the nature of the guarantees required, the amount of credit. As for the factors related to the borrowers, the authors mention the customer's experience in conducting the business, the gender, the sector in which the financed activity evolves. By focusing on the determinants of credit risk in banks, other works claim that the lending technique used by the lending institution, the economic environment of the country would explain the level of performance of banks [8].

Thus, in the case of Benin, the rate of defaults in microfinance institutions is explained by the inherent characteristics of microenterprises [9]. For this author, it is the high degree of informality that is the cause of the default rate.

It means that this degree of informality is materialized by the poor quality of the guarantees presented when applying for credit, the low rate of return of microenterprises, the absence of movements on the accounts of microentrepreneurs, the low deposit of these, the very high social character for microentrepreneurs. It is in this context, it is desirable to replace collateral with joint surety and to further develop local services [9].

Along the same lines, [10] looked at repayment factors for smallholder farmers in Habru district, Ethiopia. They conclude that the age of the borrower, the size of the household, the level of education, the area of cultivated land, the purpose of the credit, the distance to be traveled by the client, the training received before obtaining the credit on its use would positively influence the rate of credit repayment.

### **1.2. Empirical review**

Empirical work collaborates with theoretical results. Indeed, [11] questioned the loan repayment factors for small and medium enterprises in the Kenyan case. They conclude that the level of analysis of the credit file, the analysis of the financial statements of the microenterprise improves the level of reimbursement.

By studying the factors influencing the level of repayment in Bangladeshi commercial banks, [12] found that the socioeconomic factors of borrowers have effects on the rate of repayment. The authors conclude their analysis by saying that the age of the client, his level of education, his experience in the business have a positive effect while the type of business, the structure of the capital, the existence of the debt have negative effects on the reimbursement rate.

These results agree with those of [13] in the Kenyan case. Indeed, these authors were interested in the factors of the lender that influence the default in the region of Kitui. They conclude that the structure of the interest rate, the mode of repayment have positive effects on the default. For example, the authors find that the high interest rate, the credit granting procedures lead to the high default rate.

[14] finds in the case of Kenya that institutional factors, credit characteristics as well as those of the borrower have positive effects on the repayment rate. This is the case of the time between the moment of filing the credit file and the release of funds.

### **III. Tools for analyzing the risk of non-repayment in MFIs.**

#### **2.1: Data**

The data that was used in this research are primary data. They were collected from borrowers of Burundian microfinance institutions using a questionnaire.

The questionnaire included questions on the identification of the borrower. Those relating to client behavior and which could have an impact on the level of reimbursement and those relating to microfinance institutions. These data were collected from MFIs in the regions of Cibitoke, Bujumbura, Ngozi and Gitega.

As the parent population of borrowers was not known in advance, the sample size was determined by applying the formula of [15].

This formula is as follows:

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$$n = \frac{t^2 * p * (1-p)}{e^2}$$

with:

n: sample size

t: confidence level. It is equal to 1.96 for a confidence interval of 95%

p: it is the proportion of individuals who present the studied trait

e: margin of error

By taking p=0.5 and e=0.06, we have:

$$n = \frac{1.96^2 * 0.5 * (1 - 0.5)}{0.069^2} = 201,72 \text{ soit } 202 \text{ peoples.}$$

#### **2.2: Model**

Due to the dichotomous nature of the variable to be explained (here difficulty of reimbursement) we estimated the logit model [16]. This model is not only flexible and easy to use from a mathematical point of view, but also gives a meaningful interpretation of the results. The model assumes that the distribution of the error term follows a logistic law. We then have the following general model:

$$\text{We have: } Y_i^* = \beta_0 + \sum_{i=1}^k \beta_i X_i + \varepsilon_i \quad (1)$$

where the variable  $Y^*$  which represents the default rate in microfinance institutions.

$X_i$ , matrix of explanatory variables.

$\beta_i$  being a vector of k parameters or unknown coefficients.

$\varepsilon_i$  is the error term associated with  $i^{\text{me}}$  observation when  $y_i$  takes the value  $i$ . It is assumed to be normally distributed with constant variance.

This model also made it possible to calculate the probability that there is an outstanding payment in the MFI given a certain number of characteristics linked either to the institution or to the borrower.

The logit model depends on the assumption of the logistic distribution of the error term in equation (1). Its cumulative probability function (Distribution Function) is given by:

$$P_i = F(Z_i) = F\left(\theta + \sum_{i=1}^n \beta_i X_i\right) = \frac{1}{1 + e^{-Z_i}} \quad (2)$$

$P_i$  is the probability that a microentrepreneur obtains credit and repays it normally, given his characteristics or those of his institution  $X_i$ .  $\theta$  and  $\beta$  are parameters to be estimated.

The probability that a borrower will resort to other sources of financing is given by  $(1 - P_i)$ . After mathematical manipulations the equation (2) becomes:

$$(1 - P_i) = \frac{1}{1 + e^{Z_i}}$$

Or  $\frac{P_i}{1 - P_i} = \frac{1 + e^{Z_i}}{1 + e^{-Z_i}} = e^{Z_i}$  is also the probability of obtaining a loan requested from an MFI. By taking the logarithm of this ratio according to [17], we have:

$$Z_i = \ln\left(\frac{P_i}{1 - P_i}\right) = \theta + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n \quad (3)$$

Given the error term in the probability estimate, equation (3) becomes:

$$Z_i = \ln\left(\frac{P_i}{1 - P_i}\right) = \theta + \sum_{i=1}^n \beta_i X_i + \varepsilon_i \quad (4)$$

The coefficients of the logit model therefore present the variation of the logarithm of the ratio of the share of force of each variable associated with a variation of the explanatory variables.

#### **IV. Analysis of the determinants of credit defaults in Burundian MFIs.**

##### **3.1. Descriptive statistics**

The explanatory variables concern both the factors related to the borrowers or those of the lending institution when applying for credit. Using stata 16, the descriptive statistics of all the variables that have been retained in the econometric model are recorded in Annex 1. The variables retained in the model correctly predict the rate of defaults in Burundian MFIs at 85.27% (appendix 2). Thus, the variables chosen correctly explain the rate of non-repayment of loans in microfinance institutions in Burundi (83.49%). The econometric results on the determinants of defaults in MFIs in Burundi can be found in Appendix 3 and those on the marginal effects in the eighth column of Appendix 3.

#### **V. Discussion of results**

##### **3.2.1. Borrower factors**

The econometric analysis shows that the main determinants of default rates at the level of borrowers are the level of study, the sector of activity of the microenterprise, the distance which separates it from its lending institution, the poor management of the microenterprise, bad faith as well as misappropriation of the credit purpose. Indeed, microentrepreneurs who have no level of training have more repayment difficulties (0.35%) than those who have the primary level (0.18%).

These results agree with those of [18] in the case of Benin. This preliminary study has as a corollary, the financing of potentially profitable projects.

For [19], the more the level of training of the borrower increases, the more it acquires capacity, skills and abilities such as "access to information, the level of negotiation". These are essential in the conduct and success of a business.

This shows that the association of non-financial services with financial services for the benefit of borrowers will increase their entrepreneurial and managerial capacity. This, in turn, will enable them to improve the performance of their microenterprises. We can say that the high level of education of borrowers allows them to conduct an in-depth market study of the goods and services they produce in order to identify all the difficulties related to their profitability.

Similarly, the sector of activity in which the microenterprise operates is a determinant of the reimbursement rate. Indeed, the default rate is higher when the borrower invests in pastoral activities (0.04%) than in agricultural ones (0.02%). The trade and service sector has a weak effect on the default rate. This may reflect the effects of the guarantee fund policy for agricultural activities initiated by the Burundian state and managed by the rural microcredit fund (FMCR).

We believe that this default rate can be reduced by setting up a communication mechanism more suited to the characteristics of these microentrepreneurs.

It is in this sense that, based on a study conducted in Lebanon, [20] affirm that the establishment of a guarantee system associated with communication tools makes it possible to offer financial services to microentrepreneurs regardless of its sector of activity.

### **3.2.2. Institutional factors**

The main factors explaining the default rate on the supply side relate to the organizational system of the lending institution [21]. The main factors are the type of guarantee required by the lending institution, the delay in the release of credit, the duration of the credit, the lack of follow-up, the interest rate, the distance of the institution from its customers. Indeed, when the guarantees required when applying for a loan are more rigid, this increases the risk of default by 0.3%.

This is explained by the fact that the deposit of a guarantee to obtain a loan is a necessary but not sufficient condition [22]. Indeed, borrowing companies can form a more complex network even after obtaining a loan and whose control would escape the lenders. In order to reduce this risk of default, lending institutions must design a dynamic prediction framework capable of preserving the time-consuming and complex networks that companies might build. Likewise, they can use a recursive and firm mechanism capable of capturing any hidden behavior and network-related information [23].

Similarly, the lack of follow-up after the release of credit has negative effects on the repayment rate. Indeed, when the lender does not provide regular monitoring, this leads to a default rate of 0.23%. This reflects the need for lending institutions to initiate after-credit services or a framework allowing them to be closer to their customers in order to ensure regular monitoring of borrowers. Thus, when the lending institution is far from its customers, this increases the risk of default by 0.06%. This is because the lending institution or its debtor operates in a more complex environment. This clearly shows that there are other factors such as non-performing assets, market volatility that can be a source of default [24][25].

### **3.2.3. External factors**

Among the external factors, we can mention the floods and the covid-19 pandemic. With regard to floods, the econometric analysis shows that the presence of floods leads to the risk of non-repayment of loans by 0.27%. This is because such bad weather increases the economic risk and socio-economic vulnerability of borrowers in the affected region [26]. This shows the absence of insurance measures in the institutions lending small amounts of credit.

With regard to covid-19, it has had impacts on financial stability in general [27] and its effects on the repayment rate depend on the type of company that took out the loan. Indeed, non-financial companies or those that need cash would be more vulnerable than those with investment needs [28].

Although the effects of covid-19 have been noted on financial stability in general in Burundi, the econometric results reveal that covid-19 has had weak effects on the risk of non-repayment of loans in lending institutions in Burundi. (-0.14%). This can be explained by response measures that have been adopted by the authorities of the Burundian financial sector, among which we can mention the free transactions carried out via the mobile phone whose amount does not exceed 50,000 BIF- Beyond this amount, it was a question of reducing the invoicing of transactions up to 50% of the initial tariffs, free payment of water and electricity bills, via the mobile phone for the amount lower than 200,000 BIF, free transfers of bank accounts to e-money accounts and vice versa, regular hand washing especially in public places and relaxation of the conditions for opening e-money accounts[29][30].

## **VI. Conclusion.**

This article aimed to identify the determinants of the default rate in Burundian MFIs. The econometric results highlighted three types of factors likely to influence the default rate. Some are due to the behavior of the borrowers, others are linked to the lending institutions, and still others are linked neither to the

creditors nor to the borrowers. These results then made it possible to formulate economic policies with a view to reducing the rate of defaults in lending institutions. We can say that the knowledge of sources of unpaid debts for the leaders of microfinance institutions allows them to establish sound direction and management policies in order to ensure the financial performance of their institutions. This monitoring will have as a corollary, positive effects on financial inclusion in Burundi.

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Appendix 1: Descriptive statistics

variable	Obs	Mean	Std,Dev
cred_autrif	212	0,3254	0,4696
mauv_gese	212	0,4575	0,4993
deour_cred	212	0,5849	0,4939
mauv_foict	212	0,6886	0,4641
eloig_if	212	0,3820	0,4870
retar_deblo	212	0,4716	0,5003
insu_suict	212	0,5	0,5011
dos_maletu	212	0,5330	0,5008
tx_inter	212	0,5	0,5011
mont_crdev	212	0,5283	0,5003
gar_moinri	212	0,1132	0,3175
gar_plurig	212	0,3160	0,4660
absen_suivi	212	0,4103	0,4930
dure_crd	212	0,6037	0,4902
inondatio	212	0,7264	0,4468
covid_19	212	0,8584	0,3493
celib_tair	212	0,3254	0,4696
fem_e	212	0,4811	0,5008
sans	212	0,1273	0,3341
primai_re	212	0,2783	0,4492
second_re	212	0,3820	0,4870
com_ce	212	0,5141	0,5009
ele_g	212	0,2688	0,4444
agricu_r	212	0,2735	0,4468
serv_c	212	0,0377	0,1910

Appendix 2: Quality of the model

logistic model for dift_rembour			
Valeurs classées	D	~D	Total
+	110	19	129
-	16	67	83
Total	126	86	212
Sensibilité		Pr( +  D)	87,30%

Sensibilité		Pr( - ~D)	77,91%
Valeurs positives prédites		Pr( D  +)	85,27%
Valeurs négatives prédites		Pr(~D  -)	80,72%
Taux de prédiction de valeurs vraies		Pr( + ~D)	22,09%
Taux de prédiction de valeurs fausses		Pr( -  D)	12,70%
Taux des valeurs + dans le total +		Pr(~D  +)	14,73%
Taux des valeurs – dans le total -		Pr( D  -)	19,28%
Qualité du modèle			83,49%

Source: Author based on stata 16 based on 2022 survey data Robustness of the model

dift_rembour	Robust						dy/dx
	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]		
<b>cred_autrif</b>	<b>1.396139</b>	<b>.5502052</b>	<b>2.54</b>	<b>0.011</b>	<b>.317757</b>	<b>2.474522</b>	<b>.2522648</b>
mauv_geses	.5996332	.5376341	1.12	0.265	-.4541102	1.653377	.1209312
detour_cred	.7850682	.5568499	1.41	0.159	-.3063375	1.876474	.1639629
mauv_foicl	.1657022	.6673267	0.25	0.804	-1.142234	1.473638	.0343345
eloig_if	.3121451	.521726	0.60	0.550	-.710419	1.334709	.0627879
<b>retar_deblo</b>	<b>-1.095856</b>	<b>.4865562</b>	<b>-2.25</b>	<b>0.024</b>	<b>-2.049489</b>	<b>-.1422236</b>	<b>-.224333</b>
<b>insu_suivclt</b>	<b>1.146677</b>	<b>.552889</b>	<b>2.07</b>	<b>0.038</b>	<b>.0630346</b>	<b>2.23032</b>	<b>.2316225</b>
dos_maletu	-.1644472	.5902309	-0.28	0.781	-1.321278	.9923841	-.0335529
tx_inter	.3456613	.496279	0.70	0.486	-.6270277	1.31835	.0706286
mont_crdev	-.3071877	.5021142	-0.61	0.541	-1.291313	.676938	-.0625502
<b>gar_moinrig</b>	<b>-1.632135</b>	<b>.6850039</b>	<b>-2.38</b>	<b>0.017</b>	<b>-2.974718</b>	<b>-.2895515</b>	<b>-.3804417</b>
<b>gar_plurig</b>	<b>1.687529</b>	<b>.5850056</b>	<b>2.88</b>	<b>0.004</b>	<b>.5409394</b>	<b>2.834119</b>	<b>.2941898</b>
<b>absen_suivi</b>	<b>-1.488245</b>	<b>.5546186</b>	<b>-2.68</b>	<b>0.007</b>	<b>-2.575277</b>	<b>-.4012121</b>	<b>-.3124412</b>
<b>dure_crd</b>	<b>-1.279802</b>	<b>.551246</b>	<b>-2.32</b>	<b>0.020</b>	<b>-2.360224</b>	<b>-.1993796</b>	<b>-.2437897</b>
<b>inondatio</b>	<b>1.221913</b>	<b>.5412585</b>	<b>2.26</b>	<b>0.024</b>	<b>.1610659</b>	<b>2.28276</b>	<b>.2706537</b>
covid_19	-.8254364	.8854999	-0.93	0.351	-2.560984	.9101115	-.1460278
celib_tair	-.3787145	.4869873	-0.78	0.437	-1.333192	.575763	-.079488
fem_e	-.2238527	.4394637	-0.51	0.610	-1.085186	.6374802	-.0458518
<b>sans</b>	<b>3.266537</b>	<b>.960569</b>	<b>3.40</b>	<b>0.001</b>	<b>1.383857</b>	<b>5.149218</b>	<b>.3560423</b>
<b>primai_re</b>	<b>1.030595</b>	<b>.6191561</b>	<b>1.66</b>	<b>0.096</b>	<b>-.1829286</b>	<b>2.244119</b>	<b>.1883843</b>
second_re	.3305315	.6050999	0.55	0.585	-.8554426	1.516506	.0664162
com_ce	-.6901937	.8065829	-0.86	0.392	-2.271067	.8906797	-.1399748
ele_g	.235908	.7187632	0.33	0.743	-1.172842	1.644658	.0470985
agricu_r	.1103586	.7151089	0.15	0.877	-1.291229	1.511946	.0223305
serv_c	-1.91559	1.37935	-1.39	0.165	-4.619067	.7878858	-.4453032
cons	.1014385	1.332907	0.08	0.939	-2.51101	2.713888	

Source: Author based on stata 16 based on 2022 survey data