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Does Gender Have An Effect on Loan Default in MFIs? The Case of COOPEC SOLIDARITE in Togo

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Abstract: *Objective: The objective of this study is to shed light on the effect of gender on loan default in microfinance institutions (MFIs). We investigate whether female borrowers are at greater risk of loan default than their male counterparts.*

Methodology and results: To achieve this objective, logistic regression was used on data from 4,867 loan recipients of a large financial institution in Togo over the period 2012 to 2019. Our estimates show that gender has a significant effect at 1% on default. This result shows that women are less exposed to the risk of credit default than men. In addition, variables such as: duration of credit, amount of credit, number of years of experience, type of collateral, age and ICT use are significant in explaining credit repayment.

Contribution: Our results are expected to enable financial companies and regulators to develop policies that can lead to more effective and efficient credit management. Credit managers can also use our results as a model for assessing credit demand in emerging economic environments.

Keywords: Coopec, Gender, loan Default, MFI, Solidarite

1. Introduction

Microfinance is defined as a set of financial and non-financial services including microcredit, micro-savings, micro insurance, remittances, counseling, health services, training, nutrition and capacity building offered to poor, vulnerable and marginalized populations through traditional banking services (Messomo, 2013). It remains today, in different contexts, a real financial industry and is considered a powerful tool in the fight against poverty (Tchakouté-Tchigoua, 2018). It 'is recognized as an effective lever for development, serving financial constraints and broadening the range of possible solutions (Gentil, 2002). The number of clients served and the amount of credit granted are sufficient evidence of the role played by these structures in improving the living conditions of the most disadvantaged.

However, it has been noted that several microfinance institutions, despite the socialization objectives they have set themselves, are experiencing significant dysfunction. They encounter enormous difficulties that affect their stability, viability and sustainability. Since the 1980s, several theories have insisted that credit risk is the primary internal cause of failure of financial institutions. Credit risk is defined as the probability of financial loss associated with the non-repayment of a loan provided by a financial institution at maturity by the borrower and concerns multiple actors, foremost among which are banks and financial markets. As soon as a creditor grants a loan to a debtor, he runs the risk that the latter will not honor his commitments relating to the servicing of the credit, so management is necessary. The latter consists in limiting losses by checking whether a financial institution's capital is adequate to its expected credit loss provisions at a given time, a process that has long given financial institutions in general and microfinance in particular a hard time. Our paper also focuses on credit risk management.

Several studies have analyses the determinants of credit repayment but very few have addressed the gender dimension in developing economies, where the impact of credit default is very high. The findings of the few previous studies on the relationship between gender and default are contradictory and seem to depend on the samples considered. There are two opposing views on the issue. The first states that there is no difference between men and women in terms of credit repayment (Godquin, 2004; Bhatt and Tang, 2002; Anthony, 2003; Adusei, 2011) while the second thesis makes gender a very important factor in default. The World

Bank stated in 2007 that gender is one of the factors affecting credit repayment. The effect of gender on default is therefore not known a priori.

In Togo, the first savings and credit cooperative (COOPEC) was created in the late 1960s (Couchoro and Djahini-Afawoubo, 2022). This then led to the creation of FUCEC (Fédération des Unités Coopérativesd 'Epargne et de Crédit), which has 35 Coopecs, the largest of which is Coopec SOLIDARITE. According to its 2019 balance sheet, it had 208,775 members, of which 122,347 were men and 86,428 women. From 2012 to 2019, the number of loans granted to its members increased from 20,507 to 24,078 for outstanding loans which rose from 18.108 billion to 19.141 billion. It should be noted that the portfolio at risk at 90 days, ranging from 1.5% in 2012 to 4.5% in 2019, is higher than the standard of 3% set by the monetary authorities despite the rules of procedure available to the microfinance institution and the multiple efforts made by the various departments (Coopec SOLIDARITE, 2019). This is why high default rates not only compromise the viability of microfinance institutions, but also affect their sustainability. It is therefore clear that the viability of a financial institution as well as the security of savers depends on default management techniques. This drop in repayments experienced by this financial institution has become a worrying situation and may not only threaten its credibility but may ultimately threaten its existence given its size and experience; it is precisely in this respect that the question arises: does gender have an effect on loan default in MFIs? The aim of this paper is to highlight the effect of gender on loan default in MFIs. To achieve this goal, we test the hypothesis that gender has a significant effect on loan default in microfinance institutions (MFIs).

To the best of our knowledge, there is no study in the literature that answers the fundamental question of this study, so our contribution through this study is at two (2) levels. Firstly, by examining not only the effect of gender but also of certain variables on default in the Togolese context, our study attempts to fill this gap in the literature in order to enable financial companies and regulators to develop policies that can lead to more effective and efficient credit management. The findings of previous studies may not be applicable in Togo due to the strong contrast between economic indicators. Finally, credit managers can use our results as a reference to assess credit demands in emerging economic environments.

The rest of this paper is organized in four sections. Section 2 presents the theoretical review of the credit default genre. Section 3 presents the method and the results of the econometric estimation are discussed in Section 4. Section 5 concludes.

2. Review of the Literature on the Effect of Gender on Repayment Default

The literature on the effect of gender on default is not only contradictory but also scarce, especially in developing economies. On this issue two theses are opposed. The first thesis states that gender does not determine default (Godquin, 2004; Bhatt and Tang, 2002; Anthony and Horne, 2003; Adusei and Appiah, 2011) while the second thesis makes gender a very important factor in default (Motedayen et al., 2022; Mersland et al., 2010; Hulme, 1991; Kevane and Bruce, 2001; Khandker et al.) This section first presents the empirical studies that state that gender has no effect on default and then those that show that gender is one of the determinants of credit default.

Bhatt and Tang (2002) found that many microcredit programs have been created in the United States, adopting the design features of their Third World counterparts. Yet few systematic studies have been conducted to examine what determines the loan repayment performance of these programs. These authors attempted to fill this gap by examining the determinants of loan repayment for four of the oldest group microcredit programs in the US. Their results showed that key variables such as gender and borrower homogeneity were not significantly related to loan repayment.

Anthony and Horne (2003), in a paper, analyze the effects of gender and gender composition of the group on pro-social behavior. Making two competing predictions: one based on the literature suggesting that women are more cooperative than men, the other drawing on research on the effect of expectations on behavior and using data from groups of microcredit borrowers, they find that gender composition, not gender per se, is correlated with the likelihood that individuals will default on their loans.

Adusei and Appiah's (2011) study uses a binary logistic regression analysis on the gender composition of loans using cross-sectional data from 198 credit unions collected from the Credit Union Association (CUA) in Ghana. In contrast to anecdotal and empirical evidence in the literature, the evidence presented in their

work supports the conclusion that female borrowers are no better than their male counterparts. Godquin (2004) also examined the repayment performance of microfinance in Bangladesh. His result was that female borrowers were not found to have a better repayment performance. Also, (Corsi, M., & Angelis, MD, 2017) on data from a microfinance programme in Uganda, find no evidence of a significant gender gap in repayment of its loans.

The results of the logistic regression analysis of Elloumi (2013) and Nanayakkara (2015) show that credit repayment rates are not as important among women as among men. Given that the results are based on individual loan models, these observations suggest that women represent a slightly lower credit risk for financial institutions, even in the absence of collective liability.

In contrast to the above, several studies have shown that gender affects default.

Reta (2011) conducted a study with the aim of analyzing and identifying factors that influence credit repayment performance. In order to achieve this objective, primary data was collected from 200 randomly selected clients (100 defaulters and 100 good payers) using a structured interview. In addition, secondary data were also used. For data analysis, descriptive statistics including mean, frequency and percentages were used to describe the socio-economic characteristics of the borrowers. In addition, t-test and chi-square analyses were used to compare the group of defaulting and non-defaulting borrowers. A binary logit model was used to analyze the socio-economic factors influencing loan repayment. Of a total of twelve explanatory variables included in the regression, gender and work experience of the respondents were found to be significant determinants of the loan repayment rate. Also, the work of Honlonkou (2006), showed results that gender increases the risk of default.

Sugato C. et al (2019) used controlled experiments to identify the proximal causes of gender differences in microcredit repayment. To this end, they recruit male and female subjects from a patriarchal community and a matrilineal community in Bangladesh, who live in the same villages, and find that female subjects are more willing to repay microcredit in all societies, regardless of the type of credit.

Mersland et al., (2010) analyses gender differences in microfinance repayment rates using a large global data set covering 350 microfinance institutions (MFIs) in 70 countries. The results indicate that a higher number of female clients is associated with lower portfolio at risk, write-offs and loan loss provisions, ceteris paribus. These results confirm common beliefs that women in general represent a better credit risk for MFIs.

Motedayen et al (2022) identify and assess the factors that influence credit risk using a multinomial logistic regression approach. To this end, in the first phase, the indicators that affect the credit risk assessment of natural customers were identified using the literature and library method. Then, the final data on the indicators were collected, including 7330 natural customer files of Bank Mellat and multinomial logistic regression was used to investigate the indicators of credit risk assessment of natural customers of the bank. The results of the estimated model show that the indicators of gender, loan value, age, interval between installments, previous loan, occupation, loan repayment period, number of installments, amount of each installment, type of collateral, average balance, interest rate of the facility have a significant impact on the credit risk of the real customers.

The work of Montalieu (2002) and D'Espallier et al. (2011), showed that the repayment rate of women is significantly higher than that of men. They explain this result by the fact that women are more disciplined about banking expectations, more sensitive to social pressure, less mobile and more active in solidarity guarantee groups. Overall, there is a near consensus in the literature that the percentage of men with repayment problems is higher than the percentage of women.

For Garikipati (2008), financial institutions prefer to lend to women for three main reasons: (i) women are less likely to misuse credit. (ii) Women are also less likely to default on their loans due to reputational risk, and finally, (iii) they are arguably more responsible and repay their loans on time. Also in this context, Bahta et al. (2017) and Das (2017) argue that, in general, women have fewer credit opportunities than men, which leads them to seek to repay their loans to ensure continued access to credit. These reasons partly explain why women borrowers have been good clients for loan repayment over the past decade (World Bank, 2007).

Our study adds to the literature on whether women in the emerging market of Togo, where no previous research exists, are less at risk of credit default than men.

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3. Data and Methods

3.1. Data

The objective of this paper is to shed light on the effect of gender on credit default in Togo. To achieve this objective, we used data from the SAF (Financial Automation System) database. We obtained 4,867 beneficiaries of credits in the said Coopec over a period 2017-2019 to extract the variables related to the borrower and those related to the credit. Overall, seven (07) variables are used in our study to analyze the effect of gender on credit default. These variables are drawn from the literature review. They are:

Loan default (dREMB): Default is our explained variable. Depending on the data obtained, it is measured as a percentage and has values between 0 and 100%. Given the fact that a default of 0% can conceal a variety of situations ranging from no repayment to 100% repayment with delay, (Honlonkou et al., 2006). We have defined this explained variable as a dummy variable. It takes the value 0 if the loans were repaid on time (i.e. no default) and 1 if there was at least one default in the loan repayment.

Gender (GENDER): Gender is our explanatory variable of interest. This variable indicates the sex of the borrower and is therefore binary (1 for Male and 0 for Female). A significant positive sign on the coefficient of this variable will indicate that the male gender is mainly responsible for defaults. In other words, the female repayment rate is significantly lower than the male rate. The expected sign of this variable is indeterminate. For authors such as Motedayen et al (2022) the sign is positive while for Adusei and Appiah (2011) the sign is negative thus showing that women's repayment rate is significantly higher than that of men.

Borrower's marital status (STATUSMARITAL): refers to the borrower's marital status (married or not). In the MFI literature, there is a tendency to think that a married borrower may, in addition to the daily burdens borne (education, health), face an unexpected increase in consumption costs as well as unexpected illnesses of family members. Elloumi and Kammoun (2013) have shown through their work that married borrowers did indeed have difficulty repaying their loans, thus attesting that there is a link between marital status and loan repayment performance

Number of years of experience with Coopec (EXPCOOPEC): This refers to the number of years of experience with Coopec since the account was opened. This variable is supposed to have a negative effect on the default.

Amount of credit granted (AMOUNT_CRED): refers to the amount of credit granted, if the amount granted is higher than the needs, most borrowers tend to use the surplus for personal consumption which creates difficulties in subsequent repayments (Norell, 2001) and it should have a positive effect on default.

Duration of credit (DURATIONCRED): It refers to the duration of the credit or the number of instalments that the client will pay back his credit.

AGE (AGE): Expresses the age required of the borrower to carry out an activity for which the support of a microfinance institution is important for its survival. It is expressed in number of years.

ICT: expresses the use of ICT in the operations of Coopec SOLIDARITE through the available means of payment (Syscofop transfer by Microfina or not) by which the member makes his or her repayment according to the type of credit obtained. This variable is supposed to contribute to the credit repayment.

3.2. Methods

Our econometric model for analyzing the effect of gender on credit default in Togo is based on logistic regression. Indeed, in our study the explained variable takes the value 0 or 1 which makes linear estimation inappropriate.

Assuming Y, the explained variable and X the matrix of explanatory variables, the logistic regression is expressed in the following probability form:

$$log\left(\frac{p(x)}{1-p(x)}\right) = \beta_0 + \beta_1 x_1 + \cdots + \beta_p x_p,$$

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Where $p(x)$ denotes the probability $P(Y=1|X=x)$ and $x=(x_1,\dots,x_p)$ is a realization of the explanatory variables matrix X. The coefficients $\beta_0,\dots,\beta_p$ are estimated by the maximum likelihood method from the 4867 observations.

When considering the different variables of our model the model is specified as:

$$\log\left(\frac{p(x)}{1-p(x)}\right) = \beta_0 + \beta_1 \text{GENDER} + \beta_2 \text{EXPCOOPEC} + \beta_3 \text{STATUSMARITAL} + \beta_4 \text{AMOUNTCRED} + \beta_5 \text{DURATIONCRED} + \beta_6 \text{AGE} + \beta_7 ICT$$

To better explain the model, we first consider the logistic model to explain the non-reimbursement variable by gender (model 1) and then the logistic model with all explanatory variables (model 2).

4. Results and Discussions

This part includes the descriptive statistics and the presentation and interpretation of the results of the two estimations.

4.1. Descriptive Statistics

The table below presents the descriptive statistics of our different variables. From the analysis of this table with regard to the quantitative and qualitative variables, it appears that:

Table 1: Descriptive Statistics

Quantitative variables		Qualitative variables		
Variables	Mean	Variables	Modalities	Proportions
AGE (Years)	44,01	DEFAUTREMB~T	Delay	26,38%
			To date	73,62%
EXPERIENCECOOPEC (Years)	8,70	GENDER	Man	42,47%
			Woman	57,53%
DUREECREDIT (Month)	15,55	STATUSMARITAL	Married	66,88%
			Unmarried	33,12%
AMOUNT (Fcfa)	1 638 395	GARANTEE	Material	23,73%
			Immaterial	76,27%
LogAMOUNT	13,48	ICT	Yes	62,61%
			No	37,39%

Source: Authors

The average age of the 4,867 borrowers is 44 years. As for the number of years of experience with the Coopec, the average borrower has more than 8 years of experience with the Coopec, which shows the trust between the borrower and the lender. The average amount of credit granted is 1,638,395 FCFA and the average duration for a credit to be repaid is at most 15 months according to the statistical table describing the situation.

With the qualitative variables, the results show that 73.62% of the credits do not present any default in their repayment against 26.38% that do not repay well. As for gender, 57.53% of women are credit beneficiaries against 42.47% of men. This shows that women are more represented than men in the different activities financed by Coopec, a sign of women's empowerment. According to gender, 66.88% are married while 33.12% are not. As for the means of rationing, 76.27% of the credit beneficiaries provide an immaterial guarantee (savings covering the credit risk, joint guarantee, group guarantee etc.) and 23.73% provide a material guarantee (a building). Finally, 62.61% use ICT (Syscofop transfer by Microfina) and 37.39% of the beneficiaries come to the cooperative's cash desks to make transactions.

4.2. Estimation Results

The results of the estimations are provided in the table below. The chi^2 test at the 1% threshold leads to the rejection of the null hypothesis that the estimated coefficients are all zero. The pseudo R^2 is equal to 0.006 in the first estimation and 0.13 in the second estimation. Although relatively low, these values show the good

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specification of model 2 compared to model 1. The estimated coefficients presented in the table are the marginal effects.

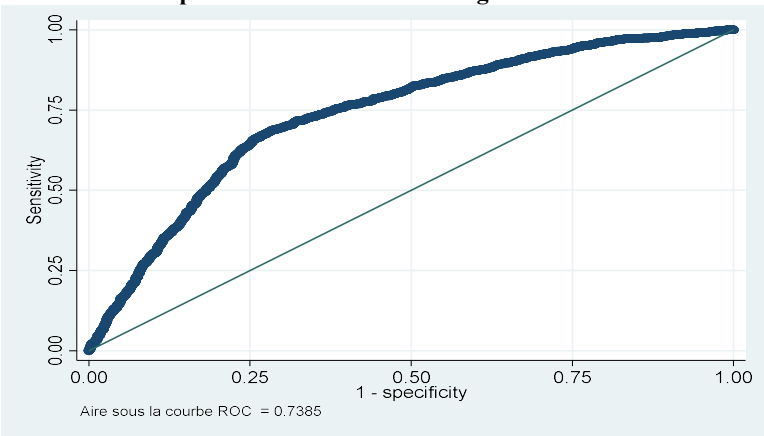
Table 2: Regression Results

	Model 1		Model 2	
	Coefficients	P-value	Coefficients	P-value
GENDER	0,736*	0,000	0,037*	0,002
AGE			-0,001**	0,015
STATUSMARITAL			-0,010	0,439
EXPERIENCECOOPEC			-0,003*	0,006
DURATIONCRED			0,002*	0,003
GARANTEE			-0,070*	0,000
LogAMOUNT			0,028*	0,000
ICT			0,290*	0,000
_cons			-0,685*	0,000
Numbobs	4867		4867	
LR chi^2	34,14		706,04	
Prob>chi^2	0,000		0,000	
Pseudo R^2	0,0060		0,1257	

Note: ***significant at 10%; **significant at 5%; *significant at 1%. The probability value is used to test the significance of the coefficients in our model. A coefficient with a probability below 10% means that the coefficient is statistically significant at 10%. **Source: Authors**

Before relying on a model to draw conclusions or predict future outcomes, it is important to check, as far as possible, that the model we have estimated is correctly specified. In other words, the data do not contradict the assumptions made by the model. In this sense, we look at the very popular ROC curve.

Graph 1: ROC[1] curve of model goodness of fit



In our study, the ROC curve above has an area of 0.738 and above the diagonal. We can therefore conclude from the work of Hosmer and Lemeshow (2000) that our model (model 2) has an acceptable discrimination power and therefore a good fit with a prediction quality of 74.48%.

Considering the statistical significance of the above table and the sign of the estimated coefficients, we can deduce that the variables: gender, duration of credit, amount of credit and ICT are significant in explaining credit default. The gender factor has a positive coefficient (0.037) with a probability of 0.002 less than 1%. It is therefore positively significant and explains the default on repayment at the 1% threshold. This result shows that women contribute less to non-repayment of credit than their male counterparts. Such a result although contrary to those of Godquin (2004); Bhatt and Tang (2002); Anthony and Horne (2003); Adusei and Appiah (2011) confirms the results of the majority of studies on gender and default in the existing literature Hulme (1991); Kevane and Bruce (2001); Khandker et al. (1995); Cheston and Kuhn (2002); D'Espallier et al. (2009).

[1]Receiver Operating Characteristic (ROC) shows a good fit of the model to the data.

With regard to the duration of credit, its coefficient is 0.002 with a probability of 0.003. It is significantly positive and provides a favorable explanation for the 1% credit default. The longer the duration, the more likely it is that there will be an incident in the repayment of the loan, as the client bears more charges (insurance and interest) that weigh on him. Also, the object financed by the Coopec, once profitable, must be paid back at the end of the repayment period, but instead of repaying the loan on time, the member reinvests the other part of the loan in an uncontrolled activity, hence the occurrence of risk. In the short term, it is flexible but reduces the enthusiasm and invites repayment. Thus, the duration must rhyme with the sector of activity.

Through the estimation obtained on the variable amount of credit, we understand that the higher the amount of credit granted to the client is than the real amount released by his financial capacity, it is likely that the credit obtained is marred by an incident in its repayment. The amount of credit has a coefficient of 0.028 with a probability of 0.000. This variable has a positive and significant coefficient at the 1% threshold. It can be explained by the fact that if the amount of credit granted is less than the amount of credit requested and accessible by his financial capacity, the client is attracted by the usurer at a very high usurious rate which plunges him further into a situation that he will not find himself in on the one hand and on the other hand at other Coopecs to look for the complement from where a cavalry within the Coopecs which will overflow the vase in the event of an abnormal situation like the example of the health crisis covid-19.

Conclusion

The objective of this article is to highlight the effect of gender on credit default in Togo and more specifically in the Coopec SOLDARITE and thus contribute to enriching the debate on the issue of credit default and therefore on credit risk management. Through an econometric analysis in logistic regression with data of 4,867 credit beneficiaries from the SAF (Financial Automation System) database. Several important results are derived from our estimations.

The gender variable has a positive and significant coefficient at 1%. Gender explains non-repayment at the 1% level. Such a result shows that women contribute less to credit default than their male counterparts and confirms the results of the majority of studies on gender and default in the existing literature (Motedayen et al., 2022; Mersland et al., 2010, Hulme, 1991). With regard to our control variables, our results show that the duration of credit, the amount of credit, the number of years of experience, the type of collateral, age and the use of ICT are also determinants of credit non-repayment.

Default management requires that financial institutions, without exception, take preventive and adequate measures, which will ensure comfortable financial results and consequently its sustainability. Our results can help financial companies and regulators to develop policies that can lead to more effective and efficient credit management. Credit managers can use our results as a model for assessing credit demands in emerging economic environments.

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