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THE BEHAVIORAL FINANCE AND THE LACK OF REIMBURSEMENT: EMPIRICAL APPLICATION IN THE CASE OF TUNISIAN INSTITUTIONS OF MICROFINANCE

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ABSTRACT

The financial intermediary role played by the microfinance institutions (MFIs) reflects that the activity of granting credit is a central banking. For this purpose, the risk of default is not only designed from the side of socioeconomic and demographic characteristics of micro-borrowers, but can be attached to the decision-making process of the loan officer in general and its emotional and cognitive biases in particular. Therefore, the objective of this paper is to understand the degree of influence of behavioral and psychological factors on the defaulting micro-borrowers. For this, our central research question is: What are the factors that explain the delay in reimbursement related to behavioral and psychological characteristics of loan officers? First, we focus in particular on the factors explaining microfinance loan repayment related to behavioral and psychological characteristics of loan officers. Then, in a second part, we shall summarize and discuss both our sample and methodology adopted to address our research question. Finally, we will try in the third part, to empirically analyze the validity of the pre-discussed ideas in the specific case of microcredit associations in the region of Sfax.

Keywords: behavioral finance, default risk, microfinance, cognitive biases, Tunisia.

JEL Classifications: G01, G32, G38

THE ROLE OF COGNITIVE BIASES IN DECISION MAKING

Cognitive biases are incorporated into the process of human reasoning and are expressed through the creation of heuristics. To this end, cognitive biases are a central element of reasoning rather than a negative mechanism to eliminate. Many studies, especially under the influence of cognitive psychology have shown that individual attitudes to risk frequently deviated rationality and thus, could lead to decision-making biases. Indeed, Kahneman, Slovic, and Tversky, (1982) have highlighted the central role of cognitive biases in decision making of any person faced with a situation of uncertainty. Several studies included in a behavioral approach have specifically highlighted the cognitive biases in expert judgment. Other studies have sought to eliminate or reduce these cognitive biases (Frischoff. 1982, Lesage, 1999.). This current research considers expertise as a rare skill that develops only after a long training and experience. This category suggests a model

that mimics the decision processes of experts.

The errors cannot be managed through their removal and thus the elimination of cognitive biases. Indeed, reasoning biases play a key role in the development of heuristics, to the extent that the deviation of the decision maker's intention will improve this heuristics. Thereby, removing the bias leads to impoverishment and even denies the heuristics. In other words, the problem is not to eliminate bias to reduce errors, but rather to strengthen protection mechanisms through the creation of conditions which aims to make visible the errors of the decision maker (Argyris., 1999). The decision maker will then retain the choice between: refocus its reasoning in relation to its original intention on the one hand, and change its original intention (intention in action) based on the new state of the reasoning of the other. So, it should reduce decision errors by the visibility of the cognitive biases of the policymakers. Tversky and Kahneman (1974) equate the decision to the result of a series of choices made at each step restoring cognitive sequence. The activation of this new line of research is based on the assumption of "developing heuristics" as a means of "reducing

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errors." In this regard, the experience could be negatively related to the risk of default if the loan officers realize some expertise on borrowers screening and follow-up time (Anderson, 2003). On the other hand, career concerns may encourage loan officers younger and less experienced to undertake a greater effort to avoid losses and to maximize their career progression and income prospects in the future. Henceforth, Andersson (2004) supports this idea by stating that the credit officers who have professional experience can achieve more consistent decisions compared to inexperienced officers. Instead, Honlonkou and al (2006) found that the number of years of experience of the manager of the fund is among the determinants of repayment rates. Indeed, the number of years of experience of the manager of the fund has a negative effect on the reimbursement rate that can be explained by familiarity with the manager of the MFI micro-borrowers as his experience extends into the area, while the coefficient on profitability study has a positive sign and shows that cost-benefit analysis of projects submitted for funding should become routine in MFIs. This is explained by the fact that the achievement of pre-investment study assesses the seriousness of the project of the borrower, which allows the credit officer to finance activities which the probability of success is larger.

An equally important additional component of behavioral characteristics of the agent of the IMF is that relating to its kind, male or female. To this end, many studies have shown that female decision makers are more risk averse than men decision makers (Barsky and al, 1997) and that risk aversion affects financial decision (Charness and Gneezy, 2007, Christiansen and al, 2006; Barber and Odean, 2001). Other authors have explored the behavior of women in different competitive environments and their treatment within financial institutions (Black, Sandra, Strahan and Philip 2001, Goldin and Rouse, 2000).

Female loan officers generally have fewer options outside of the labor market and therefore stronger to excel in the form of low default rates in their loan incentives. In addition, especially in developing countries, women are more conservative and more afraid of social sanctions, which increase pressure on loan officer's women to outperform their male colleagues. These arguments are similar to arguments why women borrowers in developing countries are generally better placed alongside the relations with

clients (micro-borrowers) than their male counterparts (Armendariz de Aghion and Morduch, 2005). In patriarchal societies, men willing agents may have a stronger status versus the borrowers, men or women, in terms of surveillance and discipline to ensure repayment of the loan. In this case, there would be a lower probability of default loans approved and monitored by the masculine loan officers.

The preceding discussion suggests that cognitive biases of the microfinance agents evidenced by their professional experience and their ages significantly influence the delay of repayment of the micro-borrowers. Therefore, in the light of what has been suggested, the underlying assumption (A.1) that we test can be formulated as follow:

Assumption 1: The cognitive biases of the microfinance agents evidenced by their professional experience, ages and gender act significantly on defaulting borrowers.

Emotional bias and decision making of the loan officers: Traditional models of decision making under risk or uncertainty are mainly focused on the cognitive aspects of information processing. More recently, several researchers have begun to develop models of cognition that include an emotional dimension. According to Zajonc (1980), emotional processing precedes cognitive processing. Indeed, in this paragraph, we present the literature and assumptions about the relationship and correlation between the delay of the repayment of the borrowers and the psychological characteristics (emotional bias) of the loan officers. In contrast, among the psychological biases, we will consider particularly emotional biases. Thus, this research studies the correlations between delay repayment and emotional biases. More clearly, we will study the impact of emotional biases loan officers on the late of the payment. Henceforth, the question that arises at this stage is to know, what is the impact of emotional biases loan officers on the risk of default of the micro-borrowers?

Five types of bias have been widely discussed in the literature: loss aversion, the lack of cognitive flexibility, Optimism, overconfidence and error conjunction¹. In contrast, among the psychological biases, we will particularly study in this research emotional biases.

¹ The error conjunction refers to the belief that a specific combination of events may be more likely than the simple elements of this combination (Tversky and Kahneman, 1983).

Thus, this research studies the correlations between the delay of the repayment of the micro-borrowers and the emotional biases of the loan officer of an MFI. More specifically, we study the relationship between the emotional biases and the repayment at maturity. Consequently, in the light of what has been suggested, the underlying assumption that we test (A.2) can be formulated as follow:

Assumption 2: The emotional bias of the loan officers are possible sources of the delay of the repayment.

Emotional Intelligence (EI): Mayer, Caruso, and Salovey (1999, 2000) define emotional intelligence by distinguishing between mental ability models, focusing on the ability to process emotional information, and mixed models conceptualizing EI as that complex built, including aspects of personality, motivation and the ability to perceive, assimilate, understand, and manage emotions. These mixed models include motivational and dispositional factors such as the concept of self-Concept, assertiveness, empathy, etc.. (Bar-On and al, 2003. Goleman, 1995.). In 1990, Mayer and Salovey are the first to formulate a mental model that includes three main processes: evaluating and expressing emotions (his own and those of others), to be able to regulate and how to use them to facilitate cognitive processes. They revised their model in 1997, expanding the IE to four dimensions, each representing a category of building and classified from the most simple to the most difficult to control: 1) the perception and evaluation (verbal , nonverbal) emotion, 2) the ability of integration and assimilation of emotions to facilitate cognitive and perceptual processes, 3) knowledge of the field of emotions (in the sense of "knowing") understanding of their mechanisms, their causes and consequences, and finally 4) the management of his own emotions and those of others. Other definitions of EI were also proposed. The model developed by Goleman in 1995 he adapted to the context of work life in 1998 publicized the concept of IE and consists of 25 skills based around five factors: 1) self-awareness, 2) self-regulation, 3) motivation, 4) empathy and 5) social skills.

Most of the results are contradictory, but some studies show a positive effect of EI on performance (Wong and Law, 2002, Cote and Miners., 2006). While many studies have examined the effect of EI on job performance, no empirical study has however analyzed the impact of EI on decision biases. In other words, high emotional intelligence should instead reduce decision bias. Henceforth, the theoretical developments such as on the

IE, the "risk-as-feelings", or the affect heuristic suggests that emotions play a significant role in human performance. However, to say that emotions and cognitions are connected is not enough: it is necessary to define precisely how they interact. One possible way to achieve this, is by focusing on the potential interactions between EI and the decision-making process. If emotions and IE in particular, contribute to an increase in the decision-making efficiency, we can consider that higher levels of IE correspond to a lesser suggestibility in cognitive biases: EI contributes to the optimization of cognitive functions. Several researchers have emphasized the importance of "soft" in the field of management and performance skills in the workplace. These researchers assume that job performance is not only dependent on the knowledge and skills directly related to the work activity but also skills dedicated to managing intra-and inter-individual emotions. These "soft" skills were mainly theorized through the concept of Emotional Intelligence.

THE OVERCONFIDENCE

Overconfidence results on a static plan, from overweight granted to private information and an overestimation in the personal ability to interpret this information and on dynamic plan, resulting from an erroneous inference of self-attribution bias. For De bondt and Thaler (1995), it is the element most robust of the psychology of judgment. The effects on the mispricing were modeled by Daniel et al (1998), leads individuals to attribute the good results to their own actions and bad outcomes to external circumstances. This bias has important effects in both inference resulting from the overconfidence and the persistence of the overconfidence. Thus, according to Daniel et al (1998), overconfidence is stronger in activities that involve valuation difficulties for which the feedback on the quality of the assessment is ambiguous. Kahneman and Tversky (1979) show that when uncertainty is high², individuals tend to construct overly confident scenarios on their probability of success (or schedule fallacy). On the other hand, the binding of this bias with uncertainty is particularly complex, as it is perceived by the decision maker, leading to a problem of reverse causality and paradoxical uncertainty: uncertainty promotes overconfidence, but this bias

² Overconfidence has been observed in the case of decision-making venture capital: Zacharakis and Shepherd (2001) show that 96% of their samples of venture capital are affected by overconfidence.

decreases perceived uncertainty. In addition, this link is dependent on the information held by the decision-maker: when he has a private information, overconfidence leads to overweight this even more strongly that the uncertainty is high information.

Competence also tends to exacerbate overconfidence (Heath and Tversky., 1991). Overconfidence bias leads people to overestimate their own skills and knowledge (Camerer and Lovo., 1999). Overconfidence as an underestimation of the variance, it is one of the most documented behavioral biases (Daniel and Titman., 1999). Thus, the study of overconfidence leaders (loan officers) is not well documented, especially in comparison to the literature on investors in financial markets. Indeed, the work on the effects of overconfidence on training courses are already relatively provided through over and under-reactions to the model of Daniel and al (1998) and volatilities and volumes following the model of Odean (1998). Henceforth, the first empirical results, which we will develop in this review, confirm the strong presence of this bias among business leaders and its effect on their choices, especially in terms of investment policy and funding. This bias, combined with the optimism, is a central aspect of the current literature in behavioral finance business as highlighted by Baker and al (2004). The focus on overconfidence seems also particularly fertile for at least three reasons.

The process of making financial decisions of the bank is generally divided into two major blocks. The first is the block in the back office with a production role of trust. In this case, the teams of the first block filter the quality of the securities that the bank buys and sells securities with quality financial commitment of trust. The bank is then an information specialist. Indeed, the performance of back office based on the balance in its relationship with the front office is assimilated as the second block. The latter includes all operations in direct contact with the customer. It is responsible for advising and supporting the customer, but its activities and decisions are guided by a system of incentives for the development and cross-selling. In other words, the process of making the decision to grant credit, conceived as process of buying shares must be studied in a logic of Supply Chain Management, that is to say, as a chain of logistics purchase where different actors must be involved: externally, the final and intermediate supplier / prescribers and internally, the adviser and any delegation chain that validates the decision to

purchase debt securities. Thus, the characteristics of managerial decision (complexity, low repetition, slow and difficult to interpret feedback) and the policy environment (uncertainty, weak disciplinary controls) tend to favor overconfidence. In addition, the specific attributes associated with the management function also tend to justify a stronger presence of excess through trust in leaders (loan officers) than in the general population.

Hackbarth (2004) models the choice of capital structure in the context of the theory of trade-off decisions and compares a biased and unbiased leader. Optimism and overconfidence are distinguished here: Optimism produces overestimation of earnings growth, while overconfidence reduces the variance from expected results. Both effects lead to underestimate the probability of bankruptcy and, therefore, under the mobilized theory to higher debt. Therefore Keiber (2006) also shows that overconfidence is not necessarily negative. It is not the level of overconfidence that defines optimality, but the positive or not information. Overconfidence is then favorable to the shareholder in the presence of positive information about the projects and, conversely, in the case of negative information. In all cases, overconfidence reduces agency costs and increases (decreases) the demand for variable executive remuneration when information is positive (negative). In addition, banks and microfinance institutions in particular are guarantors of confidence in their financial commitments. Indeed, they are experts on one side of the selection of their clients' investment and evaluators of these projects as well as projects. Based on these ideas, banks must determine the level of confidence that the credits are granted. The preceding discussion suggests that the overconfidence of the loan officer significantly influences the delay repayment borrowers. Therefore, our objective is to verify the influence. In light of what has been advanced, the assumption that we test is as follows:

Assumption 1: The overconfidence causes a delay repayment of micro-borrowers.

The attitude to the risk: In prospect theory the loss aversion refers to the tendency of people to prefer more the avoidance of loss rather than the acquisition of a gain (Kahneman and Tversky, 1979). In an uncertain environment, it is investors' choices as choices on lotteries. Traditional finance such as behavioral finance focuses therefore their attitude to the risk. Among the

individual variables that may influence this attitude, are wealth, level of education, occupational status, but also temporal variables such as generation, and especially the age of the investor.

The risk behavior has been the subject of numerous investigations relating to various theoretical anchors under managerial theories, psychological, sociological or anthropological. To this end, the concept of risk is multidimensional and difficult to understand. Thus, the classical notion of risk is the variance of the probability distribution of the results (Vlek and Stallen., 1980 and Shapira., 1995). The risk is often expressed by the composite index of the probability of occurrence of an event and its value (Von Neumann and Morgenstern., 1947). Beyond these one-dimensional representations of risk, we retain a sense of risk considered a future danger whose outcome is uncertain. If multiple hazards exist simultaneously, it is clear that people seem to care more particularly certain dangers while ignoring others. As a result, the risk has two species one objective and the other subjective.

Future dangers vary depending on the degree of uncertainty and the nature of the losses. In other words, the risk has two characteristics: a quantitative and qualitative. More consequences of future events are unpredictable and difficult to control over the degree of risk is important. The nature of the risk to the characteristics of future events that the decision maker is concerned: their time horizon, the potential victims, the importance of the benefits and potential losses. Given the limited cognitive capacity of the decision maker, he cannot objectively understand the concept of risk.

In this context, shared heuristics within a community can influence risk perception of the individual drawing the attention of decision makers on certain criteria and that through modeling the management of risky situations or filtering information. In addition, national culture may influence the risk appetite of the individual (Williams and Narendran., 1999). Individual attitudes and values are thus partly influenced by those shared within the cultural community of the decision maker (Hofstede. 1991). The valuation of risky behavior in a given society is likely to encourage the acceptance of risk (Baird and Thomas., 1985). Strong cultures may induce avoidance behavior patterns characterized by low propensity to risk. In this perspective, an individual with a low risk appetite overestimate the probability

and the level of potential losses associated with risk-taking (Sitkin and Weingart., 1995).

Although the degree of risk assumed is higher or lower depending on the degree of perceived risk, the risk behavior does not always reflect the perception of risk. Bettman (1973) distinguishes the risk inherent to a given alternative. However, the decision maker is not always able to assess the objective risk that characterizes the alternative studied. The risk of an alternative may well be likened to the risk perceived by the individual. Thus, the nature of risk assumed may be distinct from perceived risk. Indeed, once the perceived risk, the decision maker can implement different strategies to channel even master (MacCrimmon and Wehrung, 1986 and Mitchell and McGoldrick, 1996.). The decision-maker as the case may want to increase profits, reduce losses and the uncertainty of the realization of its benefits (March and Shapira, 1987. Mitchell, 1995 Chiles and McMackin, 1996).

Risky behavior will be characterized by a strategy to improve profits while a conservative behavior will result in the quest to reduce losses. We define the risky behavior as the acceptance of risks which the degree and the potential benefits are significant. The degree of risk assumed may be studied through the number of times that the individual is willing to take actions whose consequences are uncertain. The nature of risk assumed in this case can be understood by the criteria of risk taking most used by the decision maker. Thus, the criteria for assessing risk reflect, as specified by Wildavski and Douglas (1982), the structure of social relations which is closely related to the profile of the decision maker and rooted in a specific social environment. Risk assessment depends on the social forms promoted by the socio-cultural environment. Proponents of cultural risk analysis (Douglas and Wildavsky, 1982) highlight that each institution vehicle values, codes and practices that induce different cognitive styles referring to perceptions time or projection capabilities in differentiated future.

Based on the cultural theory of risk, Thompson and al. (1990,) and Dake (1992) define different types of institutions that shape patterns of perceptions and different attitudes to risk. In this perspective, Dake (1992) identifies three key cultural archetypes that influence patterns of risk perception. If the hierarchical ideology values the expertise and the social conformity, individualistic ideology encourages, for its part,

individual initiative and advocates for payments backed by performance individual.

The latter vehicle modes of perception of high risk behaviors inducing risk aversion unlike the individualistic and egalitarian ideology associated with propensity to take higher risks. By internalizing social pressures, the decision maker is required to manage risk without knowing following social rules that tell him to ignore the risks. In this perspective, institutions are considered shared within the community heuristics.

The preceding discussion suggests that, based on these ideas, the attitude to the risk of the loan officer significantly influences the delay of the repayment of the borrowers. Therefore, our objective is to verify this influence. In light of what has been advanced, additional assumption (A.2.2) derived from the central assumption A. 2 that we test is as follows:

Assumption 2: The attitude to the risk of loan officer significantly reduces the delay of the reimbursement of the micro-borrowers.

Optimism: Optimism bias leads an individual to believe that their future will be better compared to other (Bazerman., 2006). For this purpose, optimism reflects a preference for the positive outlook and an unrealistic overestimation of future events not related to personal skills, and it is understood as an average error (overestimation). Thus, the two terms, optimizes and overconfidence are often used interchangeably (Fairchild, 2005). In addition, these two biases are often simultaneous (Heaton, 2002 Gervais and al, 2003.) and combine especially in the illusion of control which the individual expects to control, thanks to its abilities, events purely random. Weinstein (1980) points out that the natural tendency of people to overestimate the result of a decision is enhanced when the decision maker thinks he can control the outcome. In addition, optimism bias leads agents to favor a positive outcome scenario rather than darker. This excessive optimism of lenders and therefore, borrowers, resulting in excessive bank debt and will be fatal when the true value of the returns will be perceived. This behavior banks is described as "aggressive" (McKinnon and Pill (1997, p.191).

In this context, Heaton (2002) believes that over-investment and under-investment are resulting from a managerial optimism. Leaders take more risk due to the overvaluation of investment opportunities and misperceptions of the cash flows generated by the projects. The preceding discussion suggests that the

optimism of the loan officer significantly influences the delay of the repayment of the borrowers. Therefore, our objective is to verify the influence. In the light of what has been advanced, the assumption that we test is as follows:

Assumption 3: The optimism of agents generates a significant impact on the delay of the repayment.

The lack of cognitive flexibility: According to studies of Canas, Quesada, Antoli and Fajardo (2003), cognitive flexibility³ refers to the ability to adjust strategies and cognitive processes in response to new and / or unforeseen environmental conditions. This definition can lead to three important features of concept. First, cognitive flexibility is the ability which could involve a process of learning (it could be accumulated with experience). Then, cognitive flexibility includes the adaptation of cognitive processing strategies. Based on this definition and referring to the analysis of Payne, Bettman and Johnson (1993), it is conceivable that a strategy is a sequence of operations that are looking for a problem space. Indeed, cognitive flexibility for changes in complex behaviors, not discrete answers. Finally, adaptation to produce new and unexpected environmental changes after a person has completed a task f. Although, through their studies, Payne, Bettman and Johnson. (1993), argue that flexibility could be considered as an adaptive capacity of individuals, which does not occur in a continuous manner. In situations where a person should be flexible if only he treats the environment changes, it is the cognitive inflexibility or lack of cognitive flexibility. In the context of our research, it is rather the lack of cognitive flexibility is through. When a person is not cognitively flexible, he has a non-functional way, agreeing to deal with situational demands, which will result in an incorrect performance. Psychological endowments of the individual play an important role in individual creativity.

Thus, the above discussion suggests that the lack of cognitive flexibility of the loan officer has a positive / negative delay of the repayment of the borrowers. Therefore, our objective is to verify this influence. In light of what has been advanced, the assumption that we test is as follows:

Assumption 4: The lack of cognitive flexibility of the

³ Chevalier and Blaye (2008) argue that cognitive flexibility is the ability to change mental attitude in response to relevant changes in environmental signals.

loan officer determines significantly the default of the repayment.

In fact, little empirical work embedded in behavioral finance has tried to highlight the role of the specific loan officer cognitive flexibility to limit credit risk. Indeed, the analysis of the validity of this assumption in the case of MFIs is a valuable contribution in the absence of specific regulations in this area on one side and in the presence of a certain emotional intelligence on the other side.

The Results of the estimates: To test our assumption and to study these variables, we used a sample survey at the end of 2010 and during the year 2011 based on the technique of semi-structured interview with 88 officers belonging to the Tunisian MFIs. Thus, a list of items is available to loan officers in our study that includes the main issues related to objectives. Indeed, a number of items were selected to measure psychological and behavioral dimensions of our agents.

We will try in what follows to analyze the correlations of each variable, which are related to psychological biases loan officers' attitude towards risk, overconfidence, optimism and lack of cognitive flexibility by the delay in the payment and by using a method which is the test of dependency of Chi2, based primarily on the chi-square statistic, which allows misuse intensity dependence between two variables. It is here, the link between the variables of psychological dimension of the agent and the delay of the repayment. Therefore, under A_0 , the probability of the significance of chi-square is low, that is to say less than 10%. In contrast, the alternative assumption corresponds to a value of high chi-square to indicate a significant relationship for the variables implicated.

The chi-square test shows that there is a relationship between attitude towards risk and the rate of repayment and therefore we cannot accept the null assumption of independence (p-value = 0.0000) and in other words, the presence of a significant association at the 1%. Indeed, our results emphasize the role of these agents as risk taker for making the decision and the amount considered under different type was not considered with caution and great care by the agents to decide whether the rejection or modification of the characteristics of the loan.

In addition, our results by the flat sorting, show an overall significant relationship between the optimism and the reimbursement rates (p-value = 0.005). In fact, this personality trait (optimism) for each loan officer in

our study is likely to influence the delay of the repayment. In other words, this behavior facilitated agents to analyze expectations micro-borrowers and overestimation of the most demanding customers in terms of credibility, which reduces the probability of default of the repayment of loans.

Table 1. Test result of dependence between psychological profile and repayment rates.

Attitude to risk	Reimbursement rate
Chi2 ⁴	240.35***
p-value	0.0000
degree of freedom	168
Optimism	Reimbursement rate
Chi2	213.69***
p-value	0.005
degree of freedom	164
Overconfidence	Reimbursement rate
Chi-two	206.42***
p-value	0.001
degree of freedom	148
Lack of Flexibility	Reimbursement rate
Chi2	147.05***
p-value	0.000
degree of freedom	92

(***) Significant coefficient at threshold of 1%.

The main results of pair wise comparisons also show that the reimbursement rate seems to explain not only overconfidence, but also cognitive flexibility. Indeed, the test displays respectively a chi-square = 206.42 and 147.05, which is significant at 1%. However, these statistics indicate cause and effect that can play the role played by the behavioral profile (age, gender and experience) and psychological bias (attitude to risk, overconfidence, the optimism and lack of cognitive flexibility). Thus, to build our psychological dimension, we hypothesized that "the likelihood of the repayment of micro-borrowers is determined by emotional bias". This finding of a relative similarity of loan officers leads us to wonder about the relationship that can be established between the reimbursement process and psychological biases.

Our analysis was based on a central assumption which states that "behavioral and psychological characteristics associated with loan officers are the possible sources of

⁴ By contingency table and under the chi2 statistic, one seeks the risk λ is the chi-square table for the number of degrees of freedom $df = (N-1) * (N-1)$. If $P < 10\%$ indicates acceptance of the hypothesis of addiction.

the delay of repayment of the microfinance borrowers". Below, these results are put in context with the existing literature to illustrate what they mean for researchers and practitioners. Indeed, the next paragraph is devoted to the discussion and the interpretation of the results of

our empirical study in conjunction with our research assumptions.

In addition, the estimation of this model was conducted using the method of maximum likelihood and gave the following results:

Table 2. Estimation results of multinomial logit: Variable to explain delay of repayment.

Variables	No delay = 1 (solvent)	Low level of delay = 2		High level of delay = 3	
		Coefficient	(Z-stat)	Coefficient	(Z-stat)
Age		0.922	(1.39)	0.0012	(0.1)
Experience		-0.559**	(-2.97)	- 0.029***	(3.05)
Attitude	**Alternative of Ref**	0.24***	(4.04)	0.158***	(2.76)
optimism		-0.04	(-0.15)	-0.18	(-0.78)
overconfidence		0.094	(0.39)	0.1	(0.44)
flexibility		-0.48 *	(-3.07)	0.108*	(5.29)
Number of observation		88			
L-likelihood		-73.872884			
LR Chi2		45.61			
p-value		0.000			
R ²		0.23			

(*), (**), (***) Coefficients respectively significant at the 10%, 5% and 1%.

Table no. 2 presents the results of the regression analyzes of two equations. This table shows the estimation results of the regressions relating the probability of achieving a level of late payment over solvent micro-borrowers, and behavioral and psychological variables of loan officers. Indeed, from the table above, the test of overall significance of chi-square shows that the overall model is significant (p-value = 0.000) and the test of maximum likelihood ensures that the coefficients estimated on the two equations are simultaneously different from zero, it is the overall significance of the model in terms of the joint effect of each variable that generate the probability of default. Henceforth, the estimates presented by the table highlight the crucial role played by behavioral and psychological characteristics of loan officers in the explanation of the reimbursement rates of the micro-borrowers and this idea is strengthened by the presence of empirically acceptable explanatory power of the model (coefficient of determination medium) (R²= 0.23) is therefore an acceptable quality of adjustment. This implies that the selected variables related to agents, age, gender, experience, attitude to risk, optimism, overconfidence and cognitive flexibility, explain an acceptable share of the probability that the individual realizes a delay of repayment in our sample with a percentage of 23%. Thus, we can conclude that this percentage is sufficient as a percentage of explanation of a variable. In addition, the test of overall significance of

chi-square shows that the overall model is significant (p-value = 0.000), thereby rejecting the null hypothesis of coefficients to estimate.

So we must consider two assumptions to confirm whether or not some chance of making a late payment for our model. Therefore, for an odds ratio of achieving a low delay of repayment (RR2), we test the following hypothesis:

$$H_0: RR_i < 1 \text{ and}$$

$$H_1: RR_i > 1. \text{ With } i = 2, 3$$

In fact, under the hypothesis H₀, the model must be specified by a ratio of less than 1 chance and indicates that there is more chance that the delay does not occur. Instead, the acceptance of the alternative hypothesis justified the effect of an increase in the explanatory variable on the report of maturities compared to solvent and hence a delay greater than 1 chance. The test results ratio is set by the table no. 3.

The results of our empirical investigation are consistent with our assumptions by suggesting that a level of low delay and very low refund (Alternative 2 and 3), compared to the creditworthiness of micro-borrowers (Alternative 1), the delay of reimbursement and the variables of optimism and overconfidence are not statistically significant. This hypothesis could not be validated, which is among the limits we can bring to our work, and this result has shown the weakness of the relationship for both types of behavior. Indeed, the no validity of this assumption can be explained by the

sensitivity of the behavior studied. However, this dimension seems to allow development of explanatory theories of behavior in decision-making and its influence on the default. We can see the existence of this behavior from the frequency analysis that is an analysis by item. But in a perfect financial sector, this behavior can be expressed or unexpressed. Again, Table 3. Ratio chance after the multinomial logit model: Variable to Explained: Delayed repayment.

Variables	No delay = 1 (solvent)	Low level of delay = 2		High level of delay = 3	
		Coefficient	(Z-stat)	Coefficient	(Z-stat)
Age		2.51	(1.48)	0.97	(0.39)
Experience		-0.57* <1	(-3.04)	1.09** >1 ?????	(4.72)
Attitude	**Alternative of Ref**	1.27**	(4.04)	1.31***	(2.28)
optimism		1.09	(0.37)	0.96	(0.09)
overconfidence		0.094	(0.39)	1.17	(0.6)
flexibility		1.23 **	(-3.99)	0.61** < 1	(5.29)
Number of observation		88			
L-likelihood		-75.355575			
LR Chi2		35.38			
p-value		0.0004			
R ²		0.22			

(*), (**), (***), Coefficients respectivement significatifs au seuil de 10%, 5% et 1%.

CONCLUSION

The results obtained from this analysis verify our assumption of departure. Thus, the comparison of "bad" and "good" micro-borrowers shows that they differ significantly. In other words, the causes of arrears to the MFIs are mainly influenced by three variables, namely: attitude to risk, lack of cognitive flexibility and experience.

To prevent and assess credit risk, loan officers are required to keep the necessary information about its customers. It is therefore preferable to have a good information system to establish sustainable mechanisms of prevention and to move towards procedures in order to achieve the survival of the MFIs. In addition, before engaging in a business relationship, it is essential to know a minimum of information about the customer. Thus, the loan officer collects information from the customer and other external sources to get the credit and be completed by internal information if the applicant is already a customer. In this sense, the sustainability of MFIs depends on its ability to collect and use information effectively. This allows it, to select applicants credit and, secondly, to monitor its performance. On the other hand, the literature has extensively studied the adverse consequences of the existence of information between lenders and microfinance borrowers in the process of failure

according to the economic conditions of the last period, which is in a very troubled economic level following the Tunisian revolution phase, loan officers can be neither optimistic nor pessimistic. In addition, this estimate shows that the variables, experiment, the lack of cognitive flexibility and attitude to risk are statistically significant.

asymmetry. The information regarding the characteristics of the micro-borrowers asymmetry is particularly predictable at the time of the action of the loan because it reduces the ability of the lender to distinguish between good and bad micro-borrowers.

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