

A Proposal of a Microcredit Granting Model for the Microfinance Associations in Tunisia

Zouhayer Mighri¹, Asma Saghaier*²

Received: April 16, 2018

Accepted: July 17, 2018

Abstract

This article is devoted to look at how the factors micro-loan risks in microfinance are related to the micro-borrowers. In this regard, the present analysis involves the using of a set representative and fundamental variables in our research. The study basically use the socio-economic and socio-demographic features specific to the micro-borrowers, which are expected to affect the repayment delay, using the scoring models introduced to assess the micro-borrowers' risk quality. Based on survey and logistic regression containing these features, the empirical results of econometric model show their impact on the repayment delay in the Tunisian Micro-Credit Associations.

Keywords: Repayment Delay, Microfinance Associations, Micro-borrowers, Simple Logit, Tunisia.

JEL Classification: G21, G28.

1. Introduction

This article examines the relevance of the factors and causes of repayment delay in microfinance which are conceived at the level the micro-borrowers' socio-economic and demographic features of a Tunisian Micro-Credit Associations (AMCs). In the financial literature revue, there are a few of paper which discuss these factors (Agier and Szafarz, 2013). On this point, Honlonkou et al. (2006) state that the term "delay" may depend on the features of the micro-borrowers of a Microfinance Institutions (MFI). Indeed, the

1. College of Business Administration, Prince Sattam Bin Abdulaziz University Kingdom of Saudi Arabia, Al Kharj, Saudi Arabia (z.mighri@psau.edu.sa).

2. College of Business Administration, Prince Sattam Bin Abdulaziz University Kingdom of Saudi Arabia, Al Kharj, Saudi Arabia (Corresponding Author: asma_sghaier1983@yahoo.fr).

emergence of microfinance as a new funding method in the developing countries result from the excluding of vulnerable social groups through the formal financial system (Morduch and Barbara, 2002).

Therefore, microfinance was considered as a funding instrument of short-term contract staff and micro-projects through micro-loans. (Servet, 2010; 2011), and that can have a crucial role in the economy on the achieving of objectives in terms of regional development, job creation, income generation and poverty reduction, (Guérin and Palier, 2006). Therefore, it is necessary and essential to emphasize this delay problem and examine the socio-economic and demographic characteristics of the microfinance borrowers, which may be potential sources of delay. For this reason, our central question that should be asked is: What are the main factors of delay related to the socioeconomic and demographic characteristics of the micro-borrowers? The objective in this article is to try to identify the micro-borrowers' characteristics that affect the delay. The idea is to identify their aspects and distinguish between good and bad micro-borrowers, to predict the delay probability and suggest a new technique to measure it so that we can achieve a better understanding of the possible sources of this delay and the ideas related to it.

This paper is organized as follows: the first section deals with the renewal of micro credit in Tunisia. The second section examines a research methodology, in the third section we explain the application and results and Discussion finally last we find the conclusions.

2. Literature Review

In previous literature microfinance is considered as a tool which help the eradicate poverty. Through various approaches, this research area proved its capacity to provide financial services to the populations excluded from traditional finance (Vincent, 2005). However, Microfinance provide some examples of successes but remains characterized by cases of bankruptcies (Sharma and Zeller. 1997¹). In fact, the measurement model of micro-borrowers' to refunding the

1. The analysis of Sharma and Zeller (1997) and Godquin (2004) show that, the probability of no payment increases with the size of the loan granted to the borrower.

situation passes by an evaluation of their particular characteristics which influence the probability having a lack of reimbursement (Giné et al., 2010).

To identify the impact of factors related to the micro-borrowers' specific characteristics on the repayment default, it is necessary through to stop at examine the explanatory factors of the micro-borrowers' repayment default. Indeed, many empirical studies found a relationship between several the micro-borrowers characteristics to the lack of reimbursement (Galema et al., 2008). This make possible to put the characteristics of micro-borrowers in the center of our research' attempt, to categorize the micro-borrowers according to the factors affecting their refunding and to define a standard profile of solvent micro-borrowers. Several previous research show that the characteristics related to the micro-borrowers are differently interact with the probability of the repayment default depending on area and person. For this reason, the research field suggests a classification of research works according to the demography, professional experience or the socio-economic origin. In this regard, Wenner (1995) proposes an application of research per specific groups of micro-borrowers refer to set of characteristics such as age, gender, learning, location, marital status, branch of industry, nature of the project, number of dependent children, and the amount of loan. Navajas et al. (2000) report that the lack of reimbursement has a bad incidence on the microfinance institution as well as for the micro-borrower and it is a phenomenon that should be avoided.

2.1 Problems Involved in the Socio-economic Characteristics of the Micro-borrowers

Our study is bases on the follow-up of the micro-projects, geographical area, amount of the loan, industry, nature of the project and the distance between the institution and the customer's residence as determinant of socio-economic characteristics that may affect the repayment default.

In the wake of the revolution, the challenges were enormous in Tunisia. The political impact embodied by the departure of President Ben Ali, on January 14, has given way to a violent economic shock: tourists have deserted, the activity was stopped because of strikes,

investors fled ... And the number of the unemployed continues to grow. According to the Tunisian Minister of Vocational Training and Employment, Said Aydi, by July 2011, some 700,000 Tunisians could be job seekers, against 562,000 estimated in April. Microcredit has quickly emerged as the solution to restart the economic machine. A history of microfinance in Tunisia appears interesting in order to proceed, later, to the regulatory framework governing the matter and present the actors of micro lending in Tunisia.

The follow-up of the micro-projects: Several studies reports the lack of tracking financed projects, in inappropriate periods of withdrawal, diversion of the appropriations to the consumption or the refunding of the usurers and the perception of the public financing called "cold money" are all assimilated, as more significant in the explanation of microcredit' repayment default (Honlonkou et al. (2006); Khawari (2004); Kim et al. (2006)). Indeed, Honlonkou et al. (2006)¹, Morduch and Barbara (2002) showed that the frequent visits of the personnel of the microfinance institutions has a positive effect on the refunding. In contrast, Zeller and Meyer (2002); Littlefield and Rosenberg (2004); and Nowak (2005), found that the visits of the personnel of the microfinance institutions could lead to a rise in the transaction' costs. The authors report that the rise in the costs of transaction is connected to the costs of transport, and therefore will have a negative impact on the rates of refunding. Nevertheless, the microfinance institutions increase their reimbursement rate by adopting an adequate supervision after obtaining the credit through the monitoring of the borrower in residence, imposing a penalty and interest on arrears in the event of no refunding; making dissuasive suggestions such as the publication of picture and names of the failing ones and sending a letter of congratulations in the end of refunding (Zeller et al., 1997).

The geographical area: Based on previous research about the relation between the geographical area of the micro-borrower and the lack of reimbursement, Singh et al. (2007) and Shepherd (2003) found that the risk of no refunding of a microcredit depends on the

1. Honlonkou et al. (2006) tried to identify certain causality between the defect of refunding and the personal characteristics related to the borrowers of an institution of microfinance.

geographical establishment of concerned project. In the rural zones, in particular, the borrowers can be far away from the counters of the microfinance institutions (Thornhill and Gellatly (2005); Thornhill (2006)). The more significant the distance, the greater the credit risk will be insofar as the follow-up of the loan is less rigorous because of the generated cost. According to Morduch (1999a; 1999b), in rural areas, the financing of the agricultural projects assumes specific risks related to the economic and natural context. In summarize, the urban zone decreases the probability of the repayment default. Moreover, by studying the influence of the geographical expansion on banking efficiency, Fielden et al. (2000) showed that, it is more delicate to remotely control the micro-projects which are geographically far away from the headquarter. Indeed, when microenterprises are located far from the microfinance institutions or from their head offices, the cost of information would increase the costs of communication and travel for both parts (Franco and Haase, 2009). However, in many configurations, the microfinance institution seeks customers in more remote areas because the recipients of the microcredits do not have bank accounts and therefore have to travel to carry out the refunding (Frese et al., 2007).

The amount of the loan: Another determinant of the repayment default in microfinance, is related to the amount of the loan. Therefore, in an attempt to identify the causes of non-repayment through the synthesis of several studies, (Honlonkou et al. (2006); Morduch and Barbara (2002), we found that the insufficiency of the amounts of credit to finance the projects is an important factor of a bad performance of refunding. In the same way, Sharma and Zeller (1997) found that the coefficient of the amount of the loans is significant and negative. This result was also confirmed by Labie and Sota (2004), Labie (2005). Indeed, the negative sign is theoretically explained by the fact that the amount of the loans increases the profit associated with the moral risk. However, Hartarska and Nasdolnyak (2007) showed that, most of the loans which were not repaid at maturity were completely refunded a year later. In this context, the moral risk is interpreted as the choice of a project with a longer maturity (and a higher awaited value) than that of the loan rather than the choice of a riskier project. The negative sign relating to the

amount of the loan can also be associated with the problems that the borrower can face to refund a higher amount over a given period (usually a year). It may be that for a given maturity, the loans of significant size do not meet the requirements of the borrowers and therefore are not appropriate for the local economy (Mersland and Strom, 2008; Mersland, 2009). For a particular borrower and a duration of a given loan, it is shown (Lh eriau, 2005) that the probability of refunding decreases with the size of the loan. The speed of the probability of not refunding due to the size of the loan changes depending on the initial equipment of the borrowers and the costs which they associate with the strategies of moral and the strategic risk . In addition, the microfinance institution cannot reach a perfect rate of refunding on the basis of the several inciting mechanisms. In order not to exceed the new target threshold of defect, the microfinance institution will grant higher loans to the slightly risky borrowers (Cull et al., 2006).

Industry: Khawari (2004) identifies other factors affecting the refunding operation in microfinance. These factors are related to the bond between the financed branch of the industry, the nature of the project of the micro-borrowers and the lack of reimbursement. It should be noted that, according to these studies, the microfinance institutions frequently finance the activities belonging to the innovating sectors of services, small trading activities, craft industry and agriculture. Indeed, Ndimanya (2002), Honlonkou et al. (2006) found that the percentage of the credit allocated to agriculture negatively influences the performance of refunding. This idea can be explained by the threats attached to the lack of rain in agriculture. This result justifies the weak engagement for the financing of agriculture. Sharma and Zeller (1997) conducted a study on the performance of refunding in Bangladesh and showed that the reimbursement rate is high when the borrower does not consider= agriculture as a principal activity. Moreover, Zeller (1994) analyzed the rationing of credit by proving that it depends on a whole set of determinants, particularly the branch of the industry to be financed. This author also recommended that the needs and the risks change according to the branch of the borrower's industry. At this level, Zeller et al. (1997) stipulate that the agricultural loans are risky, expensive and particularly difficult to

obtain. On the other hand, Zeller et al. (1997) think that the practice of the breeding combined with agriculture increases the risks and makes the probability of refunding dubious. The results of their studies confirm that these two activities, which are more exposed to the risks, negatively affect the refunding rates. In the same way, Sharma and Zeller (1998) also discovered that the number of the borrower's years of experience in agriculture had a negative impact on the refunding capacity. Lastly, the older the borrower is, the less innovating he is. Honlonkou et al. (2006) discovered that on the side of the borrower, the possession of equipment approximated by the level of richness exerts a positive effect on the performance of refunding. The level of the owner's wealth is also conditioned by the possession of domestic animals that can be easily resold. In addition, the practice of animal breeding would have a positive influence on the capacity of refunding.

The nature of the project: Regarding to the relationship between the borrower's nature of the project and the delay of refunding, it can be noted that the executives of the institutions of microfinance consider that job-creation projects are profitable, and that the extension projects are associated with a reimbursement rate higher than the one for the job-creation (Feroze, 2011; Farsi et al., 2012).

The distance between the institution and the residence of the customer: By examining the relationship between the distance separating the bank from the borrower and the lack of reimbursement, Mersland (2009) showed that the effect of this distance is positive for the men and negative for the women. The negative result of the female gender can be explained by the absence of means of displacement for the latter. This report will have negative repercussions materialized by weak contacts with the cases and therefore, the non-respect of their engagement. Later, Honlonkou et al. (2006) showed that the distance of the borrower from his case could negatively affect refunding. The positive influence of the distance between the microfinance institution and the micro-borrower is unexpected, but it can be justified. The more the customer is outdistanced, the more the fund administrators seek to ensure sufficient repayment conditions. This increases the performance of the borrowers to refund. Moreover, the capacities of supervision of the credit agents charged to collect the funds are higher

when the dwelling of the borrower is outdistanced from the bank (Frame et al. (2001); Jenssen and Greve (2002)). The preceding discussion materialized by the follow-up of the micro-projects, the geographical area, the amount of the loan, the branch of the industry, the nature of the project and the distance between the institution and the residence of the customer, suggest that, these factors significantly and positively influence the lack of reimbursement of the micro-borrowers. Our objective is to check this influence. Consequently, in the light of what was advanced, the subjacent hypothesis (H.1) which we will test is as follows:

Hypothesis 1: There is a positive relationship between the lack of reimbursement and the socio-economic characteristics of the micro-borrowers represented by the follow-up of the micro-projects (H1.1), the geographical area (H1.2), the amount of the loan (H1.3), the branch of the industry (H1.4), the nature of the project (H1.5) and the distance between the institution and the residence of the customer (H1.6).

2.2 Problems Involved in the Demographic Characteristics of the Micro-borrowers

Regarding the relationship between the nature of the project of the borrower and the delay of refunding, it can be noted that the executives of the institutions of microfinance consider that the job-creation projects are profitable and that the extension projects are associated with a reimbursement rate higher than the one for the job-creation.

The Gender: Regarding the relationship between the gender of the borrower and the repayment default, Dutta and Thornhill (2007), Field et al. (2008) showed that the female borrowers do not significantly realize a higher performance of refunding, and even if the coefficient is positive, it is not significant. The fact that, on average, women present a probability of defect weaker, this can be partially justified by the fact that they receive on average smaller loans. Therefore, gender influences refunding, in other words, men have a tendency to better refund than women. This result goes against what is usually marked in the literature which supposes that the reimbursement rate of women is definitely higher than that of men because the formers appear more

disciplined versus the expectations of the banks. However, Berger et al. (2005) noted that, gender is not a significant factor of the reimbursement rate in the context of Malawi. Moreover, Berger and Udell (2002) stipulates that the Grameen Bank is owned by the poor (particularly and primarily women) whereas the other banks are owned by the rich (primarily men). In addition, Enda considers that the woman refunds her credit better. Coleman (2006) and Cull et al. (2006) specify that the programs of microfinance show the wisdom of the poor and particularly women who are regarded as excellent recipients and who are sometimes better than the other borrowers (men). Moreover, this criterion can have a higher weight at the time of the arrival of an event: like marriage, death of a husband, divorce, saving or some female activities. The financing of women seems to be less risky (Caudill et al., 2009). At this level, Servet (2011) and Cull et al. (2007) indicate that women refund better than men and further exploit the resources of the microfinance for the benefit of the family and the children. The authors do not mean that women are poorer than men but their incomes are lower than those of men. Consequently, gender appears to be a determining factor of the repayment default.

Age: Concerning the relation between the borrower's age and the repayment default, Servet (2010-2011) finds, in several investigations, that young people are compared to very risky borrowers. Therefore, the risk of delay decreases with the borrower's marriage and thus, a married customer is less risky than a single person. In fact, it is the family stability of the married person which pushes him to repay his loan. It is logical to think that experience also plays in the favor of the borrower; youngest borrowers tend to have a weak repayment rate. Indeed, the age criterion was frequently used by the Tunisian Solidarity Bank for the choice of the borrowers (Benarous, 2004). This bank prefers to grant credits to young people, which seems to be a significant criterion insofar as the bank seeks a population of young, courageous, and motivated contractors. As a consequence, the project is the only guarantee for the banker. It is an objective element and a significant index of its profitability. In addition, the age criterion is significant in the strategy of Enda microcredit institution because young people have a significant role in the development of the companies of which they are not only the recipients but also the potential actors.

The marital status and the number of dependent children: As for the relationship between the marital status and the number of the borrower's dependent children and the lack of reimbursement, it is observed that women, more often unmarried women, have a priori fewer guarantees to obtain external financings (Nawai and Shariff, 2010). In other words, the borrower's marital status can condition the capacities of the latter to refund his loan. More, there are children in the family of the borrower, more this one is insolvent (Woller et al., 1999).

Educational level, former experiment and microfinance institution: Concerning the relation between the educational level and the former experiment of the borrower and the lack of reimbursement, we note that the reimbursement rate was influenced by the human capital. Indeed, formal education makes it possible to structure the ways of thinking and to reinforce the cognitive capacities of the active micro-borrower and the future contractor (Van et al., 2011). Therefore, it can be assimilated as a significant source of skills, capacity to solve problems, motivation, knowledge, self-confidence. The accumulation of these skills makes it possible for the individuals to adapt to the new changes such as the risk taking and to the entrepreneurial act which can lead to a new activity with a high added value. Thus, contractors can better profit from their knowledge and their contacts generated by the education system to acquire necessary resources, identify and exploit the business opportunities. In other studies, such as that of Abdou (2009), the most educated contractors are able to identify and/or to carry out the outputs of these opportunities. In the same way, according to Servet (2006), the majority of the studies on the determinants of the refunding rates integrate variables related to the educational level and the former experiment of the borrower with his bank. Andersson (2004) showed that these experiments can contribute to the integration and the accumulation of a new knowledge and also make it possible for the individuals to become more productive and creative and, consequently, more likely to define and structure new solutions to the existing problems (Anderson et al., 2004) and discover and exploit opportunities. The preceding discussion materialized by the gender, the age, the marital status, the number of dependent children, the educational level and the former experiment with the microfinance institution, suggests that, these factors significantly and positively

influence the repayment default of the micro-borrowers. Our objective is to check this report. Consequently, in the light of what was advanced, the additional hypothesis H.2 that we will test is as follows:

Hypothesis 2: There is a positive relationship between the lack of reimbursement and the demographic characteristics of the micro-borrowers represented by the gender (H2.1), the age (H2.2), the marital status (H2.3), the number of dependent children (H2.4), the educational level (H2.5) and the former experiment with the microfinance institution (H2.6).

2.3 Conceptual Research Framework

Based on the criteria discussed above, the conceptual model is presented in following figure:

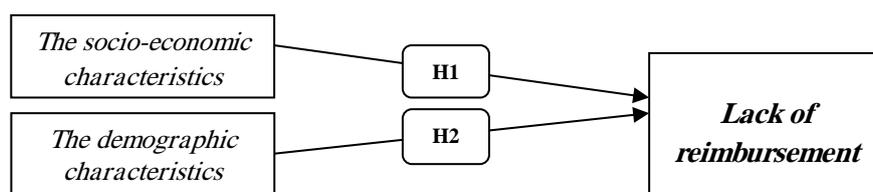


Figure 1: The Conceptual Model of the Research

3. Research Methodology

3.1 Targeted Population, Data Collection and Processing and Sampling Methodology

Our study sample, which consists of MCAs' micro-borrowers of the Sfax region, was built in order to establish the links between the different characteristics of the microfinance borrowers and their repayment attitude at maturity. Therefore, to examine the factors influencing the repayment, we focused on a sample of 999 micro-credit observations. From then on, to deal with the data, we have used two methods. The first is the "descriptive approach", which is based essentially on the construction of frequency simple and cross-tabulations to assess not only the importance of the micro-finance borrowers' use of MFIs according to their characteristics, but also the impact of these characteristics on the delay. The second is the "econometric approach", which essentially seeks to identify the factors that cause the repayment delay on the part of the microfinance

borrowers' characteristics. Moreover, to understand these different variables, it is worth adopting the qualitative method as an exploratory and descriptive research method which explores the repayment delay phenomenon of our AMCs' micro-borrowers, to represent them and therefore understand them in the Tunisian context (Chye et al., 2006).

3.2 Analysis Method and Data Processing

Three purely statistical techniques were conducted to expand our model. These are: the CPA, the analysis of the average values and the logistic regression. Actually, our analysis was performed on the basis of 999 micro-borrowers 79.78% of whom are men aged 49. This is indeed a fairly elderly population; 97.4% of microfinance borrowers are at least 50 old and 2.5% are aged between 41 and 50. Moreover, 67.1% are married and almost 48.9% of them have children. Actually, most of them are qualified through their career paths and 52.9% had tertiary education. As a result, these data have given us an idea about the characteristics of the microfinance borrowers of whom we retained two types that we met to construct our sample.

Table 1: Crossing Age and Activity Sector

| Gender AGE/ Branch of the industry | Men | | | Total | Frequency% | Cumule |
|--|-------|-------|-----|-------|------------|--------|
| | 20-30 | 41-50 | <50 | | | |
| Service | 0 | 13 | 299 | 312 | 31,23 | 31,23 |
| Artisanat | 1 | 9 | 357 | 367 | 36,74 | 67,97 |
| Agriculture | 0 | 1 | 41 | 42 | 4,20 | 72,17 |
| Small trades | 0 | 2 | 276 | 278 | 27,83 | 100 |
| Total | 1 | 25 | 973 | 999 | 100 | |

Source: our calculations start from the data base of microfinance institutions.

The age distribution in our study based on the activity sector seems to indicate the existence of three groups: The 1st one includes the microfinance borrowers who have invested in the craft sector, that is, 36.74% of the total sample whose age is over 50. Then, the second group includes those who have invested in the service sector, with a rate of 31.23% and who are the oldest. Finally, the third group includes those who have small trades the rate of whom is 27.83%. These statistics made us confirm that the average age is the same in all

the three sectors. In fact, the relationship between the industry and age shows the strong link between these two variables, the thing which confirms the pre-discussed research which shows that young people are the most defaulting for a particular given sector.

3.2.1 Results' Analysis in Principal Component

The objective of this section is to describe the structure' characteristics of sample composed by 999 customers. In fact, we try to underline these features through a multidimensional approach. For this reason, we will attempt to locate the different variables on a factorial design. For this purpose, we will first examine the dimensionality of the scale using the CPA, and then, its reliability by calculating Cronbach's alpha. Finally, we will proceed with the interpretation of the priorities selected by the CPA. Hence, the scale meets the application conditions of the factor analysis, $KMO^1 = 0.699$ and Bartlett's test = 349.9 (0.000). As a result, a first ACP according to the covariance matrix of 13 items was launched without specifying the number of the required axes. According to the KMO, two factors are extracted and used to reposition 33.7% of the total variance. The first factor accounts for 22.4% of the total variance whereas the second accounts for only 11.3%. Finally, the items of the correlations with both extracted axes of the CPA, after a vari-max rotation, are shown below and the choice of the vari-max rotation indicates that the factors are separable.

To describe the particular characteristics of 180 companies we use a multidimensional approach. We will seek to locate the several variables' measurement of entrepreneurial culture and leader profile on a factorial design. Therefore, we will successively examine the dimensionality of the scale by means of the principal component analysis (PCA), his reliability (internal coherence between the answers by calculating Cronbach alpha) and we carry out the interpretation of the axes retained by the PCA. Indeed, the scale fills the conditions for application of the factorial analysis ($KMO^2 = 0.699$

1. The KMO is a reality ranging from 0 to 1. An acceptable KMO higher than 0.5 ensures that the partial correlations are not too significant compared to the simple ones. The KMO is essential to obtain an interesting PCA. In the negative one, it can be necessary to remove some variables.

2. The KMO is a reality ranging from 0 to 1. An acceptable KMO higher than 0.5 ensures than the partial correlations are not too significant compared to the simple

and the test of Bartlett = 349.9). A first look on the analysis in principal component according to the matrix of covariances, on 7 items is launched without specifying the number of required axes, we find a value supports the criterion of Kaiser (eigenvalue > 1), two factors are extracted and make it possible to put in perspective 33.7 % of the original variance. The first factor takes a value of 22.4% of the original variance the second factor have just 11.3%. The results of correlations between the items and this two axes extracted the PCA, after rotation vari-max, are presented below and the choice of rotation VAR-max indicates the reparability of this factors.

Table 2: The Factorial and Exploratory Results Entrepreneurial Culture and Profile of the Leader Scale of Analysis (With Rotation VAR-max)

| Variables | Fact1 | Fact2 | Saturation |
|--|--------------|---------------|-------------------|
| The Gender | 0.202 | | 0.08 |
| The age | 0.107 | | 0.106 |
| The educational level | 0.55 | | 0.306 |
| The branch of the industry | 0.73 | | 0.559 |
| The marital status and the number of dependent children | 0.12 | | 0.643 |
| The distance between the institution and the residence of the customer | 0.87 | | 0.76 |
| The follow-up of the micro-projects | 0.55 | | 0.315 |
| Marital status | | 0.75 | 0.57 |
| Experience | | 0.101 | 0.286 |
| The geographical area | | 0.004 | 0.776 |
| The amount of the loan | | 0.312 | 0.11 |
| The number of instalments | | 0.309 | 0.09 |
| The nature of the project | | 0.12 | 0,02 |
| Variance | 3.13 | 1.57 | |
| % explained Variance | 22.4% | 11.3% | |
| Total variance explained | | 33.7 % | |

Source: our calculations starting from the data base of microfinance institutions.

Fact1: Factorial axis 1

Fact2: Factorial axis 2

Representative variables are on FAC 1 and FAC2

correlations. The KMO is essential to obtain an interesting PCA. In the negative one, it can be necessary to remove some variables.

3.2.2 Analysis in Principal Component: Correlation Circle

The result shows a high correlation between gender and age (it a value 0.65, at the level of significance of 1%). Another result not expected about the correlation between the number of dependent children and family situation, which indicates a strong negative correlation making a problem about the correlation matrix saturations and shows that these two variables are doublets and have a double function. For this purpose, the analysis of the correlation circle shows that some variables form a right angle, which shows that some variables are independent and have a zero correlation coefficient, which is the case between the number of monthly payments and the loan amount.

As a result, the analysis of both the table and the graph below shows that the only characteristics of the microfinance borrowers contain redundant and unnecessary information to use, which makes the recognition system learning more complex. Therefore, it is better to reject it in order to avoid the singularity case of the correlation matrix ($\text{debt} = 1$). To summarize our work, we wished to carry out a multidimensional approach of the specific characteristics of the microfinance borrowers and the variables with the most important contribution to the cloud inertia. To present the Second analysis in principal component, we use 10 variables including: the Educational level (EL), the Branch of industry (BA), the Nature of the project (NP), the Number of dependent children (NCH), the Distance (DIST), the Marital status (MS), the Former experiment (EXP), the Follow-up of the micro-projects (FA), the Amount of the loan (AL) and the Geographical area (GA) to represent the most relevant and the most active characteristics of microfinance borrowers.

To detect most of the redundant variables, we use the second factorial analysis via the correlation circle to reduce the number of the variables which constitute the contained informational one of the final data base. Thus, the configuration of 7 variables provides the best approximation of the real angles between the variables, and consequently the best plane representation of the matrix of the correlations. Indeed, the correlation circle shows that, several variables are very close, which means that there is a high correlation coefficient.

The two variables group' culture and need for achievement are

presented by two points diagonally opposed on the sphere which reflect that the latter ones are bound by a strong negative correlation and this make impossible saturations of the matrix of correlation and shows that the two variables are doublets. Moreover, the analysis of the table shows that the entrepreneurial culture and the profile of the leader contain redundant and useless information what returns the training of the system of recognition more complex and thus, preferable to reject it in order to avoid the case of singularity of the matrix of correlation ($\det=1$). To synthesize our results, we wished to lead multidimensional approach of the entrepreneurial culture and the profile of the leader. The second analysis in principal component, takes into account 7 variables which are: Culture of group, hierarchical culture, adhocratic culture, culture of the market, as variables representative of the entrepreneurial culture, and need for achievement, entrepreneurial self-efficacy and internal locus of control to apprehend the profile of the leader.

Table 3: Principal Results of the Second PCA

| Variables | Fact1 saturation | Fact2 saturation | Fact1 score | Fact2 score |
|---|---------------------|--------------------------|----------------|----------------|
| Educational level | 0.15 | | -0.005 | |
| Branch of industry | 0.28 | | -0.04 | |
| Nature of the project | 0.012 | | -0.001 | |
| Number of dependent children | 0.06 | | -0.027 | |
| Distance | 0.14 | | -0.012 | |
| Follow-up of the micro-projects | 0.15 | | 0.007 | |
| Marital status | | 0.07 | | 0.02 |
| Experience | | 0.46 | | -0.24 |
| Amount of the loan | | 1.11 | | 0.79 |
| Geographical area | | 0.22 | | 0.05 |
| % explained Variance | 53.3% | 16.1% | | |
| Original variance explained | | 69.4% | | |
| KMO | | 0.699 | | |
| Test de Bartlett (p-value) | | 349.9 (0.0000) | | |
| Regulate of Kaiser: Eigenvalue >1 | | Two Factors | | |
| Diagonal of the Matrix AntiImage > 0.5 | | Coefficient Satisfactory | | |

Source: our calculations starting from the data base of microfinance institutions.

Although only one axis is expected, the ACP restores only two: the indicator family that contributed to the construction of the 1st factor

which defines the variables related to the 'quality of the borrowing, which are represented by: the Educational level (EL), the Branch of industry (BA), the Nature of the project (NP), and the indicator family that contributed to the construction of the second factor defining the variables related to " the micro-borrower's position ", which are represented by: the Marital status (MS), the Former experience (EXP), the Amount of the loan (AL) and the Geographical area (GA).

Actually, the results in the table help us carry out the following analysis: the ACP accompanied by the rotation enabled us to synthesize 10 variables in 3 iterations to show their characteristics in two factors, which, in turn, explain 69.4% of the total variance. Finally, to carry out our multidimensional approach, we will represent the 10 variables on the correlation circle, which enables us to interpret the graph reproducing the variables projection on the first factorial plan issued from the CPA.

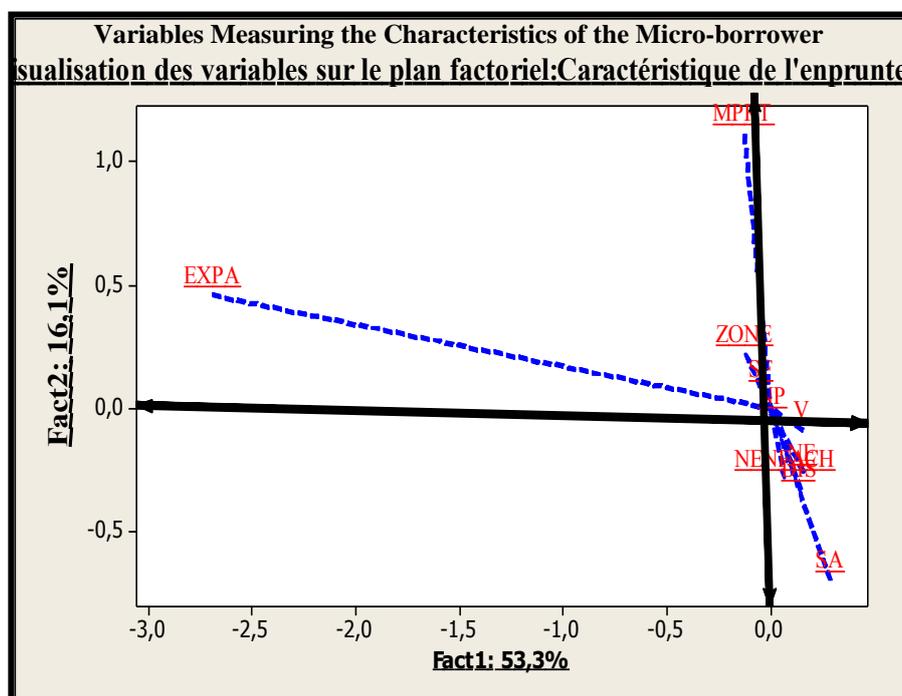


Figure 2 : Second Analysis in Principal Component on 10 Variables

Note: Representation of the active variables on the first plan issued from the ACP on the variables measuring the characteristics of the micro-borrower. Result visualization using the MINITAB 15 software.

The representation of the variables enable to carry out the following analysis: the first axis (Vertical), which represents 53.3% of the inertia of the scatter plots, reflects the amount of information captured by the intrinsic quality of the micro-borrowers represented by the variables “Educational level (EL), Branch of industry (BA), Nature of the project (NP), Number of dependent children (NCH), Distance (DIST) and Follow-up of the micro-projects (FA).

To the right of this axis, an association between the micro-borrowers and the cultivated assets having a higher level of activity in a sector based largely on small businesses and agriculture. Moreover, in this quadrant, the micro-borrowers have a high number of dependent children in charge and are located far from the bank. To the left of this axis, there is a gathering of the credit applicants having a low level of education and those who have creation credits.

The second axis (Horizontal) includes 16.1% of the dispersion and single and married people. In this axis, these micro-borrowers are marked mainly by a lack of experience. Finally, the study of the position of the variables in each of these quadrants obtained from this statistical approach helps us distinguish between two groups of micro-borrowers on the basis of the repayment rate which differs according to their characteristics.

3.2.3 Test of the Difference in the Average Values and in the Variance Equality

By conducting this test, we will assess the average values of the variables for the good and bad micro-borrowers. In fact, the advantage of this test is that it helps obtain more reliable results. Therefore, our results of the tests show that there is an overall significant difference between a good and bad micro-borrower regarding the variables “follow-up of the micro-projects (FA), number of dependent children (NCH), distance (DIST), geographical area (GA), nature of the project (NP) and former experience (EXP). However, no significant difference was found between "good and bad" regarding the marital status (MS) and the branch of industry (BA). The test results are shown in the table below:

Table 4: The Difference Test of the Percentage Value and the Variance Equality

| Rate of Marital status | | Rate of Follow-up of the micro-projects | |
|--------------------------------------|---------|---|----------|
| Delay ==1 | 0.21 | Delay ==1 | 0.52 |
| Delay ==0 | 0.19 | Delay ==0 | 0.36 |
| Diff | 0.019 | Diff | 0.167*** |
| T-stat | 0.52 | T-stat | 5.19 |
| p-value | 0.59 | p-value | 0.000 |
| Ficher | 0.93 | Ficher | 1.08 |
| p-value | 0.47 | p-value | 0.402 |
| Rate of Number of dependent children | | Rate of Distance | |
| Delay ==1 | 2.44 | Delay ==1 | 0.83 |
| Delay ==0 | 2.58 | Delay ==0 | 0.92 |
| Diff | -0.13** | Diff | -0.093** |
| T-stat | -1.93 | T-stat | -2.02 |
| p-value | 0.029 | p-value | 0.021 |
| Ficher | 1.17 | Ficher | 1.06 |
| p-value | 0.03 | p-value | 0.47 |
| Rate of Branch of industry | | Rate of Geographical area | |
| Delay ==1 | 1.24 | Delay ==1 | 0.63 |
| Delay ==0 | 1.31 | Delay ==0 | 0.58 |
| Diff | -0.07 | Diff | 0.045* |
| T-stat | -0.9 | T-stat | 1.407 |
| p-value | 0.36 | p-value | 0.079 |
| Ficher | 0.98 | Ficher | 0.96 |
| p-value | 0.86 | p-value | 0.33 |
| Rate of Nature of the project | | Rate of Experience | |
| Delay==1 | 0.57 | Delay==1 | 5.64 |
| Delay =0 | 0.62 | Delay==0 | 6.37 |
| Diff | -0.04* | Diff | -0.72*** |
| T-stat | -1.46 | T-stat | -4.06 |
| p-value | 0.07 | p-value | 0.0001 |
| Ficher | 1.04 | Ficher | 0.97 |
| p-value | 0.66 | p-value | 0.4 |

Source: our calculations start from the data base of microfinance institutions.

(*), (**), (***) significant coefficients with the threshold respectively of 10%, 5% and 1%.

$H_0: \sigma_1/\sigma_0 = 1$ and $H_1: \sigma_1/\sigma_0 \neq 1$.

The results shown in the table above indicate that, first; the variance heterogeneity property of both groups namely, the fact of making a delay or not, is encountered by the NENFACH. In fact,

Fisher's test (p-value = 0.03) shows that we will reject H_0 of homogeneity, in other words, the heterogeneity H_a will be accepted. These results confirm beforehand that the dispersion structure for the 999 micro-borrowers of our sample is not the same. Actually, these results are opposed by the presence of the variance homogeneity for the other indicators while based on Fisher's exact test (p-value = 0.47, p-value = 0.402, p-value = 0.86 ...). Then, the use of the in-percentage value difference test enables us to confirm in advance that the percentage of both the number of dependent children and the distance differs according to the delay. In fact, table 4 shows a difference of 0.13 and 0.093, respectively, which is significant at 5% threshold.

Finally, these results, which focus on the relationship between these indicators and the delay, are opposed by the absence of a sectoral difference. Actually, they confirm in advance that the fact of creating a micro-project in a given sector has an equal probability of delay compared to the micro-borrower who creates his micro-project in another sector.

3.3 The Model to be estimated

Following on an empirical study carried out by Honloulou et al. (2006), we will try to introduce, in our model, the variables that deal with some of the following characteristics, such as the age, the gender, the marital status, the number of dependent children, the education level, the number of years of previous experience with the bank, the nature of the projects, the activity sector, the loan amount, the distance between the customer's home and the bank, the customer's geographical area and the microcredit agents' visits to the micro-projects, which can have an impact on the repayment delay.

For this reason, we believe that the most appropriate method for the case of this study is the simple logit which helps identify these factors and enables the bank to distinguish the creditworthy micro-borrowers from those who are not. Actually, we try to explain, through a simple binary logit model, the probability of the 999 microfinance borrowers' repayment default ($Y * i$) depending on their characteristics (X_i) so as to reduce the information asymmetry.

In order to test these interactions, the general form of the regression assumed between the dependent variable and the explanatory variables

studied and included in the model to estimate can be represented as follows: $Y_i : \beta_0 + \beta_1 X_{i1} + \beta_2 X_{i2} + \dots + X_{ij} + \epsilon_i$.

Finally, the final model to estimate is presented as follows:

In order to test these interactions, the general form of the regression assumed between the dependent variable and the explanatory variables studied and included in the model to estimate can be represented as follows: $Y_i : \beta_0 + \beta_1 X_{i1} + \beta_2 X_{i2} + \dots + X_{ij} + \epsilon_i$.

Finally, the final model to estimate is presented as follows:

$Delay_i (Y_i) = \beta_0 + \beta_1 * MS_i + \beta_2 * BI_i + \beta_3 * NP_i + \beta_4 * EXP_i + \beta_5 * NCH_i + \beta_6 * AL_i + \beta_7 * GA_i + \beta_8 * DIST_i + \beta_9 * FM_i + \beta_{10} * EL_i + \beta_{11} * G_i + \beta_{12} * A_i + \mu_i$; with $i=1\dots 999$. With:

- Y_i The dependent variable, whose values are determined by those of explanatory variables X_i ;
- **G**: Refers the gender of the micro-borrowers;
- **A**: Refers the age of the micro-borrowers;
- **MS** : Refers the marital status of the micro-borrowers;
- **BI** : Refers the branch of the industry of the micro-borrowers;
- **NP** : Refers the nature of the project of the micro-borrowers;
- **EXP** : Refers the former experiment with the microfinance institution of the micro-borrowers;
- **NCH** : Refers the number of dependent children of the micro-borrowers;
- **AL** : Refers the amount of the loan of the micro-borrowers;
- **GA** : Refers to the geographical area of the micro-borrowers;
- **DIS**: Refers to the distance between the institution and the customer's home;
- **FM** : Refers to the follow-up of the micro-projects of the micro-borrowers;
- **EL** : Refers to the micro-borrowers' educational level ;
- **NbrCred** : Refers to the number of loans taken by the micro-borrowers ;
- **MS**: Refers to the number of monthly payments so that the micro-loan will be repaid;
- μ_i : is the random component or the standard error term and $j = (1.k \dots)$: the number of variables.

Les parameters¹ β_0 and β_j (where β_0 is the constant regression and the coefficient β_j in the regression equation) are parameters related to the studied phenomenon.

4. Application and Results

We formulated a principal hypothesis (H1) according to which the particular characteristics of the micro-borrowers are the possible sources of the lack of reimbursement. More clearly, the empirical part of this paper has as an objective the study of the relationship between the particular characteristics of the micro-borrowers, the dependent variable, and the probability of the lack of reimbursement (Frese et al., 2007). With this intention, our primary step consists in determining the nature of the joint and the marginal effects of each factor which generates the lack of reimbursement. Thus, we resort to the logistic law the repair function of which is written as follows:

$$F(x) = \frac{\exp(x)}{1+\exp(x)}$$

Concerning the marginal effects of each indicator measuring the particular characteristics of the micro-borrowers, elasticities β_i of the model are determined by the following formula:

$$\frac{\partial P}{\partial x_i} = \beta_i * Pr(1 - Pr)$$

At this level, the estimators of the parameters β_i , are those of the maximum of likelihood (log likelihood). In addition, we preceded with the delight of the quality of the model prediction, to evaluate its quality and predict the values 0 and 1 of the lack of reimbursement. With this intention, we fix a threshold of probability equal to 0.5, which gives the two following central hypotheses?

1. It is possible to estimate the values of these parameters through the sample data on the basis of which we will try to estimate an equation of type: $Y: \beta_0 + \beta_1 X_1 + \dots + \beta_j X_j$. These parameters are related to the phenomenon studied and determined using the maximum likelihood method to maximize the distinction between the different groups of micro-borrowers. They also indicate the y change caused by an x change of a unit while the other variables remain constant. This seems to prove that when β_j is positive (respectively negative), this means that an increase of x_i has a positive (respectively negative) effect on π . As a consequence, the regression equation can be presented as follows: $\ln(\hat{Y} / 1-\hat{Y}) = \beta_0 + \beta_1 X_1 + \dots + \beta_j X_j$. It corresponds to the natural log of the likelihood of being part of a group divided by the probability of not being part of the group (Desjardins. 2005).

$$H_0: \text{Delay} = 1 \quad \text{if } \text{Delay}^* \geq 0.5$$

$$H_1: \text{Delay} = 0 \quad \text{if } \text{Delay}^* < 0.5$$

Therefore, under the null hypothesis **H0**, the model can be specified with a predicted probability higher than the threshold and consequently the micro-borrowers carry out a lack of reimbursement.

Table 5: Diagnosis of the Quality of the Logit Model for the Probability of the Delay of Refunding

| Classification | Rate of prediction |
|---|--------------------|
| Percentage of good predictions for the bad micro-borrowers (Delay =1) | 0.76 |
| Percentage of good predictions for the good micro-borrowers (Delay=0) | 0.66 |

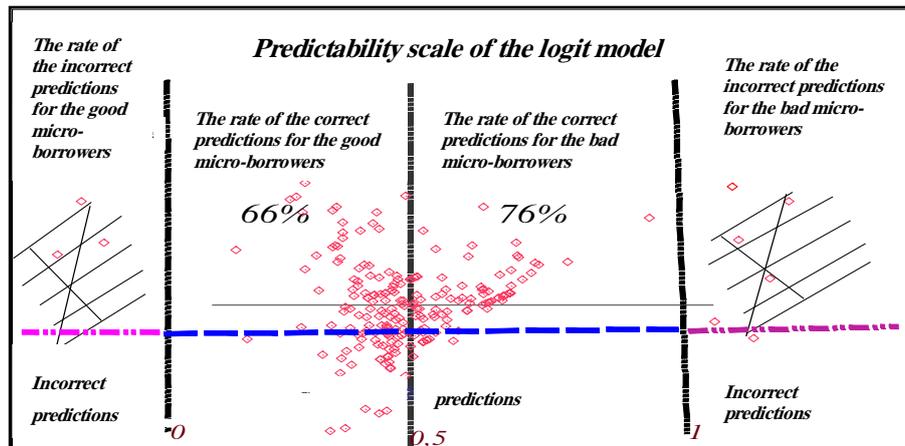


Figure 3: Predictability Scale of the Logit Model

Source: our calculations are taken from the data base of microfinance institutions, 2010.

- 1: Zone of the achievement probability, which is the percentage of the correct predictions
- 0--0.5: The rate of the correct predictions for the good micro-borrowers (66%)
- 0.5--1: The rate of the correct predictions for the bad micro-borrowers (76%)

The other zones are the rate of the incorrect predictions for the good and bad micro-borrowers.

based on the result presented in table n5, the micro-borrowers

carrying out a lack of reimbursement (bad micro-borrowers) are 541 out from 710 who were well predicted with a model rate equal to 0.76 (correct forecasts). On the other hand, the micro-borrowers not having a lack of reimbursement (goods micro-borrowers) are 192 out of 289, who were well predicted with a model rate equal to 0.66. Finally, the model prediction rare is equal to $\frac{541+192}{999} = 73.3\%$.

This is a relatively good model. Besides, the choice of the logit model seems to be justified in this case. It should be noted that the probability elasticity, which is associated with the delay of the $(p_i)^{13}$ micro-borrower related to the explanatory variables, is given by:

$$\Phi(x_i, \beta) = p_i = \frac{\exp(x_i \beta)}{1 + \exp(x_i \beta)}$$

Actually, a 1% increase of x_i leads to an increase of $\frac{\beta x_i}{1 + \exp(x_i \beta)}$ of the probability of making a delay. In other words, if x_i increases by 1%, therefore, the delay probability increases by $\alpha_i = \frac{x_i \beta}{1 + \exp(x_i \beta)} \%$.

The estimate of this model for purpose unites was carried out according to the maximum of probability¹, and which gives the following results:

**Table 6: Results of the Estimate; Dependent Variable;
«Lack of Reimbursement»**

| Characteristics of the micro-borrowers | Joint effects | | Marginal effects |
|--|---------------|--------|-------------------------|
| | Coefficient | z-stat | Predicted delay = 0.809 |
| Marital status | -0.055 | -0.35 | -0.009 |
| Branch of industry | -1.03 | -1.2 | -0.017 |
| Nature of the project | 0.14 | 0.92 | -0.024 |
| Former experiment | 0.32*** | 8.23 | 0.056 |
| Number of dependent children | 0.102 | 1.34 | 0.017 |
| Amount of the loan | -2.81*** | -10.6 | -0.48 |
| Geographical area | -0.38 | -0.91 | -0.065 |
| Distance | 0.015* | 2.34 | 0.017 |
| Follow-up of the micro-projects | -0.74*** | -4.15 | -0.12 |
| Educational level | 0.0018 | 0.02 | 0.0003 |
| Constant | 17.1** | 9.4 | |
| chi square | 157.21 | | |
| p-value | 0.0000 | | |
| R2 | 0.22 | | |

Note: (*), (**), (***) Coefficients respectively significant with the threshold of 10%, 5% and 1%.

The estimates exposed by table 6 emphasize the crucial role played by the characteristics of the micro-borrowers in the determination of the reimbursement rate. This idea is empirically consolidated by the presence of an acceptable explanatory capacity of the model (fairly coefficient of determination: $R^2=0.22$) and thus, an acceptable quality of adjustment. This result implies that the variables selected are dependent on the particular characteristics of the micro-borrowers. In other words, we can conclude that this percentage is sufficient to explain the qualitative variable. Moreover, the test of the general significance of the Chi-square shows that the overall model is significant ($p\text{-value}=0.000$), this makes it possible to reject the null assumption which stipulates that the coefficients are equal to zero.

The results of our empirical investigation show that, on the one hand, the effects of the variables related to the geographical area, the industrial sector, the nature of the project, the marital status, the number of the dependent children and the educational level of the micro-borrowers, on the lack of reimbursement are not statistically significant. However, in the case of our sample, the microfinance institution would gain from refunding if it is interested in the visit of the agent to the micro-projects of the micro-borrowers, the amount of the loans granted to the customers, the distance separating the institution from the residence of the micro-borrower and the former experience with their microfinance institutions. Therefore, the microfinance institution can be based on some criteria more than the others before granting the credit with an aim of increasing the probability of refunding.

5. Discussion and Conclusion

The follow-up of the micro-projects : The theoretical literature undertakes the microcredit agents' visits to the customer's micro-project significantly affect the repayment delay. The findings show a significant coefficient related to this variable but it bears a negative sign (-0.74). This means that this variable has a negative effect on the probability of making delay Zouhayer and Anis (2013). Actually, a 10% increase in the micro-agents' visits implies a 7-point drop of the probability that the micro-borrower is delayed. This means that greater the number of the visits, the delay will be lower, which indicates that the micro-borrowers will be more creditworthy. Our study shows that

the agents' visits negatively affect the microfinance customers' repayment delay. According to Honlonkou et al. (2006), the result supports the hypothesis expected which states, that the number of the micro-agents' visits shortens the repayment delay.

Thus, an MFI can increase its repayment rate using an adequate supervision after obtain the credit by supervising the micro-borrower at home and at his workplace by a loan officer who plays at the same time the role of the management consultant; and by applying some penalties and default interests in case of non-repayment, as well as dissuasive suggestions, such as the publication of photos and the defaulters' names, a congratulation letter at the end of the refunding. Moreover, it was also shown that the frequent visits of the microfinance institution's staff had a positive impact on the repayment whereas Zeller and Meyer (2002) found that the MFI staff members' visits could lead to higher transaction costs. Therefore, the latter ones think that, since their increase depends on the transport costs, the transaction costs will have a negative impact on the refunding rates. As a consequence, it is preferable for MFIs in Sfax area to increase the number of visits to the micro projects. Actually, we found that the micro-borrowers who have the chance to be visited by the very best agents tend to repay their microloans Zouhayer and Anis (2013). In general, in the case of our sample, the MFAs will benefit from the repayment if they are interested in the agent's visit.

The amount of the loan: The theoretical literature shows that the amount of the loan granted to customers significantly affects the repayment delay. However, our estimates show that the opposite effect is observed. On the other hand, the results are found to be opposed by the negative effects of the loan amount on the probability of a delay occurrence. In fact, a 1% increase in the amount implies a decline of more than 2 percentage points of the probability that the micro-borrower will make a delayed repayment. In other words, this variable coefficient is significant and carries a negative sign (-2.81), which implies that it has a negative effect on the repayment delay. This means that the greater the loan amount is, the higher the repayment rate will be and the lower the repayment delay is. Furthermore, it was noticed that the loan amount negatively affects the repayment delay. Actually, the greater the loan amount is, the better

the loan repayment will be. This result confirms our hypothesis which states that, through the synthesis of several studies, the inadequate amounts of credit for project financing, inappropriate payment periods, misappropriation of funds for consumption or the repayment of loan lenders and the perception of public funding called "cold cash" are all causes of poor repayment performance Zouhayer and Anis (2013-2014). Therefore, individuals who receive large amounts of credit have better relationships with the loan officers; hence, there is a less increasing monitoring of the credit destination, as shown by Morduch. (1999a-b).

For a particular micro-borrower and a particular loan period, it is shown (Lhériaux, 2005) that the refunding decreases with the loan amount and the evolution rate of its repayment default, the loan size, which varies depending on the micro-borrowers due to their initial endowments and the costs they associate with the moral hazard and the strategic default. As a consequence, an MFI can achieve a repayment rate of 100% only through different incentive mechanisms of its lending methodology. For this reason, it is preferable for the AMCs to review the amount of money granted to their customers especially in the case of a loan renewal. Thereby, we found that the micro-borrowers who have the chance to benefit from a significant amount of loan from the agents refund their micro-loans better than the other customers Zouhayer and Anis (2013-2014). Consequently, in the case of our sample, a CMA would generally benefit from the repayment if it is interested in the loan amount.

The distance between the institution and the customer' residence: the literature shows that the distance between the customer's home and the bank significantly affects the delay. The findings reveal a positive effect of the distance on the delay. Actually, a 10% rise in the distance results in a 1 percentage point increase of the probability that the micro-borrower is late. In other words, the coefficient on this variable is found to be significant with a positive sign (0.015), which implies that the distance of the MFI micro-borrowers positively influences the probability of a delay.

This means that if the distance between the bank and the micro-project increases, the delay increases. According to the literature, the delay seems to depend on the distance. In fact, the further the banks

are from the customer's home, the more difficult to control the quality of the loans granted by the managers. Berger et al. (2005) found that the more complex the bank's organizational structure is, the more difficult the personal and direct contact with the microfinance borrowers will be, which leads to a subsequent increase of the agency costs between the two contractors. Moreover, the distance between the bank and the micro-borrowers homes positively affects the customer's delay. In other words, the greater the microcredit distance is, the higher the delay will be.

This result is expected since it confirms our hypothesis which, by referring to Honlonkou et al. (2006), suggests that the MFI customer's home distance increases the delay. In fact, the farther the customer's home is from the bank, the lower the repayment rate is and the higher the delay will be. Consequently, the distance indicator reflects the ease of monitoring and following up the micro-borrower by the agents. This explained by the visit frequency to the project field, where it was noticed that the nearest projects to the agency are those which were the subject of the greatest number of visits and, therefore, more supervision and monitoring than the distant projects (rural areas) Zouhayer and Anis (2013-2014).

The former experiment and microfinance institution: several studies provide that the number of the micro-borrowers' years of prior experience with the MFI significantly affects the delay. Actually, we believe that our estimation results reveal a positive and significant impact of the micro-borrower's years of prior experience with the bank on the likelihood of making a delay. In other words, the coefficient relative to this variable is statistically significant at 1% threshold and has a positive sign (0.32). In fact, a 10% increase in the number of years of experience with the bank generates a rise by 3 points in the probability rate that the micro-borrower is lagging behind. This means that the delay increases as long as the number of the micro-borrowers' years of past experience with the MFIs increases Zouhayer and Anis (2013-2014). Specifically, the higher number of the customer's years of previous experience with the bank, the lower the performance regarding the repayment will be.

Therefore, the customer's previous experience with the bank is said to positively affect the delay. The more important experience is, the

greater the delay will be and the less capable the micro-borrowers are to repay their loans at maturity. This result is unexpected and does not confirm our hypothesis which, according to Honlonkou et al. (2006) states that the micro-borrower's past experience with the bank negatively affects the loan repayment rate and reduces the micro-borrower's likelihood to make a delay. However, this can be justified by the fact that when having a loan for the first time from the MFI, the micro-borrower seeks to show himself to the institution as a loyal customer who repays its loans at maturity to access higher amounts. Once this is achieved, the incentive to repay the loan decreases.

Finally, the results obtained at the end of this analysis validate our departure hypothesis which states that the repayment delay is caused by the micro-borrowers' characteristics. Furthermore, these results show that the repayment is based on specific characteristics Zouhayer, Tarek and Anis (2015). On the other hand, these results can provide the AMCs' managers with a revised tool useful to their activities. This helps put forth the recommendations to improve the functioning of the CMA to multiply the creation of micro-projects and mainly promote employment and development in other areas and sectors Zouhayer, Samir and Anis (2014).

On the basis of these results, in terms of economic policy track, it is clear that there is a need to increase the number of visits to micro-borrowers by adopting an adequate supervision, after obtaining a microcredit, through home monitoring and in the workplace by a loan officer who plays at the same time the role of a management consultant, to raise and revise the amount of the loan, by focusing on the customer's experience in entrepreneurship and in the creation of geographical distance Zouhayer, Tarek and Anis (2015). As a consequence, the MFI type can greatly contribute to the repayment through several methodology factors for granting microcredit, among which we can mention the political risk-taking, the customer's follow-up policy, the previous training of the candidates for the loan and finally the quality of the corporate governance. It is actually to implement specific measures to help the MFIs to reach a financial and social viability. The results obtained from this analysis validate our assumption according to which the repayment default is due to the micro-borrowers' characteristics related to their profiles/Therefore,

the results show that the repayment of the microcredit is based on specific characteristics related to the vulnerable micro-borrowers and excluded from the traditional financial system Zouhayer, Samir and Anis (2014).

5.1 Conclusion

To develop micro-finance, we have to review the regulatory framework and implement an independent and effective supervisory capacity. On the basis of this backdrop and in order to unlock the microfinance potential, there has been a clear vision, thanks to the concentration of the relevant ministries, to the service providers and the donors involved in the micro finance sector, under the supervision and coordination of the Ministry of Finance. This vision is summarized as follows: a socially responsible and sustainable micro finance which, through providing the large number of people with quality financial services, contributes to the struggle against financial exclusion, to the harmonious development of the regions and to economic growth.

This makes it possible to advance possible suggestions and recommendations to improve the operations of the microfinance institutions, which are likely to multiply the creation of the micro-projects and especially to support employment and growth in other localizations and branches of the industry. As a consequence, this analysis could lead to strategic actions targeting to eliminate the constraints which limit the chances of the success of the micro-projects Zouhayer, Tarek, and Anis (2015). What rises from these results, in terms of track of the economic policy, is the need to increase the number of visits to the micro-borrowers by adopting an adequate supervision after obtaining the micro-credit, increasing and revising the amount of the loan, evaluating the experience of the customer in entrepreneurship, taking into account the geographical distance between the microfinance institution and the customer's home. In spite of the central questions raised by our analysis and related to the socio-economic and socio- characteristics of the micro-borrowers, it is also important to examine the role of the credit agent in the reduction of the repayment default of the microfinance institution Zouhayer, Samir and Anis (2014).

References

Abdou, H. (2009). An Evaluation of Alternative Scoring Models in Private Banking. *Journal of Risk Finance*, 10, 38-53.

Agier, I., & Szafarz, A. (2013). Subjectivity in Credit Allocation to Micro-Entrepreneurs: Evidence from Brazil. *Small Business Economics*, 41(1), 263-275.

Anderson, R. C., Mansi, S. A., & Reeb, D. M. (2004). Founding Family Ownership and the Agency Cost of Debt. *Journal of Financial Economics*, 68, 263-285

Andersson, P. (2004). Does Experience Matter in Lending? A Process-tracing Study on Experienced Loan Officers' and Novices' Decision Behavior. *Journal of Economic Psychology*, 25, 471-492.

Berger, A., & Udell, G. (2002). Small Business Credit Availability and Relationship Lending: the Importance of Bank Organizational Structure. *Economic Journal*, 112, 34-53.

Berger, A. N., Scott Frame, W., & Nathan, H. M. (2005). Credit Scoring and the Availability Price and Risk of Small Business Credit. *Journal of Money, Banking and Credit*, 37, 191-222.

Caudill, S., Gropper, D., & Hartarska, V. (2009). Which Microfinance Institutions Are Becoming More Cost Effective with Time? Evidence from a Mixture Model. *Journal of Money, Credit and Banking*, 41, 651-672.

Chniguir, M., Sghaier, A., Soufeljil, M. & Mighri, Z. (2017). The Degree of Home Bias in the Holding of Share Portfolio: Case of American Investors. *International Journal of Sustainable Economies Management (IJSEM)*, 6(3), 1-16.

Chye, K. H., Chin, T. W., & Peng, G. C. (2006). A Two-step Method to Construct Credit Scoring Models with Data Mining Techniques. *International Journal of Business and Information*, 1, 96-118.

Coleman, B. (2006). Microfinance in Northeast Thailand: Who Benefits and How Much? *World Development*, 34(9), 1612-1638.

Crosan, R., & Gneezy, U. (2009). Gender Differences in Preferences. *Journal of Economic Literature*, 47, 448-474.

Cull, R., Demirgüç, K. A., & Morduch, J. (2007). Financial Performance and Outreach: A Global Performance of Leading Micro Banks. *Economic Journal*, 117, F107-F133.

----- (2006). *Financial Performance and Outreach: A Global Analysis of Leading Micro Banks*. Washington, DC: The World Bank.

Dutta, D. K., & Thornhill, S. (2007). Evolution and Change in Entrepreneurial Growth Intentions: Developing a Cognition-based Model. *Journal of Business Venturing*, 23, 307-332.

Farsi, J. Y., Imanipour, N., & Mahlouji, S. (2012). Effects of Experience on Applying Entrepreneurial Decision Heuristics. *Global Journal of Human Social Science*, 22, 43-50.

Feroze, S. M., Chauhan, A. K., Malhotra, R., & Kadian, K. S. (2011). Factors Influencing Group Repayment Performance in Haryana: Application of Tobit Model. *Agricultural Economics Research Review*, 24, 57-66.

Field, E., Rohini, P., & Pande, R. (2008). Repayment Frequency and Default in Microfinance: Evidence from India. *Journal of European Economic Association*, V6, 501-509.

Fielden, S. L., Davidson, M. J., & Makin, P. J. (2000). Barriers Encountered During Micro and Small Business Start-up in North-West England. *Journal of Small Business and Enterprise Development*, 7, 295-304.

Frame, W. S., Srinivasan, A., & Woosley, L. (2001). The Effect of Credit Scoring on Small Business Lending. *Journal of Money Credit and Banking*, 33, 813-825.

Franco, M., & Haase, H. (2010). Failure Factors in Small and Medium-Sized Enterprises: Qualitative Study from an Attributional Perspective. *International Entrepreneurship and Management Journal*, 6(4), 503-521.

Frese, M., Krauss, S. I., Keith, N., Escher, S., Grabarkiewicz, R., Luneng, S. T., Heers, C., Unger, J. M., & Friedrich, C. (2007). Business Owners' Action Planning and Its Relationship to Business Success in Three African Countries. *Journal of Applied Psychology*, 92, 1481-1498.

Galema, R., Plantinga, A., & Scholtens, B. (2008). The Stocks at Stake: Return and Risk in Socially Responsible Investment. *Journal of Banking and Finance*, 32, 2646-2654.

Giné, X., Jakiela, P., Karlan, D., & Morduch, J. (2010). Microfinance Games. *American Economic Journal: Applied Economics*, 2, 60-95.

Guérin, I., & Palier, J. (2006). Microfinance and the Empowerment of Women: Will the Silent Revolution Take Place, Finance and the Common Good. *Bien Commun*, 25, 76-82.

Hartarska, V., & Nasdolnyak, D. (2007). Do Regulated Microfinance Institutions Achieve Better Sustainability and Outreach? Cross Country Evidence. *Applied Economics*, 39(10), 1207-1222.

Honloulkou, A. N., Acclassato, D. H., & Quenum, C. V. C. (2006). Determinants of repayment performance in microfinance institutions in Benin. *Annals of Public and Cooperative Economic*, 77, 53-81.

Jenssen, J. I., & Greve, A. (2002). Does the Degree of Redundancy in Social Networks Influence the Success of Business Start-ups? *International Journal of Entrepreneurial Behavior and Research*, 22, 254-267.

Khawari, A. (2004). Microfinance: Does Hold its Promises? A Survey of Recent Literature. *Hamburg Institute of International Economics, Hwwa Discussion Paper*, Retrieved from https://papers.ssrn.com/sol3/Delivery.cfm/SSRN_ID556213_code357559.pdf?abstractid=556213&mirid=1.

Kim, P., Aldrich, H., & Keister, L. (2006). The Impact of Financial, Human and Cultural Capital on Entrepreneurial Entry in the United States. *Small Business Economics*, 27, 5-22.

Labie, M. (2005). Microfinance Funds Impact on Microfinance Institutions Governance: What Could be expected for the Future? Governance and Microfinance Organizations: the Need to Delineate the Contributions of a Board of Directors, the Case of a Colombian NGO (380-391). In I. Guerin, J. M. Servet, *Exclusion and Financial Links*. Paris: Economica.

Littlefield, E., & Rosenberg, R. (2004). Microfinance and the Poor: Breaking Down the walls between Microfinance and the Formal Financial System. *Finance & Development*, 41, 38-40.

Mersland, R. (2009). The Cost of Ownership in Microfinance Organizations. *World Development*, 37, 469-478.

Mersland, R., & Strom, R. Ø. (2008) Performance and Trade-offs in Microfinance Institutions – Does Ownership Matter? *Journal of International Development*, 20(5), 598-612.

Mezhoud, M., Sghaier, A., & Boubaker, A. (2017). Impact of Internal Governance Mechanisms on Share Price Volatility of Listed Companies in Paris Stock Exchange. *Bulletin of Applied Economics, (Risk Market Journals)*, 4(1), 1-12.

Morduch, J. (1999a). The Microfinance Promise. *Journal of Economic Literature*, 37, 1569-1614.

----- (1999b). The Role of Subsidies in Microfinance: Evidence from the Grameen Bank. *Journal of Development Economics*, 60, 229-248.

Morduch, J., & Barbara, H. (2002). Analysis of the Effects of Microfinance of Poverty Reduction. *NYU Wagner Working Paper*, Retrieved from http://www.academia.edu/download/3470021/morduch_02_analysis_effects.pdf.

Navajas, S., Schreiner M., Meyer R. L., Gonzalez-Vega, C., & Rodriguez, M, J. (2000). Microcredit and the Poorest of the Poor: Theory and Evidence from Bolivia. *World Development*, 28, 333-346.

Nawai, N., & Shariff, M. N. M. (2010). Determinants of Repayment Performance in Microcredit Programs: A Review of Literature. *International Journal of Business and Social Science*, 1, 152-161.

Ndimanya, P. (2002). *Microfinance in Burundi does not meet the Conditions for Becoming Part of a Sustainable Development Framework* (PhD Dissertation, University of Gembloux, Belgium).

Servet, J. M. (2011). Corporate Responsibility versus Social Performances and Financial Inclusion. In Armandariz, B., Labie, M., *The Handbook of Microfinance*. Singapore: World Scientific Publishing.

----- (2010). Microcredit, In K. Hart, J. L. Laville, A. D. Cattani, *The Human Economy*. Boston: Polity Press.

Sghaier, A. (2016). Measuring Efficiency of Islamic and conventional Banks in MENA Region. *International Journal of Sustainable Economies Management (IJSEM)*, 5(1), 29-51

Sghaier, A., Lahdhiri, M., Gilles, P., & Mansouri, F. (2015). Estimation of the Islamic Banks' Competitive Structure vs Conventional Banks' one. *Global Journal of Management and Business Research*, 15(7), 19-29.

Sghaier, A., & Lahdhiri, M. (2015). Islamic Banks (BI) vs Conventional Banks (BC): Capital Structure and Profitability: An Empirical Study. *Journal of Research in Business and Management*, 3(11), 33-50.

Sghaier, A., Sekrafi, H. & Mighri, Z. (2016). Comparative Study on Performance of Islamic and Conventional Banks in MENA Region. *E3 Journal of Business Management and Economics*, 7(2), 072-088.

Sghaier, A., & Harzallah, M. (2015). E-Learning and Intent of Continuation: Case of the Tunisian Post. *International Journal of Advanced Research*, 3(12), 197-204.

Sghaier, A., Gilles, P. & Mansouri, F. (2015). Measure the Efficiency of Islamic Banks vs Conventional Banks in the MENA Region. *French Journal of Management*, Retrieved from <https://journalofbusiness.org/index.php/GJMBR/article/download/1765/1667>.

Sharma, M., & Zeller, M. (1997). Repayment Performance in Group Based Credit Programs in Bangladesh. *World Development*, 25, 1731-1742.

Shepherd, D. A. (2003). Learning from Business Failure: Propositions of Grief Recovery for the Self-employed. *Academy of Management Review*, 28, 318-329.

Singh, S., Corner, P., & Pavlovich, K. (2007). Coping with Entrepreneurial Failure. *Journal of Management and Organization*, 13, 331-344.

Soufeljil, M., Sghaier, A., Kheireddine, H., & Mighri, Z. (2016a). Managerial Property, Strategic Resources and Diversification of Enterprises: Case of Tunisian Businesses Rated. *Journal of Economics and Business*, 1(2), 89-101.

----- (2016b). Ownership Structure and Corporate Performance: the Case of Listed Tunisian Firms. *Journal of Business & Financial Affairs*, 5(4), 1-8.

----- (2017). The Financial Structure of the Tunisian Listed Businesses: An Application on Panel Data. *Journal of Global Entrepreneurship Research*, Retrieved from <https://link.springer.com/content/pdf/10.1186%2Fs40497-017-0081-3.pdf>.

Thornhill, S., & Gellatly, G. (2005). Intangible Assets and Entrepreneurial Finance: The Role of Growth History and Growth Expectations. *Journal of International Entrepreneurship and Management*, 1, 135-148.

Thornhill, S. (2006). Knowledge, Innovation and Firm Performance in High-and-low Technology Regimes. *Journal of Business Venturing*, 21, 687-703.

Van Gool, J., Verbeke, W., Sercu, P., & Baesens, B. (2011). Credit Scoring for Microfinance: Is It Worth It? *International Journal of Finance & Economics*, 17, 103-123.

Wenner, M. (1995). Group Credit: A Means to Improve Information Transfer and Loan Repayment Performance. *Journal of Development Studies*, 32, 263-281.

Woller, G., Dunford, M., & Christopher, W, W. (1999). Where to Microfinance? *International Journal of Economic Development*, 1, 29-64.

Zeller, M. (1994). Determinants of Credit Rationing: A Study of Informal Lenders and Formal Credit Groups in Madagascar. *World Development*, 22(12), 1895-1907.

Zeller, M., & Meyer, R. L. (2002). *The Triangle of Microfinance: Financial Sustainability, Outreach and Impact*. Baltimore, MD: John Hopkins University Press for IFPRI.

Zeller, M., Schrieder, G., Von Braun, J., & Heidhues, F. (1997). *Rural Finance for Food Security for the Poor: Implications for Research and Policy*. Washington, DC: IFPRI.

Zouhayer, M., & Anis, J. (2014a). Behavioral Finance and the Lack of Reimbursement: Empirical Application in the Case of Tunisian Institutions of Microfinance. *Indian Journal of Management Science, (IJMS)*, 4(1), 19-31.

----- (2014b). Determinants of the Performance of Refunding in Microfinance: Empirical Application for the Case of Enda-Interarabe of Tunisia. *Management and Administrative Sciences Review*, 3(3), 355-377.

----- (2014c). The Factors behind the Repayment Failure of the AMC Micro-borrowers in Tunisia: a Test across the Cognitive Approach. *Management and Administrative Sciences Review*, 3(5), 660-682.

----- (2013a). Factors Affecting Repayment of Loans by Micro-borrowers in Tunisia: An Empirical Study. *Journal of Management & Public Policy*, 4(2), 4-16.

----- (2013b). Mechanisms of the Governance in Microfinance and the Rate of Reimbursement: Empirical Application to the Tunisian Case. *African Journal of Science and Research*, 2(6), 27-36.

----- (2013c). The Factors of the Lack of Reimbursement of the Microfinance Institutions: Empirical Evidence in the Case of the Tunisian Micro-borrowers. *International Journal of Information, Business and Management (IJIBM)*, 5(2), 139-158.

Zouhayer, M., Samir, A., & Anis, J. (2014). Corporate Governance, Profile of the Executive Directors and the Rate of Refunding of Microcredit's in the Case of the Tunisian Associations of Microfinance. *I-manager's Journal on Management*, 8(3), 32-46.

Zouhayer, M., Tarek, B. H., & Anis, J. (2015). Mediating Effects of Management of Information on the Relationship between Mechanisms of Governance and Lack of Reimbursement of Tunisian's Associations of Microfinance. *Journal of the Knowledge Economy*, 9(1), 40-61.