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The failure of farmers' organizations to repay microcredits granted by MFIs: Determining factors in the Cameroonian context

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The aim of this article is to analyze and identify the factors that explain the failure of farmers' organizations (FOs) to repay microcredits received from microfinance institutions (MFIs) to finance their projects. Default of a FO is observed when the monthly installment of a loan is partially reimbursed, reimbursed late, or not at all. Through the prism of agency theory, informational asymmetry, and contingency theories, it is postulated that FO failure may be due not only to the characteristics of the FO but also to credit conditions and the activity carried out. The analysis of logistic regression tests on data collected by questionnaire between July and December 2021 from a sample of 266 FOs yielded interesting results. Overall, these results show that FO characteristics (group homogeneity, solidarity between members), credit conditions (amount, repayment period), and FO activity (agricultural production, marketing, pest attacks) significantly explain FO loan repayment defaults. In light of these results, recommendations have been formulated for FOs and MFIs to reduce FO default rates and, indirectly, MFI bankruptcy rates.

Key words: Farmers' organizations, microfinance institutions (MFIs), non-repayment, agricultural financing, contingency theory, information asymmetry theory.

INTRODUCTION

Agricultural development is one of the levers on which developing countries are acting to end extreme poverty and strengthen wealth sharing (Beckman and Countryman, 2021). In 2018, agriculture accounted for 4% of global gross domestic product (GDP) and can exceed 25% in some developing countries. In Cameroon, agriculture is the main source of growth. Its contribution to GDP in 2020 was around 17.38% (Abia et al., 2016). The sector employs nearly 62% of the working population, including 48.8% of the rural population. In the wake of the collapse of the state agricultural support

system, the number of farmers' organizations (henceforth FOs) in sub-Saharan Africa has been on the rise for several decades now (Mees et al., 2019). Farmers' organizations are understood here as groups of family farmers living in rural areas who have come together at the local level to achieve a common development goal.

For at least five decades, various agricultural policies implemented by the government of Cameroon have emphasized the promotion of farmers' organizations. According to Mewouth Thang (2021), these policies are based on the assumption that FOs will enable producers

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to find collective solutions to problems to which individual farmers are unable to find sustainable solutions to improve their production, processing, marketing, or representation activities. Despite their contribution to economic growth and the promotion of agriculture and farmers, FOs face serious financing difficulties (Muluh et al., 2019; Mees et al., 2019), as too few farmers in southern countries have access to financial services tailored to their needs.

Total credit granted to operators in the agricultural sector in Cameroon was estimated at 313.6 billion FCFA, representing 14.9% of national bank credit for the 2015 financial year. While the share of bank credit granted to the country's agricultural sector is clearly on the rise, it has to be said that most of this financial support is directed towards agro-industries. However, 80% of rural farmers, whose national production is in the same proportion as that of the agro-industries that have benefited from credit, unfortunately often lack the guarantees required by the banks. This continues to make agriculture one of the poor cousins of bank financing in Cameroon. To overcome their financing difficulties or seize new opportunities, many FOs have sought financial support from microfinance institutions (henceforth MFIs), which are forms of savings and/or credit institutions created for poor populations with a view to ensuring their economic and social self-help, with or without technical and/or financial support from external partners (Doligez, 2013; Mees et al., 2019). However, this financial support for FOs exposes the MFIs to various risks, the most important of which is credit risk. This risk stems from the fact that some FOs that have requested and obtained financial support from MFIs may be unable to meet their commitments when they are due. This situation jeopardizes the activity of the MFIs or even their bankruptcy in the long term. For example, according to a report by Cameroon's Ministry of Finance (MINFI), the loss ratio of MFIs' loan portfolios is around 30%, with an acceptable level of 10%. MFIs in the third category have the highest rate of overdue loans (50%), followed by the second category (24.25%) and the first category (19.92%). As a result, the quality of the customer portfolio is constantly deteriorating in MFIs (Maichanou and Daouda, 2021; Tchakoute-Tchuigoua and Soumaré, 2019). These statistics do not highlight the share of overdue receivables in the agricultural sector. With this in mind, an exploratory survey of 12 rural MFIs was launched to determine whether loans to FOs were in arrears. Overall, the comments made by loan officers at the MFIs in the study area revealed a strong recurrence of FOs defaulting on their debt repayments.

To date, microfinance literature extols collective or group lending as an opportune strategy for collective borrowers to increase their chances of accessing credit in the absence of material collateral. For the MFI, lending to a group of people is a strategy for reducing asymmetrical information problems between the contracting parties,

thus guaranteeing a better loan repayment rate (Guérin, 2000). Despite these precautions, unpaid loans in this category persist in Cameroon's MFIs. The question at the heart of this study is: What factors explain FOs' failure to repay microcredits granted by MFIs in the Cameroonian context? In the literature on agricultural finance, several authors (Jumpah et al., 2018; Etukumoh and Akpaeti, 2015; Rathore et al., 2017; Qin et al., 2019) have highlighted a myriad of factors explaining the default of individual farmers on loan repayments, but determining the factors explaining the default of group farmers is still a poor relation in agricultural finance research. The aim of this study is therefore to analyze and identify the factors behind FOs' failure to repay loans granted by MFIs in Cameroon. A better understanding of these factors will undoubtedly make it possible to put in place measures to prevent default on the part of both FOs and MFIs. To achieve this objective, we will use data collected by questionnaire on a sample of FOs that have applied for and obtained financing from MFIs. The development of this article will be structured in three parts: the first circumscribes the theoretical aspects and the development of the hypotheses; the second presents the methodological aspects; and the third presents the results and the managerial implications they raise.

Theoretical framework and development of hypotheses

Farmers' interest in group organization

Faced with the structure and imperfections of the agricultural credit market, organizing into groups is of great interest both to farmers and to partners who have decided to provide their financial support to farmers in the context of bank credit rationing in agricultural settings (Rustinsyah, 2019). For farmers, organizing as a group first enables the FO to benefit from technical support from certain NGOs or to access MFI financing without material guarantees thanks to joint liability, which makes each member personally responsible and liable for the FO's entire outstanding balance (Geta and Hamiso, 2017). Secondly, organizing as a group makes it easier for group members to procure agricultural inputs (seeds, seedlings, and cuttings; water; fertilizers; and pesticides) and gather larger production volumes to reach wider markets. Farmers can then reduce their costs through economies of scale or synergy effects and improve their bargaining power. For MFIs, farmers organized in groups enable them first and foremost to solve the problems of adverse selection, moral hazard, and compliance with commitments to MFIs that are generally found in individual loans (Couchoro and Djahini-Afawoubo, 2022). With the aim of combating adverse selection, MFIs give borrowing farmers the latitude to form groups with individuals of their choice. Through this peer selection,

members will avoid associating with those whose risk profile they are unfamiliar with. This principle enables the formation of homogeneous groups in which all members are fully aware of their partners' risk and creditworthiness characteristics (Bernstein, 2017; Hoff and Stiglitz, 1990). With regard to the ex-ante moral hazard to which MFIs fall victim, peer monitoring can considerably reduce it. It regulates the behavior of players in credit groups. Indeed, the associated monitoring costs would be too high for a lending MFI to bear. To minimize these costs, the MFI leaves the monitoring to its peers, who are jointly and severally liable, as the credit will not be renewed to the group in the event of non-repayment. This is one of the pillars of group lending (Hill and Sarangi, 2012; Mokhtar et al., 2012). When it comes to meeting commitments, pressure is exerted by group members when an individual does not agree to pay his dues even though his project has recorded income. This peer pressure reduces the ex-post moral hazard and avoids the risk of the group being deprived of future credit (Zeller et al., 1998; Wenner, 1995). The significant reduction in these informational problems is effective thanks to each member's proximity to peers and joint responsibility (Abate et al., 2016).

Factors explaining FOs' default on loans granted by MFIs

Granting microloans to individual farmers or groups of farmers presents risks, the main one being counterparty default. This counterparty default, which indicates a future default by borrowers, very often manifests itself in the form of unpaid loans. According to Djoutsa Wamba et al. (2015), counterparty default occurs when a borrower is unable to settle its debt on time or fails to meet its obligations as stated in the loan contract. For the purposes of this study, borrower default is defined as partial repayment, late repayment, or non-payment. Despite the micro-insurance provided by joint liability loans, some FOs still default on repayment of their MFI debts. However, our study aims to determine the causes of this default. According to Mees et al. (2019), these causes may be inherent to FO characteristics, credit conditions, or the activity carried out by FOs.

Influence of FO characteristics

Based on findings from the literature, there exists a plethora of indicators used to assess a farmers' group (Tallam, 2018; Ma and Abdulai, 2016; Wossen et al., 2017). For the purposes of this article, we have selected group structure, group homogeneity, and intra-group solidarity. Group structure is determined by age and size. With regard to group size, as measured by the number of members, some previous studies have shown that the

number of group members has a positive influence on loan repayment performance (Sahan and Phimister, 2023), while others have shown no link (Hill and Sarangi, 2012; Wamba et al., 2015; Singh and Gupta, 2022). The results highlighted by Lanha (2006) are rather nuanced. According to this author, the repayment rate is positive for a small group (up to 3 people) and then becomes negative as this number increases. Based on the work of Sahan and Phimister (2023) and Lanha (2006), we propose to test the following hypothesis:

Hypothesis 1a: the larger the FO, the greater the likelihood of their defaulting on repayment of microcredits granted by MFIs.

What's more, existing empirical studies fail to reach a consensus on the effect of group age on the probability of insolvency. For Noglo and Androuais (2015) and Singh and Gupta (2022), greater group age would result in a lower probability of default, in contrast to Djoutsa Wamba et al. (2015), for whom an increase in group age significantly increases the default rate on group loans. Hill and Sarangi (2012) find no link between group age and delinquency. Focusing on the second group of authors, we propose the following hypothesis:

Hypothesis 1b: the longer the FO has been in existence, the greater the likelihood of their defaulting on repayment of microcredits granted by MFIs.

Drawing from the literature, group homogeneity, as reflected in social ties, plays a role in increasing social inequalities. This homogeneity is perceived through the intensity of social ties between group members. In the literature, several criteria have been used to characterize the ties between members of a group: gender, ethnicity or religion, occupation, and residential area. In the realm of studies analyzing the relationship between group homogeneity and repayment performance, Singh and Gupta (2022) find that group homogeneity is positively associated with repayment delay. Hill and Sarangi (2012), on the other hand, show that groups whose members share the same gender, ethnicity, or occupation repay better than those whose individuals differ in these characteristics. The study by Djoutsa Wamba et al. (2015) in the Cameroonian context identifies belonging to the same village or neighborhood as a variable that can significantly reduce default on group loans. According to Asgedom et al. (2015), groups with strong ties can lead to monitoring or strong pressure, resulting in a good level of repayment. Appropriating the findings of Hill and Sarangi (2012) and Djoutsa Wamba et al. (2015), we propose to test the following hypothesis:

Hypothesis 1c: The more homogeneous the group, the lower the probability of the FO defaulting on the repayment of microcredits granted by MFIs.

It may happen that a group member's project fails for exogenous reasons or for reasons beyond his or her control. Other members who have no repayment problems can assist him or her to avoid the collective failure of the group. This behavior, which demonstrates solidarity with the member in difficulty, ensures timely repayment. An empirical study by Noglo and Androuais (2015) and Sahan and Phimister (2023) argues for a positive effect of solidarity on loan repayment. On the other hand, Djoutsa Wamba et al. (2015) find no significant relationship between solidarity between group members and the probability of defaulting on loan repayments. Drawing on the empirical work of Noglo and Androuais (2015) and Sahan and Phimister (2023), we propose to test the following hypothesis:

Hypothesis 1d: The greater the solidarity between FOs members, the lower the probability of their defaulting on the repayment of microcredits granted by MFIs.

Influence of credit conditions

A multitude of studies attribute responsibility for repayment defaults to credit conditions. For the purposes of this research, we have selected those that appear repeatedly in the literature to explain borrowers' default on repayment. These include the amount of credit, the interest rate on the loan, the credit orientation, and the repayment term.

In previous studies, several researchers have analyzed the relationship between credit amount and credit repayment default. Most of these studies (Guipelbe et al., 2015; Boungou-Bazika and Balongana, 2015; Sahan and Phimister, 2023) show that the amount of credit exerts an influence on loan repayment performance. Moreover, for some authors (Nzongang et al., 2014; Sahan and Phimister, 2023), it is easier for an organization that has received an amount corresponding to its demand to repay the credit on time. Their results are justified by the fact that a credit amount that does not correspond to the amount requested by the investor will not enable him to carry out the project, the operation of which will lead to repayment of the debt. This argument prompts us to propose the following hypothesis test:

Hypothesis 2a: The higher the amount of credit obtained by the FOs, the lower the probability of their defaulting on the repayment of microcredits granted by MFIs.

The interest rate on a loan represents the return on the capital lent. This rate is perceived in the literature as a factor that can influence loan repayment performance. Previous work has not established a consensus as to the direction of the relationship. Some have highlighted a positive impact, while others have emphasized a negative one. In the realm of studies that have highlighted a negative impact, we find those of Salifu et al. (2018) and

Sahan and Phimister (2023). For these authors, a high interest rate reduces the probability of loan repayment, as the financial charges are very heavy and have an impact on the monthly repayment.

On the other hand, among the works that have found a positive effect of the interest rate on repayment performance, we find the work of authors such as Worokinasih and Potipiroon (2019) and Mehmood et al. (2012). This second group of authors argues that the interest rate plays a disciplinary role. The higher the interest rate, the greater the incentive for borrowers to repay on time in order to avoid penalties for non-repayment. This ensures a better repayment rate. With this argument in mind, based on the findings of the latter group of authors, we propose to test the following hypothesis:

Hypothesis 2b: The higher the interest rate on loans, the lower the probability of FOs defaulting on repayment of microcredits granted by MFIs.

With regard to credit orientation, several empirical studies (Guipelbe et al., 2015; Nadew and Senapathy, 2023; Tchekpo et al., 2020; Adegbola and Singbo, 2005) have demonstrated a negative relationship between credit orientation and repayment default. According to the findings of these studies, borrowers who use credit solely to finance the project for which they are applying have a higher repayment rate than those who have diverted the purpose of the loan. In other words, instead of allocating the loan to production as agreed in the loan contract, the borrower diverts it to consumption purposes or allocates it to other activities unrelated to their project. Based on this, we deduce the following hypothesis:

Hypothesis 2c: The more credit is used for the project for which the application is made, the less likely the FOs are to default on the repayment of microcredits granted by MFIs.

Repayment times are often cited in the literature as a cause of default on loan repayments (Kiros, 2023; Worokinasih and Potipiroon, 2019). For some authors, a repayment term that is not in line with the company's production cycle will only lead to non-repayment or delayed repayment. A short repayment period, on the other hand, will only contribute to suffocating the farmer, who will have to repay everything before the production is marketed. However, a long repayment term is more appropriate, as it would enable the farmer to repay a large part of his debt from the proceeds of his own hard work. On the basis of this argument, we propose to test the following hypothesis:

Hypothesis 2d: The longer the loan repayment period, the less likely the Fos are to default on the repayment of microcredits granted by MFIs.

Influence of factors linked to the FO's activity

Several factors linked to the activity of farmers' organizations have been listed in the literature as being able to influence loan repayment performance. These include production levels, satisfaction with sales compared with expectations, the incidence of climatic hazards, and the incidence of pest attacks on agricultural production. A loan that enables the farm to obtain better returns can be a source of timely repayment of the loans obtained. Empirical evidence provided by previous work (Hill and Sarangi, 2012; Koloma, 2021; Tchekpo et al., 2020) argues that production level has a negative influence on loan repayment default. Conversely, poor production performance penalizes debt repayment efforts. We propose to test the following hypothesis:

Hypothesis 3a: The higher the level of production, the lower the probability of the FOs defaulting on the repayment of microcredits granted by MFIs.

The proceeds from sales are used to cover operating expenses on the one hand and financial expenses on the other. In financial literature, sales remain a factor that can determine a company's ability to meet its commitments. Consequently, poor sales are often singled out as the main cause of borrower default. Empirical evidence reported by a few studies (Adegbola and Singbo, 2005; Tesgera, 2019; Gueye, 2002) confirms a strong correlation between a farm's financial performance and its loan repayment performance. Based on the results of these various studies, we deduce the following hypothesis:

Hypothesis 3b: the more satisfactory the production turnover, the less likely the FOs are to default on the repayment of microcredits granted by MFIs.

Another factor leading to repayment default is climatic hazards. Climate can be a favorable or unfavorable factor for agricultural activity (Huang et al., 2022). A climate conducive to agricultural production means better yields (Mitra et al., 2021), which may enable farmers to meet their commitments to the MFI. On the other hand, if production is destroyed by climatic hazards such as floods, droughts, and storms, this can only lead to lower agricultural and financial yields, exposing farmers to repayment default (Olagunju et al., 2023). Due to the predominant and sometimes independent uncertainty of borrowers, not everything can be foreseen in a contract. Thus, some authors (Rozhkova, 2021; Coulibaly et al., 2019; Kaua et al., 2021) have argued that adverse weather conditions have a negative impact on repayment performance among farmers. Based on the findings of these studies, which analyzed the relationship between climatic hazards and repayment performance, we propose to test the following hypothesis:

Hypothesis 3c: The greater the impact of climatic

hazards on production, the greater the likelihood of FOs defaulting on the repayment of microcredits granted by MFIs.

Pest attacks are an agricultural risk that can also lead to the FOs defaulting on repayments. A serious risk of economic losses for crops following the destruction of plots by animals (pachyderms, parasites, birds, and rodents) can have a heavy impact on agricultural yields. Several authors (Ugwumba and Uchehara, 2015; Yadav and Sharma, 2015; Maitra et al., 2017) attribute to pests the responsibility for the damage suffered by farms and the economic losses recorded by crops. This damage has a negative impact on farmers' incomes and also on their loan repayment performance. Based on the literature supporting the negative impact of pests on farms, we propose to test the following hypothesis:

Hypothesis 3d: The greater the incidence of pest attacks, the greater the likelihood of FOs defaulting on the repayment of microcredits granted by MFIs.

In light of the above developments, it is possible to conclude that there is a relationship between FOs characteristics, credit conditions, and factors linked to their activity, and FOs default on repayment of microloans. Our empirical study on a sample of FOs in the Sudano-Sahelian zone of Cameroon will enable us to test all the hypotheses put forward in this study. However, first, we will present the methodological aspects linked to this study.

METHODOLOGY

The authors will present a two-point approach. First, the sample constitution process and the data collection method; then, the theoretical model of the study and the operationalization of its variables.

Sample and data collection

The study focuses on FOs in the Sudano-Sahelian zone of Cameroon that have applied for financing from MFIs for their activities. Over the period from July 1 to December 31, 2021, we interviewed 503 heads of FOs whose activities were partly financed by MFIs using a questionnaire: 138 in the Adamaoua region, 170 in the Far North region, and 208 in the North region. At the end of the survey, 266 responses were deemed usable, including 82 in the Adamaoua region, 30 in the Far North region, and 151 in the North region. The 237 questionnaires deemed unusable are due, on the one hand, to the fact that certain FOs who responded to the questionnaires had indeed received funding but not from the MFIs. On the other hand, some of the questionnaires received had missing answers but were deemed useful for the study. The final sample was therefore 266 FOs.

Study model

A review of the literature has led to highlight certain factors that can

lead to FOs defaulting on the repayment of microcredits granted by MFIs. Drawing on previous work (Nzongang et al., 2014; Djoutsa Wamba et al., 2015), a model was formulated with the dependent variable as FOs default on repayment of MFI loans, and explanatory variables relating to FOs characteristics, credit conditions, and FOs activity, to which we associated some control variables. The model is written as follows:

$$DEFREM = \beta_0 + \sum_{j=1}^n \beta_j x_j + \mu \quad (1)$$

With: DEFREM designating the FO's default on microcredit repayment; β_0 , the constant; β_j , the regression coefficients; and μ , the error term. The detailed model can be presented as follows:

$$DEFREM = \beta_0 + \beta_1 TAILOP + \beta_2 AGEOP + \beta_3 HOMOGP + \beta_4 SOLIDAR + \beta_5 MONCRED + \beta_6 DUREM + \beta_7 INTPRET + \beta_8 UTICRED + \beta_9 CHISAT + \beta_{10} NIVPROD + \beta_{11} CONCLIM + \beta_{12} NUIRAV + \beta_{13} REGORIG + \beta_{14} NIVETU + \beta_{15} STAMAT + \mu \quad (2)$$

With DEFREM = FO default on repayment of microcredits granted by MFIs; TAILOP = FO size; AGEOP = FO age; HOMOGP = group homogeneity; SOLIDAR = solidarity between group members; MONCRED = loan amount; DUREM = repayment period; INTPRET = interest rate on loan; UTICRED = credit orientation; CHISAF = satisfactory sales compared with expectations; NIVPROD = production level; CONCLIM = level of impact of climatic conditions on production; NUIRAV = level of impact of pests on production; REGORIG = region of origin of the main FO leader; NIVETU = level of education; STAMAT = marital status. β_0 , the constant; β_j , the regression coefficients; and μ , the error term.

Operationalization of study variables

Measurement of the dependent variable

The dependent variable is the FO's default on repayment of microloans granted by MFIs (DEFREM). For the purposes of this study, we considered it important to observe this default through three main indicators generally used by MFIs: default following partial payment of a monthly installment on the due date (DEFREM1), default following late payment of a monthly installment on the due date (DEFREM2), and default following non-payment of a monthly installment (DEFREM3). They are all binary variables and take the values 1 respectively if repayment is partial (model 2.1), if repayment is late (model 2.2), or for non-repayment of a monthly installment on the due date (model 2.3), and 0 otherwise. Many authors (Nzongang et al., 2014; Djoutsa Wamba et al., 2015) have used this in their work.

Measurement of independent variables

Three categories of variables were selected for this study. These are variables linked to FO characteristics, credit conditions, and the activity carried out by the FOs.

Variables linked to FO's characteristics

TAILOP refers to the size of the FOs. It is measured by the number of members making up the FOs. It is therefore a nominal variable, taking the value 1 for up to 3 people, 2 for 4 to 6 people, 3 for 7 to 10 people, and 4 for more than 10 people. Lanha (2006) and Djoutsa Wamba et al. (2015) used this measure in their studies. AGEOP is a dummy variable designating the age of the FOs. As in the studies by Djoutsa Wamba et al. (2015), we measured it

through the number of years the FOs have been in existence. It takes the value 1 if the FOs are no more than 3 years old, 2 if the age varies between 3 and 5 years, and 3 if the age of the FOs is greater than 5 years. HOMOGP refers to group homogeneity. It is measured by the intensity of the social ties existing between the members of the FOs. This intensity of ties is measured through a score calculated on a set of five criteria, translating the attachment between the members of the group that constitutes the FOs: same religion, same village, same district, same ethnic group, same activity. We calculated this score from the single factor resulting from the principal component analysis on all five criteria, captured by a dichotomous measure taking the value 1 for presence and 0 for absence. The resulting score is standardized and ranges from 0 to 1, with 0 indicating low homogeneity between members and 1 indicating high group homogeneity, which denotes the effectiveness of solidarity between members. It takes on a value of 1 if the head of the FOs affirms that members contribute for those in default and 0 if the FOs use other sources of financing to reimburse their share.

Variables related to credit characteristics

MONCRED is the amount of credit received from the EMF. Its value is assessed according to the amount requested. It is therefore a nominal variable, taking the value 1 if the FOs manager judged this amount to be insufficient, 2 if he judged it to be average, and 3 if he judged it to be high. This highly subjective measure was used by Guipelbe et al. (2015) and Boungou-Bazika and Balongana (2015) in their work. INTPRET refers to the level of interest rate assessed by FOs managers on their loans. It is a nominal variable. It takes the value 1 if the FO judges the interest rate to be low, 2 if it judges it to be average, 3 if it judges it to be high, and 4 if it judges it to be very high. In the work of Mehmood et al. (2012) and Worokinash and Potipiroon (2019), the interest rate was retained as one of the explanatory factors for delinquencies in the EMF. UTICRED refers to credit orientation. We have appropriated the measure proposed by Nadew and Senapathy (2022) and Tchekpo et al. (2020) as part of their work. It is dichotomous and takes the value 1 if the FOs have used all the credit to finance the project, the object of the credit, and 0 otherwise. DUREM refers to the loan repayment period. It is a nominal variable apprehended through five modalities: very short (coded 1), short (coded 2), medium (coded 3), long (coded 4), or very long (coded 5).

Variables linked to the activity carried out by the FOs

CHISAT measures the FO's satisfaction with the sales generated by their activities. It is a dichotomous variable, taking the value 1 if, according to the FOs, sales are satisfactory in relation to expectations and 0 otherwise. NIVPROD assesses the level of production achieved in relation to expectations. This is a nominal variable, taking the value 1 if the FO considers its production level to be low, 2 if its production level is average, and 3 if it is high. CONCLIM refers to the level of impact of climatic hazards on agricultural production. We calculated this impact using a score based on three criteria describing climatic conditions: floods, droughts, and storms. To capture each of these criteria, we used a dichotomous scale with 1 for presence and 0 for absence. We then calculated a score on these three criteria using PCA. The score calculated in this way is standardized, with values ranging from 0 to 1. 0 represents the lowest score (less incidence), and 1 represents the highest score (more incidence). NUIRAV refers to the level of incidence of pests on agricultural production. It was measured using a 5-point Likert scale, ranging from "strongly disagree" to "strongly agree." In this way, each FOs manager was asked to give his or her level of agreement with the statement that pests had affected their agricultural production.

Measurement of control variables

Three control variables were selected: level of education, region of origin, and marital status of the main FOs leader. Three modalities were used to measure the FO's leader's level of education (primary, secondary, or university). Three modalities were also used to measure marital status (single, married, divorced, and widowed). In terms of region of origin, the FOs manager could be from the Nord, Adamaoua, or Extrême-Nord regions. Table 1 summarizes the variables, their definition, and their measurement.

RESULTS AND DISCUSSION

Presentation and analysis of study results

The authors first present the results of the descriptive analyses and then the results of the explanatory analyses.

Descriptive statistics on study variables

Table 2 shows the statistics for the various variables in the study. From the characteristics of central tendency (median, mode, or mean) and dispersion (standard deviation) recorded in Table 2, we can draw several conclusions. In the majority of cases, the FOs in the sample have been in operation for over 10 years and have a membership of more than 10. These FOs are not formed on the basis of social ties between members, as the average intensity of homogeneity between group members is 0.1976, well below the theoretical average of 0.5 with a standard deviation of 0.23175. This would justify why, within these groups, there is a lack of solidarity between members. In terms of credit conditions, the majority of FOs find the amount of credit they receive from MFIs insufficient to carry out their activities, with an interest rate they consider high and a repayment period they consider equally long. Many FOs use credit exclusively for their activities. With regard to the conditions under which they carry out their activities, the descriptive statistics show that the majority of FOs in the sample are satisfied with the level of sales achieved on their production, although this is average compared with expectations. Many of these FOs feel that the level of impact of climatic hazards on agricultural production is high, with an average of 0.69 higher than the theoretical average of 0.5. They fully agree that the level of incidence of pests on agricultural production has affected their agricultural production. FOs declared to have defaulted on loan repayments are those that have experienced at least one late repayment, partial repayment, or non-repayment of an installment during the life of the loan. Figure 1 illustrates the distribution of FOs according to whether or not they have encountered these various difficulties.

Examination of this Figure 1 reveals that among the 266 FOs surveyed, nearly 6% have not honored their repayments, 9.8% have repaid with a delay of more than

45 days, and 15.5% have only partially repaid the amount due. Overall, these statistics highlight that unpaid bills at Cameroon's MFIs remain a reality.

Results of explanatory analyses

The Gaussian curves depicted in Figure 2 illustrate a statistical distribution concentrated towards the left for all three criteria justifying FOs' defaulting on loan repayments. This indicates that a small proportion of FOs in the sample have experienced partial, late, or non-repayment of a monthly loan installment at least once. Consequently, the average probability that a FO taken at random has made a partial repayment is 0.16, a late repayment is 0.10, or a non-repayment is 0.6. These statistics substantiate the persistent presence of counterparty risk in the operations of MFIs in Cameroon.

Given these statistics, we are intrigued by the factors influencing why some FOs default on loan repayments while others do not. A literature review suggests that FOs' failure to repay microcredits may stem from characteristics specific to FOs, credit conditions, and their operational activities. To investigate the potential relationship between these factors and FOs' loan repayment failures, we employed the Chi-square test of independence and logistic regression analysis, given the nature of the dependent variables. The Chi-square test of independence assesses the strength of the relationship between the dependent variable and the independent variables. Table 3 presents the results of these tests.

From Table 4, it is evident that significant relationships exist between FO characteristics, credit conditions, the activities carried out by the FOs, and their failure to repay loans. Regarding FO characteristics, the test indicates that FO size and age explain non-repayment significantly at the 95 and 99% confidence levels, respectively. Conversely, the homogeneity between group members explains late repayment significantly at the 99% confidence level. However, intra-group solidarity did not yield significant statistics. Concerning credit conditions, the results underscore that the amount of credit, its duration, interest rate, and credit orientation all significantly explain FOs' failure to repay credit, regardless of the measurement indicator, at highly significant levels (95 and 99%). Examination of the relationship between FOs' failure to repay loans and factors associated with FO activity reveals that satisfactory sales, the level of agricultural production, the incidence of pests on agricultural production, and climatic conditions significantly influence FOs' failure to repay microcredits. Specifically, this influence is significant for the level of sales (99% confidence level), the level of production (99% confidence level), and the incidence of pests and diseases on agricultural production (99 and 95% confidence levels), regardless of the observed default size. Additionally, the control variables included in

Table 1. Summary of the operationalization of variables.

| Variable | Variable definitions | Measurement | Reference authors |
|----------|---|--|---|
| DEFREM1 | Failure of the FOs to repay microcredits granted by MFIs | Dichotomous variable, taking the value 1 if the repayment is partial and 0 otherwise | Nzongang et al., 2014; Djoutsa Wamba et al., 2015 |
| DEFREM2 | | Dichotomous variable, taking the value 1 if repayment is late and 0 otherwise. | |
| DEFREM3 | | Dichotomous variable, taking the value 1 if no repayment is made at maturity and 0 otherwise | |
| TAIOP | OP size. | Number of OP members. | Lanha, 2006; Djoutsa Wamaba et al., 2015. |
| AGEOP | Age of OP | Number of years OP has been in existence | Djoutsa Wamba et al. (2015) |
| HOMOGP | Group homogeneity | Score calculated on a set of five criteria reflecting attachment between FOs members: Same religion, same village, same neighborhood, same ethnic group, same activity | Singh and Gupta, 2022; Hill and Sarangi, 2012. |
| SOLIDAR | Solidarity between members | Dichotomous variable, taking the value 1 if a FO member in difficulty is helped by his peers to repay his share and 0 otherwise | Noglo and Androuais, 2015; Sahan and Phimister, 2023 |
| MONCRED | Amount of credit received from EMF | Nominal scale taking the value 1 if the amount is deemed insufficient, 2 if it's average, and 3 if it's high | Guipelbe et al., 2015; Boungou-Bazika and Balongana, 2015 |
| INTPRET | Loan interest rate | Nominal scale taking the value 1 if it is judged low, 2 if it is judged medium, 3 if it is judged high, and 4 if it is judged very high" | Mehmood et al., 2012; Worokinasih and Potipiroon, 2019 |
| UTICRED | Credit orientation | a dichotomous variable with a value of 1 if the FO has used the entire loan to finance the project for which the loan was granted and 0 otherwise | Nadew and Senapathy, 2022; Tchekpo et al., 2020. |
| DUREM | loan repayment period | It is apprehended through five modalities: very short (coded 1), short (coded 2), medium (coded 3), long (coded 4), or very long (coded 5) | Kiros, 2023; Worokinasih and Potipiroon, 2019). |
| CHISAT | FOs satisfaction with sales generated by their activities | Dichotomous variable taking the value 1 if, according to the FO, sales are meeting expectations and 0 otherwise | Tesgera, 2019; Gueye, 2002 |
| NIVPROD | Level of production achieved compared to expectations | Nominal variable: taking the value 1 if the FO considers its production level to be low; 2 if its production level is average; and 3 if it is high. | Hill and Sarangi, 2012; Koloma, 2021; Tchekpo et al., 2020. |
| CONCLIM | Impact of climatic hazards on agricultural production | Score based on three criteria describing climatic conditions: flood, drought, and storm | Coulibaly et al., 2019; Kaula et al., 2021 |
| NUIRAV | Impact of pests on agricultural production | The degree of agreement of each FO manager is measured by a 5-point Likert scale, ranging from "strongly disagree" to "strongly agree" | Yadav and Sharma, 2015; Maitra et al., 2017 |
| NIVETU | Level of education of the FO manager | Nominal variable: taking the value 1 if the FO manager has primary education, 2 if secondary education, and 3 if university education | |
| REGORIG | Region of origin of the main FO manager | Nominal variable: taking the value 1 if the FO manager is from the North region, 2 if he is from Adamaoua, and 3 if he is from the Far North | |
| STAMAT | Marital status | Nominal variable: taking the value 1 if the FO is single, 2 if married, and 3 if divorced or widowed | |

this study, such as the region of origin of the main FO manager, their level of education, and marital status, strongly explain partial repayment (95 and 99% confidence levels) and weakly explain late repayment (90%). These initial findings confirm

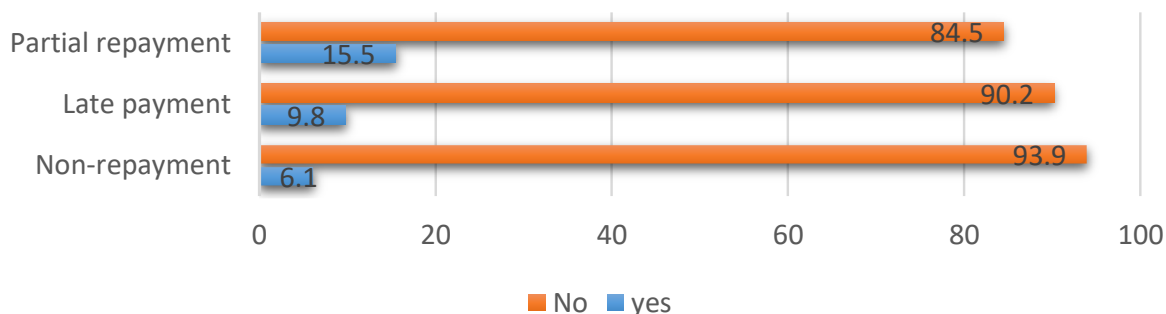
several of the hypotheses formulated. However, a limitation of the Chi-square test of independence is its failure to specify the direction of the relationship and account for any interrelationships among explanatory variables. To delve deeper

into these results, logistic regression tests were conducted to address this limitation. Given the qualitative nature of the dependent variables, binary logistic regressions were chosen. Before proceeding, multicollinearity tests were conducted

Table 2. Statistics on study variables.

| | N | | Mean | Median | Mode | Std. Deviation | Minimum | Maximum |
|----------|-------|---------|--------|--------|------|----------------|---------|---------|
| | Valid | Missing | | | | | | |
| TAILOP | 263 | 3 | 4.69 | 5.00 | 4 | 0.747 | 1 | 4 |
| AGEOP | 265 | 1 | 3.3170 | 4.0000 | 4,00 | 0.96408 | 1.00 | 3.00 |
| HOMOGP | 266 | 0 | 0.1976 | / | / | 0.23175 | 0.00 | 1.00 |
| SOLIDAR | 266 | 0 | 0.2970 | 0.0000 | 0,00 | 0.45779 | 0.00 | 1.00 |
| MONTCRED | 265 | 1 | 1.87 | 2.00 | 2 | 0.419 | 1 | 3 |
| DUREM | 262 | 4 | 2.90 | 3.00 | 3 | 0.626 | 1 | 5 |
| INTPRET | 250 | 16 | 2.84 | 3.00 | 3 | 0.534 | 1 | 4 |
| UTICRED | 265 | 1 | 1.07 | 1.00 | 1 | 0.258 | 1 | 2 |
| CHISAT | 266 | 0 | 1.21 | 1.00 | 1 | 0.408 | 1 | 2 |
| NIVPROD | 266 | 0 | 2.05 | 2.00 | 2 | 0.564 | 1 | 3 |
| CONCLIM | 266 | 0 | 0.69 | / | / | 0.464 | 0 | 1 |
| NUIRAV | 265 | 1 | 3.28 | 4.00 | 4 | 1.251 | 1 | 5 |
| NIVETU | 266 | 0 | 2.53 | 3.00 | 2 | 0.673 | 1 | 4 |
| SITMAT | 266 | 0 | 1.11 | 1.00 | 1 | 0.475 | 1 | 4 |
| REGORIG | 266 | 0 | 2.16 | 2.00 | 2 | 0.715 | 1 | 3 |

DEFREM = FO default on repayment of microcredits granted by MFIs; TAILOP = FO size; AGEOP = FO age; HOMOGP = group homogeneity; SOLIDA = solidarity between group members; MONTCRED = loan amount; DUREM = repayment period; INTPRET = interest rate on loan; UTICRED = credit orientation; CHISAF = sales satisfactory in relation to expectations; NIVPROD = production level; CONCLIM = level of impact of climatic conditions on production; NUIRAV = level of impact of pests on production; REGORIG = region of origin of the main FO leader; NIVETU = level of education; STAMAT = marital status.

**Figure 1.** Difficulties leading to failure.

using variance inflation factor (VIF) analysis to determine if the retained explanatory variables were suitable for multivariate regression analyses. The results presented in Table 4 provide insight into the VIF values.

Upon reviewing Table 5, it is evident that the VIF values are considerably below 10, a threshold suggested by Hair et al. (2010) as an indicator of the absence of multicollinearity issues. Based on these results, we infer that the selected explanatory variables for this study are suitable for multiple logistic regression analysis. Table 5 presents the outcomes of our diverse model estimations, contingent on whether the FO's default on repayment is characterized by partial repayment, delayed repayment, or non-repayment of a monthly debt installment.

The findings from Table 5 provides valuable insights. The Chi-square, Cox and Snell, and Nagelkerke R^2 tests were employed to evaluate the robustness of the different models. Notably, for the variables representing unspecified factors (constants), these tests indicate a positive and non-significant value for the first model, and negative and equally non-significant values for the last two models. Furthermore, the Chi-square statistic, indicating model specification, is significant at the 1% level for all three models.

Additionally, there are eight significant variables for the first model, four variables for the second model, and a single variable for the third model. This suggests that the first model captures a wider range of significant predictors

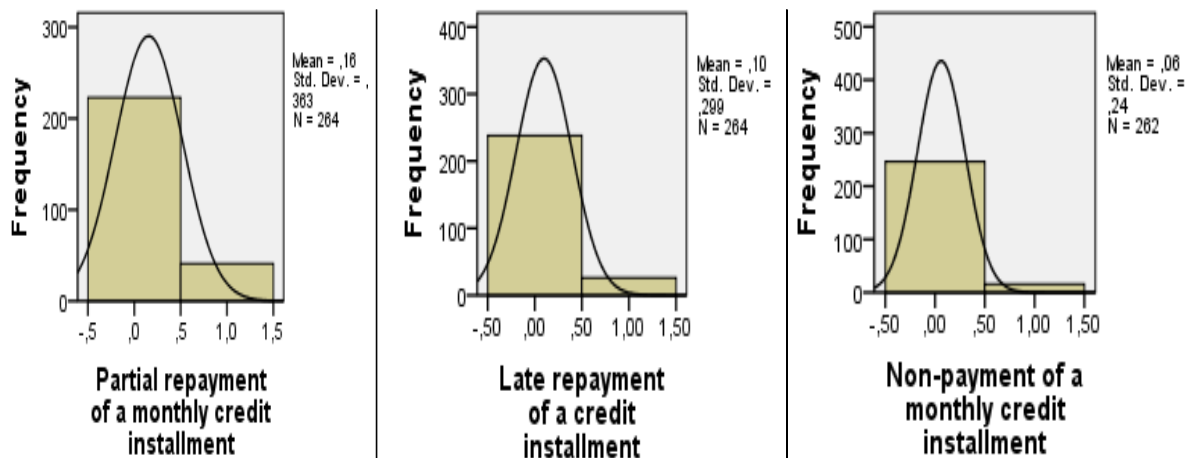


Figure 2. Propensity of FOs to default on loan repayments.

Table 3. Chi-square test of independence.

| Variable | FO's failure to repay MFIs microcredits | | | | | | | | |
|----------|---|----|----------|----------------|----|----------|---------------|----|----------|
| | Partial repayment | | | Late repayment | | | Non-repayment | | |
| | Chi-Square | df | Sig. | Chi-Square | df | Sig. | Chi-Square | df | Sig. |
| TAILOP | 3.296 | 4 | 0.510 | 4.304 | 4 | 0.366 | 10.894 | 4 | 0.028** |
| ANCOP | 1.835 | 3 | 0.607 | 4.006 | 3 | 0.261 | 12.180 | 3 | 0.007*** |
| HOMOGP | 19.399 | 1 | 0.000*** | 1.765 | 1 | 0.184 | 0.248 | 1 | 0.619 |
| SOLIDAR | 0.000 | 1 | 0.988 | 0.414 | 1 | 0.520 | 0.657 | 1 | 0.418 |
| MONTCRED | 51.418 | 2 | 0.000*** | 40.845 | 2 | 0.000*** | 77.836 | 2 | 0.000*** |
| DUREM | 12.606 | 4 | 0.013** | 24.684 | 4 | 0.000*** | 14.551 | 4 | 0.006*** |
| INTPRET | 12.266 | 3 | 0.007*** | 18.159 | 3 | 0.000*** | 10.825 | 3 | 0.013** |
| UTICRED | 0.001 | 1 | 0.974 | 6.253 | 1 | 0.012** | 3.350 | 1 | 0.067* |
| CHISAT | 31.710 | 1 | 0.000*** | 40.958 | 1 | 0.000*** | 30.808 | 1 | 0.000*** |
| NIVPROD | 77.723 | 2 | 0.000*** | 91.571 | 2 | 0.000*** | 71.168 | 2 | 0.000*** |
| CONCLIM | 0.106 | 1 | 0.745 | 0.006 | 1 | 0.938 | 0.351 | 1 | 0.553 |
| NUIRAV | 16.639 | 4 | 0.002*** | 5.184 | 4 | 0.269 | 11.918 | 4 | 0.018** |
| NIVETU | 8.282 | 3 | 0.041** | 7.388 | 3 | 0.060* | 4.660 | 3 | 0.198 |
| SITMAT | 11.531 | 3 | 0.009*** | 10.416 | 3 | 0.015 | 14.871 | 3 | 0.002 |
| REGORIG | 5.776 | 2 | 0.056* | 1.093 | 2 | 0.579 | 5.175 | 2 | 0.075 |

With :TAILOP = FO size; AGEOP = FO age; HOMOGP = group homogeneity; SOLIDA = solidarity between group members; MONTCRED = loan amount; DUREM = repayment period; INTPRET = interest rate on loan; UTICRED = credit orientation; CHISAT = sales satisfactory in relation to expectations; NIVPROD = production level; CONCLIM = level of impact of climatic conditions on production; NUIRAV = level of impact of pests on production; REGORIG = region of origin of the main FO leader; NIVETU = level of education; STAMAT = marital status.

compared to the subsequent models.

According to Nagelkerke's R², it can be concluded that the selected variables in this study effectively explain the variation in FO loan repayment default rates, accounting for 51.5% for partial repayment, 54.6% for late repayment, and 62% for non-repayment. This indicates a substantial proportion of the variability in loan repayment default rates can be attributed to the factors included in the models.

Based on the results presented in the Table 5, it can be

observed that FO size (TAILOP) and age (AGEOP) have a positive but non-significant impact on FO default on repayment, regardless of the repayment difficulty encountered.

These findings align with previous studies by Gueye (2002) and Wamba et al. (2015), which found no significant association between group size and the reduction of non-payments. However, they contrast with the results of Noglo and Androuais (2015), who associated greater group seniority with a lower probability

Table 4. Statistical collinearity test.

| Variable | Tolerance | VIF | Variables | Tolerance | VIF |
|-----------|-----------|-------|-----------|-----------|-------|
| (Constant | / | / | UTICRED | 0.920 | 1.087 |
| TAILOP | 0.883 | 1.133 | CHISAT | 0.786 | 1.272 |
| ANCOP | 0.893 | 1.119 | NIVPROD | 0.754 | 1.326 |
| HOMOGP | 0.805 | 1.242 | CONCLIM | 0.848 | 1.180 |
| SOLIDAR | 0.794 | 1.259 | NUIRAV | 0.912 | 1.096 |
| MONTCRED | 0.786 | 1.273 | NIVETU | 0.933 | 1.071 |
| DUREM | 0.886 | 1.129 | SITMAT | 0.923 | 1.083 |
| INTPRET | 0.904 | 1.106 | REGORIG | 0.748 | 1.337 |

***, ** , * : Significatif au seuil respectif de 99, 95 et 90%. TAILOP = FO size; AGEOP = FO age; HOMOGP = group homogeneity; SOLIDA = solidarity between group members; MONTCRED = loan amount; DUREM = repayment period; INTPRET = interest rate on loan; UTICRED = credit orientation; CHISAF = sales satisfactory in relation to expectations; NIVPROD = production level; CONCLIM = level of impact of climatic conditions on production; NUIRAV = level of impact of pests on production; REGORIG = region of origin of the main FO leader; NIVETU = level of education; STAMAT = marital status

Table 5. Econometric estimation results.

| Variable | Failure of the FO to reimburse | | | | | | | | |
|----------------------------|--------------------------------|--------|-------|----------------|--------|-------|---------------|--------|-------|
| | Partial repayment | | | Late repayment | | | Non-repayment | | |
| | B | Wald | Sig. | B | Wald | Sig. | B | Wald | Sig. |
| TAILOP | 0.160 | 0.156 | 0.693 | 0.167 | 0.118 | 0.732 | -0.310 | 0.270 | 0.603 |
| ANCOP | 0.445 | 2.036 | 0.154 | 0.376 | 1.053 | 0.305 | -0.420 | 1.005 | 0.316 |
| HOMOGP | -2.529*** | 16.528 | 0.000 | -0.715 | 0.639 | 0.424 | -0.059 | 0.002 | 0.969 |
| SOLIDAR | -1.070* | 2.844 | 0.092 | -1.123 | 1.767 | 0.184 | -0.439 | 0.164 | 0.686 |
| MONTCRED | -2.513*** | 15.754 | 0.000 | -3.203*** | 16.769 | 0.000 | 3.967*** | 10.264 | 0.001 |
| DUREM | -0.725* | 3.183 | 0.074 | -0.037 | 0.005 | 0.944 | 0.145 | 0.053 | 0.818 |
| INTPRET | 0.090 | 0.040 | 0.841 | 0.190 | 0.109 | 0.741 | 0.043 | 0.003 | 0.956 |
| UTICRED | -1.167 | 1.226 | 0.268 | 1.401 | 2.255 | 0.133 | 0.700 | 0.332 | 0.564 |
| CHISAT | -0.963* | 3.160 | 0.075 | -1.568** | 5.233 | 0.022 | -1.496 | 2.184 | 0.139 |
| NIVPROD | -1.211** | 6.229 | 0.013 | -1.146** | 4.134 | 0.042 | -0.348 | 0.263 | 0.608 |
| CONCLIM | 0.067 | 0.014 | 0.905 | 0.344 | 0.210 | 0.646 | 0.251 | 0.052 | 0.820 |
| NUIRAV | 0.378* | 2.980 | 0.084 | 0.103 | 0.153 | 0.696 | 0.162 | 0.212 | 0.646 |
| NIVETU | 1.097*** | 8.275 | 0.004 | 0.353 | 0.505 | 0.477 | -0.005 | 0.000 | 0.996 |
| SITMAT | -0.159 | 0.109 | 0.742 | 0.164 | 0.113 | 0.737 | 0.624 | 1.147 | 0.284 |
| REGORIG | 0.422 | 1.505 | 0.220 | -0.760* | 2.722 | 0.099 | 1.168 | 2.015 | 0.156 |
| Constante | 2.150 | 0.412 | 0.521 | -0.319 | 0.005 | 0.94 | -0.851 | 0.025 | 0.874 |
| Chi-square | 85.170*** | | | 71.25*** | | | 60.466*** | | |
| -2 Log likelihood | 122.165 | | | 80.947 | | | 46.386 | | |
| Cox & Snell R ² | 0.296 | | | 0.254 | | | 0.222 | | |
| Nagelkerke R ² | 0.515 | | | 0.546 | | | 0.620 | | |

***, ** , * : Significatif au seuil respectif de 99, 95 et 90%. TAILOP = FO size; AGEOP = FO age; HOMOGP = group homogeneity; SOLIDA = solidarity between group members; MONTCRED = loan amount; DUREM = repayment period; INTPRET = interest rate on loan; UTICRED = credit orientation; CHISAF = sales satisfactory in relation to expectations; NIVPROD = production level; CONCLIM = level of impact of climatic conditions on production; NUIRAV = level of impact of pests on production; REGORIG = region of origin of the main FO leader; NIVETU = level of education; STAMAT = marital status

of payment default, and Djoutsa Wamba et al. (2015), who linked increased group age with a higher default rate on group loans.

In contrast, group homogeneity (HOMOGP) and

solidarity among FO members (SOLIDAR) exhibit a negative and significant influence on the observed default rate through partial repayment of mature monthly installments, at the 1% and 10% significance levels,

respectively. These findings underscore the significance of homogeneity and solidarity among members in reducing the rate of late repayments. The results suggest that the self-selection of FO members based on strong ties and a spirit of solidarity can mitigate FO delinquency, consistent with the findings of Asgedom et al. (2015) and Djoutsa Wamba et al. (2015) regarding group homogeneity, and Noglo and Androuais (2015) and Sahan and Phimister (2023) regarding solidarity.

Regarding the impact of credit conditions (amount, duration, interest rate, and credit orientation) on the FO's default rate on repayment, the results indicate that credit amount (MONTCRED) and repayment duration (DUREM) exert a negative and significant influence on the default rate. This effect is significant at the 1% threshold for credit amount and at the 10% threshold for partial repayment concerning repayment duration. This suggests that higher loan amounts enable FOs to meet their financing needs and repay entire monthly installments on time, consistent with the findings of Guipelbe et al. (2015) and Boungou-Bazika and Balongana (2015). Additionally, longer repayment periods ensure that financed projects generate sufficient cash flows to meet repayment obligations, aligning with the rationale provided in prior research.

However, the effects of loan interest rate (INTPRET) and credit orientation (UTCRED) on default did not yield significant statistics across all default indicators. These results contradict previous findings suggesting that higher interest rates decrease the probability of repayment and that diverting credit from its intended purpose undermines repayment, as indicated by Mehmood et al. (2012), Worokinasih and Potipiroon (2019), Sobdibe et al. (2015), Nadew and Senapathy (2022) and Tchekpo et al. (2020).

Regarding variables related to the FO's activity that may impact credit repayment, the results from the table above indicate that production sales and quantity produced (NIVPROD) have a negative effect on the FO's default on repayment, significant at the 5% threshold, regardless of whether the failure is due to incomplete or late repayment.

These findings align with Adegbola and Singbo (2005) and Gueye (2002), who suggest that sales proceeds positively affect the FO's solvency, implying that higher sales volumes can reduce outstanding debts. Similarly, these results support the conclusions of Koloma (2021) and Tchekpo et al. (2020), suggesting that favorable production levels enable the FO to meet its obligations, while poor production performance increases the likelihood of repayment default.

The level of incidence of climatic conditions on production (CONCLIM) positively impacts FOs' default on repayment, although this influence is statistically insignificant across different measures of default. This finding contrasts with the conclusions of some authors (Rozhkova, 2021; Coulibaly et al., 2019; Kaua et al., 2021), who argue that agricultural production affected by climatic hazards raises the risk of loan non-repayment.

Likewise, the level of incidence of pest attacks on production (NUIRAV) positively influences the FO's default on repayment, significant at the 10% threshold if defaults are observed through partial repayment. This result supports the claims of authors such as Yadav and Sharma (2015) and Maitra et al. (2017), who attribute economic losses in agriculture to pest damage, thereby lowering borrower solvency.

Control variables including marital status, FO manager's level of education, and region of origin were also considered. Results indicate that the FO manager's level of education (NIVETU) and region of origin (REGORIG) significantly influence repayment default, consistent with findings from Salifu et al. (2018) and Sahan and Phimister (2023). However, marital status (SITMAT) did not yield significant statistics.

Managerial contributions to the study

Based on the results presented, it is evident that FOs' failure to repay microcredits obtained from MFIs is influenced not only by the characteristics of the FOs but also by credit conditions and the activities they undertake. To mitigate the number of FOs defaulting on loan repayments, corrective measures should be implemented, targeting both borrowing FOs and MFIs.

For FOs, effective group organization is essential. Our findings suggest that FOs should strive for internal homogeneity by selecting members based on strong social ties, such as shared religion, village, district, ethnicity, or occupation. This selection process can help prevent the inclusion of members with high credit risk profiles. Moreover, fostering a spirit of solidarity within the group is crucial. Members who can repay their share without difficulty should be encouraged to assist defaulting members to avoid collective default.

FOs also need to focus on marketing strategies to enhance sales and improve the quantity and quality of agricultural production. Combatting pest attacks effectively is essential for achieving this goal and ensuring better financial stability.

As for MFIs, they often interact only with the main manager of the FO and lack mechanisms to incentivize individual FO members to repay loans promptly. To reduce FO default rates, MFIs should tailor loan amounts and repayment terms to the specific needs of the target population. Inadequate loan amounts or excessive loan amounts relative to project needs are likely to result in defaults. Similarly, repayment terms should align with the agricultural production cycle for which the loan is sought to minimize repayment difficulties for FOs. Failing to address these issues could lead to long-term financial instability and potential bankruptcy for MFIs.

Conclusion

The aim of this study was to identify the factors likely to

explain FOs' failure to repay loans granted by MFIs to finance their agricultural activities. FO default on repayment of microcredits received from MFIs is manifested by three indicators: partial repayment, late repayment, and non-repayment of a monthly installment. Econometric estimation, based on data collected by questionnaire from a sample of 266 farmers' organizations (cooperatives, GICs, and associations), yielded interesting results. Overall, we found that the characteristics of the FO, the credit conditions, and the activity carried out explain the probability of the FO defaulting on the repayment of microcredits granted by MFIs. More specifically, group homogeneity, solidarity, loan amount, loan repayment period, turnover, level of agricultural production, and level of incidence of pests on agricultural production were found to be variables that significantly explain FO default on repayment of microcredits obtained from MFIs. These results led to the validation of seven of the 12 hypotheses formulated. In order to reduce the default rate of FOs on loan repayments and the long-term default of MFIs, we have formulated a number of recommendations for FOs and MFIs. Nevertheless, the results obtained from this study enrich the body of work on agricultural financing and add to the literature on the importance of MFIs in reducing poverty in the Cameroonian context. However, they are subject to certain limitations. Firstly, there is the usual limitation associated with any survey-based data collection, namely the external validity of the conclusions drawn. Secondly, the impact of the COVID-19 health crisis was not taken into account since data collection took place before the end of the crisis. The failure of FOs to reimburse could also have been due to the effects of the COVID-19 health crisis. Finally, we can also note that the survey area is restricted, taking into account only three regions out of the ten present, as well as the small sample size. This allows us to envisage, in our future research, integrating other variables into the econometric model, such as the impact of COVID-19 on the FO, and to extend the study to other regions of Cameroon.

The aim of this study was to investigate the factors contributing to FOs' failure to repay loans obtained from MFIs to finance their agricultural activities. FO default on microcredit repayment from MFIs was measured through indicators including partial repayment, late repayment, and non-repayment of monthly installments. Using econometric estimation based on questionnaire data from a sample of 266 farmers' organizations (cooperatives, GICs, and associations), the study yielded significant results. Overall, FO characteristics, credit conditions, and activity level were found to explain the likelihood of FO default on microcredit repayment from MFIs. Specifically, variables such as group homogeneity, solidarity, loan amount, loan repayment period, turnover, level of agricultural production, and incidence of pests on agricultural production significantly influenced FO default rates on microcredit repayment. These findings validated seven out of the 12 hypotheses formulated.

Recommendations for mitigating FO default rates and preventing long-term default by MFIs were proposed for both FOs and MFIs.

However, the study has certain limitations. Firstly, there is the inherent limitation associated with survey-based data collection, which raises questions about the external validity of the conclusions. Secondly, the study did not account for the impact of the COVID-19 health crisis, as data collection occurred before its conclusion. The failure of FOs to repay could potentially be attributed to the effects of the COVID-19 crisis. Additionally, the survey was conducted in a limited geographical area, covering only three out of ten regions in Cameroon, and with a relatively small sample size. Future research could address these limitations by incorporating additional variables, such as the impact of COVID-19 on FOs, and expanding the study to include other regions of Cameroon.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

REFERENCES

- Abate GT, Rashid S, Borzaga C, Getnet K (2016). Rural finance and agricultural technology adoption in Ethiopia: Does the institutional design of lending organizations matter? *World Development* 84:235-253.
- Abia WA, Shum CE, Fomboh RN, Ntungwe EN, Ageh MT (2016). Agriculture in Cameroon: proposed strategies to sustain productivity. *International Journal for Research in Agricultural Research* 2(2):1-3.
- Adegbola PY, Singbo AG (2005). Etude sur le financement de la commercialisation des produits agricoles au Bénin. Groupe de Commercialisation des produits agricoles, AGSF de l'organisation des Nations Unies pour l'Alimentation et l'Agriculture (FAO) 26 p.
- Asgedom AK, Desta TS, Bahita GH (2015). Determinants of MFIs Group Loan Repayment Performance: A Case of Dedebit Credit and Saving Institution, Mekelle, Ethiopia. *Journal of Poverty, Investment and Development* 10(1):1-22.
- Beckman J, Countryman AM (2021). The importance of agriculture in the economy: impacts from COVID-19. *American Journal of Agricultural Economics* 103(5):1595-1611.
- Bernstein ES (2017). Making transparency transparent: The evolution of observation in management theory. *Academy of Management Annals* 11(1):217-266.
- Boungou-Bazika JC, Balongana C (2015). Microcrédit et pauvreté au Congo: une analyse du comportement des petites entreprises par la théorie des jeux. *La microfinance en Afrique centrale: Le défi des exclus* 229 p.
- Couchoro MK, Djahini-Afawoubo DM (2022). Le mécanisme d'épargne-crédit a-t-il un effet sur les performances de remboursement des crédits des groupes solidaires? Le cas de la COOPEC ILEMA au Togo. *Revue Economique* 73(4):499-528.
- Coulibaly A, Motelica-Heino M, Hien E (2019). Determinants of Agroecological Practices Adoption in the Sudano-Sahelian Zone. *Journal of Environmental Protection* 10(7):900-918.
- Djoutsa Wamba L, Mbaduet JF, Sahut JM, Firas Thraya M (2015). La caution solidaire garantit-elle encore le remboursement des crédits dans les institutions de microfinance?. *Gestion* 35(6):73-94.
- Doligez F (2013). La fédération des coopératives agricoles du Nicaragua entre capital économique et pouvoir politique. *Revue Internationale de l'économie Sociale* 328:48-62.
- Etukumoh EA, Akpaeti AJ (2015). Analysis of loan default and repayment performance among farmers in Akwa Ibom State

- Integrated farmers' Scheme. *Russian Journal of Agricultural and Socio-Economic Sciences* 41(5):30-39.
- Geta E, Hamiso T (2017). Access to microcredit and its effect on crop productivity and household income in Hawassa Zuria District of Sidama Zone Southern Ethiopia. *Global Journal of Current Research* 5(3):128-134.
- Guérin I (2000). Le prêt collectif à responsabilité conjointe peut-il être considéré comme une innovation financière? / is group lending a financial innovation?. *Savings and Development* 2000:219-245.
- Gueye L (2002). Facteurs déterminants de la capacité de remboursement du crédit agricole à la CNCAS: cas de la riziculture dans la vallée du fleuve Sénégal. National Library of Canada= Bibliothèque nationale du Canada, Ottawa.
- Guipelbe S, Abba D, Tabo SN (2015). Facteurs aggravants des difficultés de remboursement de microcrédit chez les populations pauvres du canton de Guelo. *La microfinance en Afrique centrale: Le défi des exclus*. P 143.
- Hair JF, Black WC, Babin BJ, Anderson RE (2010). *Multivariate data analysis* (7th ed.). Upper Saddle River, New Jersey: Prentice Hall.
- Hill RC, Sarangi S (2012). Repayment performance in group lending: Evidence from Jordan. *Journal of Development Economics* 97(2):404-414.
- Hoff K, Stiglitz JE (1990). Introduction: Imperfect information and rural credit markets—Puzzles and policy perspectives. *The World Bank Economic Review* 4(3):235-250.
- Huang HH, Kerstein J, Wang C, Wu F (2022). Firm climate risk, risk management, and bank loan financing. *Strategic Management Journal* 43(13):2849-2880.
- Jumpah ET, Tetteh EK, Adams A (2018). Microcredit repayment among smallholder farmers: what microfinance institutions need to know. *Asian Journal of Agriculture and Rural Development* 8(2):74.
- Kaua CG, Thenya T, Mutheu JM (2021). Analyzing effects of climate variability in the nexus of informal microfinance institutions: A case study of Tharaka South Subcounty, Kenya. *Challenges in Sustainability* 9(1):1-15.
- Kiros Y (2023). Loan repayment performance and its determinants: evidence from micro and small enterprises operating in Dire-Dawa, Ethiopia. *Journal of Innovation and Entrepreneurship* 12(1):1-9.
- Koloma Y (2021). Financial inclusion and entrepreneurship willingness of youth: Evidence from Mali. *African Development Review* 33(2):263-275.
- Lanha M (2006). Opportunités et limites des prêts de groupe de caution solidaire. In *Colloque du CARE, Coûts d'intermédiation microfinancière et gestion des risques des IMF*, Université de Rouen. pp. 6-7.
- Ma W, Abdulai A (2016). Does cooperative membership improve household welfare? Evidence from apple farmers in China. *Food Policy* 58:94-102.
- Maichanou A, Hamadou Daouda Y (2021). Les faillites des institutions mutualistes ou coopératives d'épargne et de crédit au Niger. *RECMA* 4:98-116.
- Maitra P, Mitra S, Mookherjee D, Motta A, Visaria S (2017). Financing smallholder agriculture: An experiment with agent-intermediated microloans in India. *Journal of Development Economics* 127:306-337.
- Mees M, Morel D, Diop PA (2019). Les organisations paysannes, un nouvel acteur des politiques agricoles en Afrique de l'Ouest?. *RECMA* 2:109-117.
- Mehmood Y, Ahmad M, Anjum MB (2012). Factors affecting delay in repayments of agricultural credit: a case study of district Kasur of Punjab Province. *World Applied Sciences Journal* 17(4):447-451.
- Mewouth Thang AG (2021). L'entrepreneuriat coopératif, levier du développement territorial dans les régions septentrionales du Cameroun. *RECMA* 4:81-97.
- Mitra A, Das S, Tripathi A, Sarangi TK, Ranganathan T, Mitra A, Das S, Tripathi A, Sarangi TK, Ranganathan T (2021). Climate Change Impact on Livelihood and Well-Being of Rural Poor. *Climate Change, Livelihood Diversification and Well-Being: The Case of Rural Odisha* pp. 1-25.
- Mokhtar SH, Nartea G, Gan C (2012). Determinants of microcredit loans repayment problem among microfinance borrowers in Malaysia. *International Journal of Business and Social Research* 2(7):33-45.
- Muluh GN, Kimengsi JN, Azibo NK (2019). Challenges and prospects of sustaining donor-funded projects in rural Cameroon. *Sustainability* 11(24):6990.
- Nadew M, Senapathy M (2023). Small Farmers' Agricultural Loan Repayment Performance in Southern Ethiopia: monograph. *Primedia eLaunch LLC*. pp. 168-168.
- Noglo Y, Androuais A (2015). The determinants of group lending repayment performance: evidence from Togo. *Canadian Journal of Development Studies/Revue canadienne d'études du Développement* 36(4):536-554.
- Nzongang J, Djoutsamba L, Nimpa AT (2014). The determinants of loan delinquency in urban microfinance institutions in Cameroon. *Savings and Development* 38(1):69-88.
- Olagunju FI, Adejo RJ, Ayojimi W, Awe TE, Oriade OA (2023). Causal nexus between agricultural credit rationing and repayment performance: A two-stage Tobit regression. *AIMS Agriculture and Food* 8(1):151.
- Qin M, Wachenheim CJ, Wang Z, Zheng S (2019). Factors affecting Chinese farmers' microcredit participation. *Agricultural Finance Review* 79(1):48-59.
- Rathore R, Mishra S, Kumar P (2017). Factors Affecting Non-Repayment of Agricultural Loans: A case Study of Rajasthan Marudhara Gramin Bank. *International Journal of Current Microbiology and Applied Sciences* 6(4):1052-1059.
- Rozhkova A (2021). Features and problems of lending to agricultural enterprises. In *IOP Conference Series: Earth and Environmental Science*. IOP Publishing 677(2):022045.
- Rustinsyah R (2019). The significance of social relations in rural development: A case study of a beef-cattle farmer group in Indonesia. *Journal of Co-operative Organization and Management* 7(2):100088.
- Sahan S, Phimister E (2023). Repayment performance of joint-liability microcredits: Metropolitan evidence on social capital and group names. *Bulletin of Economic Research* 75(2):287-311.
- Salifu AT, Tofik-Abu Z, Rahman MA, Sualihu MA (2018). Determinants of loan repayment performance of small and medium enterprises (SMEs) in Ghana: The case of Asante Akyem Rural Bank. *Journal of African Business* 19(2):279-296.
- Singh UB, Gupta T (2022). Repayment Performance of Self-Help Groups in Uttar Pradesh: An Empirical Investigation. *Journal of Asian and African Studies* 57(2):182-197.
- Tallam SJ (2018). What factors influence performance of farmer groups? A review of literature on parameters that measure group performance. *African Journal of Agricultural Research* 13(23):1163-1169.
- Tchakoute-Tchuigoua H, Soumaré I (2019). The effect of loan approval decentralization on microfinance institutions' outreach and loan portfolio quality. *Journal of Business Research* 94:1-17.
- Tchekpo FO, Ygue PA, Afio Z, Gauthier B (2020). Determinants analysis of loan use and repayment behaviour among farmers in Benin: A semi-nonparametric bivariate probit approach. *Journal of Agricultural Economics and Development* 9(1):001-016.
- Tesgera WD (2019). Access of credit and factors affecting loan repayment performance of smallholders in Nekemte Town East Wollega Zone of Oromia Regional State. *Journal of World Economic Research* 8(2):40-48.
- Ugwumba COA, Uchehara FO (2015). Gender differences in access to and repayment of bank of agriculture loans among cooperative farmers in anambra state, Nigeria. *International Journal of Arts and Sciences* 8(8):263.
- Wenner MD (1995). Group credit: A means to improve information transfer and loan repayment performance. *The Journal of Development Studies* 32(2):263-281.
- Worokinasih S, Potipiroon W (2019). Microfinance repayment performance of SMEs in Indonesia: Examining the roles of social capital and loan credit terms. *The Journal of Behavioral Science* 14(1):28-45.
- Wossen T, Abdoulaye T, Alene A, Haile MG, Feleke S, Olanrewaju A, Manyong V (2017). Impacts of extension access and cooperative membership on technology adoption and household welfare. *Journal of Rural Studies* 54:223-233.
- Yadav P, Sharma AK (2015). Agriculture credit in developing

economies: A review of relevant literature. *International Journal of Economics and Finance* 7(12):219-244.

Zeller M, Diagne A, Mataya C (1998). Market access by smallholder farmers in Malawi: Implications for technology adoption, agricultural productivity and crop income. *Agricultural Economics* 19(1-2):219-229.