


RISK ASSESSMENT FOR REIMBURSEMENT OF MICROFINANCE INSTITUTIONS

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| ARTICLE INFO | ABSTRACT |
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| <p>Article history:</p> <p>Received 24 July 2023</p> <p>Accepted 17 October 2023</p> | <p>Purpose: Understanding the repayment behavior of the borrower is very important to the lending decisions of financial institutions and thus helps to promote the development of microfinance. This paper examines the factors that affect the repayment default of microfinance in Tunisia.</p> |
| <p>Keywords:</p> <p>Microfinance; Loan Repayment; Poverty Lending.</p>  | <p>Theoretical framework: Some studies highlight the importance of incorporating macroeconomic conditions for the estimation of borrowers' credit risk (Bellotti & Crook, 2013). However, IADB (2020) announced that after the start of the Covid-19 pandemic in the region, microfinance institutions had restricted liquidity, which affected the availability of credit. Therefore, for the purpose of the present article, the literature on default in MFIs analyzes the credit risk and factors that influence granted loans</p> <p>Design/Methodology/Approach: We carried out a survey, with a non-stratified sample of 320 microcredit beneficiaries, during 2021 in Enda-inter-Arab agencies located in the region of Sousse- Tunisia. We introduce a binary logistic regression model to predict the values taken by a discrete variable from a series of continuous or binary explanatory variables.</p> <p>Findings: We show that borrowers' socioeconomic characteristics, total loan, repayment period and past participation in microcredit loans have significant impacts, as special features, on their default rates.</p> <p>Research, Practical & Social implications: This paper has been designed to provide some valuable contributions in improving the repayment performance and can be significant political involvement, derived from the strong relationship between the level of poverty and the success of loan repayments. Indeed, the level of borrowers' poverty must be given considerable weight before the loan is disbursed.</p> <p>Originality/Value: The results indicate that the qualification and age of the workforce should be considered a basic requirement before the granting of loan. In addition the microfinance institution's credit policy should also consider service projects a priority.</p> <p>Doi: https://doi.org/10.26668/businessreview/2023.v8i10.3765</p> |

AVALIAÇÃO DE RISCO PARA REEMBOLSO DE INSTITUIÇÕES DE MICROFINANÇAS

RESUMO

Objetivo: Compreender o comportamento de reembolso do mutuário é muito importante para as decisões de empréstimo das instituições financeiras e, portanto, ajuda a promover o desenvolvimento do microfinanciamento. Este artigo examina os factores que afectam o incumprimento do reembolso das microfinanças na Tunísia.

Referencial teórico: Alguns estudos destacam a importância da incorporação de condições macroeconómicas para a estimativa do risco de crédito dos mutuários (Bellotti & Crook, 2013). No entanto, o BID (2020) anunciou que após o início da pandemia da Covid-19 na região, as instituições de microfinanças tinham restrição de liquidez,

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o que afetou a disponibilidade de crédito. Portanto, para efeito do presente artigo, a literatura sobre inadimplência em IMFs analisa o risco de crédito e os fatores que influenciam os empréstimos concedidos

Desenho/Metodologia/Abordagem: Realizamos um inquérito, com uma amostra não estratificada de 320 beneficiários de microcrédito, durante 2021 em agências Enda-inter-árabes localizadas na região de Sousse-Tunísia. Introduzimos um modelo de regressão logística binária para prever os valores obtidos por uma variável discreta a partir de uma série de variáveis explicativas contínuas ou binárias.

Resultados: Mostramos que as características socioeconômicas dos mutuários, o empréstimo total, o período de reembolso e a participação passada em empréstimos de microcrédito têm impactos significativos, como características especiais, nas suas taxas de incumprimento.

Implicações de investigação, Práticas e Sociais: Este documento foi concebido para fornecer algumas contribuições valiosas na melhoria do desempenho do reembolso e pode representar um envolvimento político significativo, derivado da forte relação entre o nível de pobreza e o sucesso dos reembolsos de empréstimos. Na verdade, o nível de pobreza dos mutuários deve receber um peso considerável antes de o empréstimo ser desembolsado.

Originalidade/Valor: Os resultados indicam que a qualificação e a idade da mão de obra devem ser consideradas um requisito básico antes da concessão do empréstimo. Além disso, a política de crédito da instituição de microfinanças também deve considerar os projectos de serviços como uma prioridade.

Palavras-chave: Microfinanças, Pagamento de Empréstimo, Empréstimos para Pobreza.

EVALUACIÓN DE RIESGOS PARA EL REEMBOLSO DE INSTITUCIONES DE MICROFINANZAS

RESUMEN

Propósito: Comprender el comportamiento de pago del prestatario es muy importante para las decisiones crediticias de las instituciones financieras y, por lo tanto, ayuda a promover el desarrollo de las microfinanzas. Este artículo examina los factores que afectan el incumplimiento de los pagos de las microfinanzas en Túnez.

Marco teórico: Algunos estudios destacan la importancia de incorporar condiciones macroeconómicas para la estimación del riesgo crediticio de los prestatarios (Bellotti & Crook, 2013). Sin embargo, el BID (2020) anunció que tras el inicio de la pandemia de Covid-19 en la región, las instituciones de microfinanzas tenían liquidez restringida, lo que afectó la disponibilidad de crédito. Por lo tanto, para los efectos del presente artículo, la literatura sobre incumplimiento en las IMF analiza el riesgo crediticio y los factores que influyen en los préstamos otorgados.

Diseño/Metodología/Enfoque: Realizamos una encuesta, con una muestra no estratificada de 320 beneficiarios de microcréditos, durante 2021 en agencias Enda-inter-Arab ubicadas en la región de Susa-Túnez. Introducimos un modelo de regresión logística binaria para predecir los valores tomados por una variable discreta a partir de una serie de variables explicativas continuas o binarias.

Hallazgos: Mostramos que las características socioeconómicas de los prestatarios, el préstamo total, el período de pago y la participación pasada en préstamos de microcrédito tienen impactos significativos, como características especiales, en sus tasas de incumplimiento.

Implicaciones de investigación, Prácticas y Sociales: este documento ha sido diseñado para proporcionar algunas contribuciones valiosas para mejorar el desempeño de los pagos y puede implicar una participación política significativa, derivada de la fuerte relación entre el nivel de pobreza y el éxito de los pagos de los préstamos. De hecho, antes de desembolsar el préstamo se debe dar una importancia considerable al nivel de pobreza de los prestatarios.

Originalidad/Valor: Los resultados indican que la cualificación y edad de la mano de obra debe considerarse un requisito básico antes de la concesión de un préstamo. Además, la política crediticia de la institución de microfinanzas también debería considerar como prioridad los proyectos de servicios.

Palabras clave: Microfinanzas, Pago de Prestamo, Préstamos para la Pobreza.

INTRODUCTION

Microfinance is a widely discussed topic in modern financial literature. It is considered a financial benefit to the poor, and plays a significant role in financial inclusion, sustainable economic development and job creation (EU, 2018; OECD, 2019; World Bank, 2017, 2019;

IMF, 2019). These institutions aim to reach the largest number of clients and to ensure their self-sufficiency (Ryhne and Otero, 1994). Their expansion began in Bangladesh with the establishment of Grameen Bank, the pioneering institution in the microcredit program, serving more than 5 million people in 2007. The main objective of the microfinance institutions is to provide financial services to sections of the population generally excluded from traditional banking systems including credit, savings, insurance, and money transfer services, so that they become actors of their own developments. It includes all financial services today and considered as a major financial innovation following the diversification of products used to meet the needs of the poorest (often women). The new adapted techniques were inspired by solidarity aspects. In fact, by granting joint loans based on the joint responsibility of borrowers, we can reduce the risks of information asymmetry and uncertainty in the absence of a guarantee. This problem of information is considered the main factor leading to the emergence of microfinance institutions, which through its characteristics and methodology, was a response to this situation. Despite this innovation, the microfinance program is nowadays limited in certain cases by repayment difficulties, also known as delinquency situations, which remain an important reality among the clients surveyed having a delayed repayment of their annuity.

The purpose of this paper is to objectively address the determinants of default and identify the factors that discriminate between "good" and "bad" borrowers. In this regard, we undertake to examine the effects of the socioeconomic characteristics of the borrower and loan, as well as the behavioral characteristics of the loan default on repayment related to Enda-Inter-Arab in Tunisia. The Tunisian micro-enterprise environment which is characterized by certain characteristics such as a high level of informality, lower productivity, lack of transparency, lack of practical guidance and lack of corporate governance, represents the objective of this research. This document is intended to make a contribution to improving the repayment performance of the MFI by better exploring its determinants. This, we reckon, might offer a few suggestions to lessen the default opportunity pertinent to the microfinance special programs.

Despite the diversity of funding programs, a segment of the population remained away from the various funding instruments. This population could not turn to commercial banks because of the lack of guarantees and qualifications. In addition, it was necessary to create a financing instrument that would allow the poorest to take charge of themselves and have a source of income while settling on the land of their ancestors. Thus was born the micro-credit system in Tunisia, which enabled the poorest social stratum to fight against poverty and to banish the assisted mentality.

Tunisia's microfinance sector is growing at strong rates with total loans up by 30% of total banking system loans in 2018. This sector is structured through the Tunisian Solidarity Bank (BTS) and more than 270 microcredit associations. It is outside this system that has developed Enda inter-arabe which has managed to achieve a social performance

The Tunisian Solidarity Bank (BTS) is a deposit bank governed by Law No. 67-51 of 7 December 1967 regulating the banking profession. It is authorized to carry on all the traditional banking activities provided for by the said law without special limitations. The BTS is defined as a "special" deposit bank. It is subject to the laws governing deposit banks, but its activity will initially focus on micro-credit granting operations. Indeed, it plays a major role in financing the creation of income sources in various sectors of activity such as agriculture, crafts or small trades. In this context, BTS will gradually assume the following main tasks:

- Provide micro-credit needs for activities that cannot access traditional bank credit
- Promote development dynamic based on initiative, creativity, self-employment and reintegration through credible and profitable individual micro projects in all areas of activity and throughout the national territory,
- Participate in the harmonization of the various existing instruments, lines and programs intended to finance this category of promoters and projects.

The BTS operates in all governorates. Its customers is therefore large and diverse. It was created in 1997 to strengthen the micro-credit system for the benefit of people who do not qualify for the traditional banking system because of lack of loan guarantees. Its culture is based on the set of principles of micro-finance practiced on the international scale. Indeed, BTS is defined as a local bank with a decentralization of credit and a simplification of operating processes, such as the selection and support of micro-actors.

One of the specificities of this bank is its "popular base". It appears through the method of mobilizing its capital. Its capital has reached 40 million dinars of which 54% are held by the State and public enterprises and 46% by the private sector. The number of subscribers exceeded 220,000 throughout the country.

Perhaps the most significant originality of the B.T.S concerns the nature of the credits and the conditions under which they are granted. Granted for an average of four years, they finance informal, subsistence and small-scale activities, as well as the acquisition of capital goods, equipment and small tools. As for the conditions of credit itself, it should be noted that while the international approach in micro-finance advocates the application of market

conditions to micro-credits in the name of financial balance, BTS has instead opted for concessional conditions.

The BTS grants thousands of credits each year to individuals with different socio-economic characteristics and with varying amounts according to several parameters. It is therefore essential to carry out a study which will help to identify the decisive parameters of the choice of the beneficiary (or of their project). On the basis of data on micro-credits granted by BTS (cumulative situation at 31/12/2007), we can distinguish an evolution of micro-credits granted according to several criteria.

The Tunisian Solidarity Bank (BTS) has established its programme of activities for 2021. It provides funding for a variety of important activities and projects. As part of its efforts, the Bank plans to play its full role in the country's development through:

- Project financing and business support impacted by the Covid-19 pandemic,
- Job creation,
- Improved service delivery to clients
- The use of money and modern technologies.

The Bank's Action Plan for 2021 provides for the granting of 13 thousand credits, with an investment envelope of around 250 million dinars.

BTS BANK is also preparing to launch new financing programmes, particularly in the social and solidarity economy and the green economy, in partnership with the German Cooperation Agency (GIZ) and the Agricultural Investment Promotion Agency (APIA).

The Bank also intends to launch several financing programmes in partnership with the Ministry of Training and Employment (New Generation), the Ministry of Women and Families (RAIDA Programme), and the Ministry of Agriculture, Fisheries and Water Resources (Agricultural Systems and Seasonal Credits).

On the other hand, BTS has established a program to transform its regional cells into banking branches that offer their clients all basic banking services. This initiative is undertaken, after the agreement of the Central Bank of Tunisia (BCT), for a first tranche of 11 agencies. This is part of BTS BANK's strategy to develop its services to become a universal bank and help consolidate the country's financial inclusion.

In the field of new communication technologies, the BTS intends to continue its digitization program and equip itself with the necessary equipment capable of ensuring remote payments via smart phones and making its customers benefit from electronic banking.

On the other hand, associations play a crucial rôle in Tunisian microfinance sector. These micro-credits are granted to finance the acquisition of small inputs necessary for production or in the form of working capital. These credits may also be granted to finance needs for the improvement of living conditions.” Eligible for micro-credits are natural persons who belong to needy families and vulnerable groups and who have the capacity to pursue an activity, or who have a qualification to pursue a profession, a trade or activity in agriculture or services...

The companies which grant micro-credits are the associations created and approved by the Ministry of Finance, after consulting a consultative committee. Tunisia have 227 associations dedicated to micro-credit, they are not autonomous and all depend on a single bank, the Tunisian Solidarity Bank (BTS). In 2007, they allocated 220,000 credits for a total amount of 135 million dollars, the number of beneficiaries reached 154,000 of which 43% are women. However, the operation of these associations and the granting of micro-credit in Tunisia are based on the intervention of public authorities at several levels:

- The establishment of a very strict regulatory and legal framework that takes into account the dual objective of microfinance: a social objective and a financial objective. Otherwise, the concern is to preserve the financial profitability of associations through a number of measures (premiums, interest rates, subsidies, etc.) while affecting the poorest social strata.
- Funding of all association micro-credit programs
- The creation of the BTS, which provides a forum for consultation, reflection and coordination of the national strategy on micro-credit.

The financial resources of these associations are essentially composed of:

- Funds made available under partnership agreements
- Grants or financial aid
- Resources in the framework of bilateral or multilateral cooperation
- Income from micro-credit repayments
- Income from investments of the funds

These resources may be used to grant of micro-credits and finance of supervision, training and follow-up measures.

The associations do not have the right to distribute profits, and the reimbursement by the beneficiaries is made to the associations which keep the proceeds of interest and return the principal to the BTS. However, these associations are under the control of the Department of Finance and must maintain regular accounting. They shall also be subject to external audit if

deemed necessary. In the event that an association fails to fulfil its obligations, it may be subject to the withdrawal of its authorisation to register loan contracts and value added tax.

The associations were responsible for granting these micro-credits in view of:

- Their experience in the development and management of the poorest social strata.
- The means at their disposal.
- The field work they are used to doing.
- Their proximity to the beneficiaries, allowing them to supervise and follow them.
- Their ability to intervene with minimal costs.
- Their participatory approach
- Their communication technique with this target population.

The micro-credit system in Tunisia is characterized by a maximum amount of 4000 TND for productive activities and 700 TND for the improvement of living conditions, a maximum interest rate of 5% per annum and a maximum repayment period of 3 years with the possibility of deductibility.

In addition, the amounts used by each association for granting micro-credit must be at least 95% of the resources allocated to the micro-credit, and the total amount of credit granted by each association for the financing of needs for the improvement of living conditions must not exceed 20% of the resources. Also, micro-credits are eligible for the guarantee of the FNG National Guarantee Fund (90% taken over by the FNG and 10% by the association). Finally, the association receives an installation fee of 15000 TND and 20 TND as administrative fees with a ceiling of 10000 TND per year.

Alongside this structure, an international non-governmental organization (NGO), Enda Interarabe, has gradually developed to grant with the BTS a considerable number of microcredits

ENDA-Inter-Arabe is founded in 1990 in Dakar (Senegal). It began as a multi-sectoral development organisation, focusing on the environment, health, education and youth activities.

Over the years, ENDA-IA has developed a number of strategic partnerships to meet the needs of its institutional development, in collaboration with other micro-finance institutions in the Arab region, such as FATEN in Palestine, Micro-funds for women in Jordan and Alamana and Zakoura in Morocco. During the 7th annual conference of SANABEL, ENDA received a certificate of 5 diamonds for transparency granted by MixMarket, prestigious prize also granted

to two other institutions: the Lebanese IMF, Al Majmoua and Al Amana, based in Morocco (Enda I.A 2010). The gross loan portfolio is more than 200 million dinars with more than 231,000 active borrowers (ENDA, 2013). ENDA-Inter-Arabe, is now the pioneering microcredit institution in Tunisia.

It has contributed to the country's economic development and poverty reduction by allowing marginalized and excluded populations of the traditional financial system to regularly access financial services tailored to their needs (Trabelsi .M and Chichti . J, 2011). Figure IV.3 shows the evolution of the number of active borrowers and gross portfolio loans of Enda-IA during the period 2000-2015. The number of active borrowers increased significantly by 120,000 in 2010 to 231,520 in 2013. Similarly, the portfolio of gross loans amounted to 103.2 million euros in 2013 against 56.4 million euros in 2010, and 6.2 million euros in 2005

The solvency of Enda-I.A's customers is an essential principle of its lending policy. In fact, the refund rate is around 99.8%. A percentage that reflects the relationship of trust and seriousness between Enda and its clients (Mohamed. Ali .T and Jameleddine. C, 2011). The microcredits offered by Enda I.A adapt to the profile of the different categories of target micro-entrepreneurs, identified by surveys and studies that have been conducted to better understand the needs of customers.

It should be noted that Enda I.A also provides individual loans (Fardi) to meet customer demand and needs. Upon repayment of their loans, customers become eligible for new loan cycles of Gradually-growing amounts. This product has three categories: FardiJadid, FardiTatweer, FardiMachrua and Istithmar.

Other financial and non-financial products have been introduced by Enda I.A. We are currently seeing the appearance of other products such as the credit «Bidaya» capped at 5000 DT, intended for young micro-Entrepreneurs with the necessary skills to carry out their projects. It is refundable over 30 months with a grace period of up to 6 months. The "Mawilni" credit, designed for micro-entrepreneurs, to finance working capital needs or to invest in a business. It is refundable over 2 years. The "mawsem" credit intended for small and medium-sized farmers to finance working capital and/or investment needs for agricultural land, livestock and irrigation equipment, also repayable over 2 years and capped at 5000 DT. The "Solfa" credit for persons or households carrying out (or wishing to launch) an activity that generates income at home. It is capped at 1000 DT and repayable over 12 months. The "Eddar" credit for anyone with a paid occupation, designed to improve housing conditions. It is capped at 5000 DT and repayable over 2 years. Finally, the "Ta'alim" credit for the financing of tuition fees, intended

for employees or micro-entrepreneurs, who are part of the creditworthy clients of Enda interarabe. It is capped at 500 DT and refundable over 12 months.

New “Al Machia” and “forsa” loans have been established to finance livestock operations in rural areas and to finance working capital and/or investment needs

Enda’s services are not limited to the provision of financial services. Great interest is given to the training and supervision of small entrepreneurs. To this end, Enda Interarabe, and the Higher Institute of Technological Studies (ISET) of Bizerte signed on May 22, 2013 a partnership agreement aimed at the creation, for the first time in Tunisia, of a license in micro-finance, the operational aspect of which is dedicated to Enda-IA’s training staff. Indeed, the students of this license have the opportunity to follow the stages of realization of projects funded by Enda

The rest of the article is organized as follows. Section 2 is the literature review. Section 3 deals with the relevant data and provides details regarding the methodology to be applied in this study. Section 4 presents the empirical Result and Discussion. Recommendation and Political Implication are in Section 5. The article concludes with Section 6.

THEORETICAL FRAMEWORK

A review of previous works has identified a number of key determinants of the repayment performance of microfinance institutions. In this regard, Several African studies on loan repayment performance showed that loan repayment was positively correlated with factors such as the speed of loans disbursement, the profitability of the business, the number of supervisory visits by loan officers that have additional sources of income and previous loan amount. (Kamajou. F. and Baker CB., 1980).

By analyzing the determinants of the repayment success of 146 credit groups in Madagascar, Zeller (1998) shows that the group generates better repayment performance than individual loans. He added that the young borrowers and the size of the family could not be used as signals of repayment capacity.

Wenner (1995) presents a methodology to check if the selection mechanism has an impact on the repayment performance of 25 credit groups in Costa Rica. It shows that the lending groups use private information to select their peers and that this selection mechanism increases the Group's repayment performance. For Sharma and Zeller (1997), credit rationing up to a certain level has a positive and significant effect on the repayment rate. Wydick (1999) used data from 137 Guatemalan credit groups to show how social cohesion affects the group's

repayment performance. He found that peer monitoring in urban groups and peer pressure in rural areas significantly affect group performance.

In a study on the Grameen Bank, Khandker, Kalily and Khan (1994) found that membership training, which relates to social intermediation, has a positive influence on repayment. In addition, they have safeguarded the partial influence of the region's characteristics on the lack of repayment. They have shown, also, that the rural electrification, the width of the road, the infrastructure, the education and the density of the bank are positively correlated with a low default rate. We can deduce from this study that the economic dynamism of the region has a positive influence on the repayment rate. Similarly, Paxton (1996) showed that access to other sources of credit, market sales activities, and urban location are related to better repayment performance. Zeller (1998) showed that young borrowers and family size could not be used as signals of repayment capacity.

According to Diagne, and al (2000), the most important factor that motivates groups to repay their credits is the relative value they associate with access to future credit, other studies consider that the difficulties of loan repayment are due to the problems in the profitability studies of micro projects before the lending, lack of technology watch culture, and financing of agriculture (Albert N. and al, 2001).

Jemal's (2003) studies of loan repayment performance show that education, income, loan supervision, the appropriateness of the repayment period, and the availability of other credit sources are main and significant factors that improve loan repayment performance, while the size of the loan significantly increases loan default. In addition, female borrowers have been found better in terms of loan repayment. When their manager is a woman, team members who feel mentally encouraged are more inclined to think imaginatively, take the initiative, and help solve difficulties (Ruiyao.M and al. 2023).

Microfinance programs using peer selection and monitoring, dynamic incentives and social guarantees maintain a high reimbursement rate (Silwal, 2003). Servet (2008), analyzes the limits of microfinance by the lack of professionalism in management techniques and tools. However, a few studies have been conducted on the issue of the individual loan design solvency applied by microfinance institutions. Research on the determinants of loan default in individual loan-based schemes can only be found in rural banks or semi-formal financial institutions (Suraya Hanim Mokhtar, 2011). Mokhtar et al. (2012), in a Malaysian study, show that "Age", "gender", "activity type", "repayment method", and "credit amount" are factors that contribute to microloan repayment difficulties.

MFIs should be sustainable and viable to ensure that they can still provide financing to small and micro entrepreneurs without depending on donors and the government. Financial viability is a prerequisite for the manufacture of permanent micro-financial services. However, IADB (2020) announced that after the start of the Covid-19 pandemic in the region, microfinance institutions had restricted liquidity, which affected the availability of credit. Therefore, for the purpose of the present article, the literature on default in MFIs analyzes the credit risk and factors that influence granted loans.

We, therefore, considered it appropriate to conduct a study on this topic and try, therefore, to answer the following question: What are the factors aggravating the repayment difficulties for clients of Enda-inter-Arab in Tunisia? To solve this problem, we present our adopted model in the following section.

METHODOLOGY

We carried out a survey in Sousse region, with a non-stratified sample of 320 microcredit beneficiaries, during 2021 in Enda-inter-Arab agencies located in the region of Sousse- Tunisia. We submitted our questionnaire during the period from July to August 2021, to only reach former microcredit beneficiaries.

In our survey, we conducted a study using a sample of 320 microcredit beneficiaries in the region of Sousse. Whereas we initially intended to cover a sample of 400 beneficiaries, the actual survey inspected only 320 beneficiaries in Enda-inter-Arab agencies during 2021. This is mainly due to the difficulties encountered, especially since our target only concerns the persons who have already taken a micro-loan and who are already repaying their annuities. In addition, most of the clients are women and the repayment of their annuity is through a member of their family, which forced us to travel to meet the concerned people. Finally, the Coronavirus and compulsory confinement cause the difficulty. Some of the escorts of Enda-inter-Arab agencies helped us by calling some former microcredit beneficiaries to their offices, generally from 2 to 3 people per day. The information obtained on each client surveyed enabled us to define 17 variables that are the subject of our study. As shown in Table 1, the independent variables, specific to each borrower in the microcredit portfolio, are classified into Socio-demographic variables (specific to the client), and loan variables (specific to the loan provided), following Baklouti (2013); Bilau and St-Pierre (2017) .

Table 1. Independent variables

| Variables | Type | Descriptor | Concept |
|---|-------------|------------------|---|
| Socio-economic Variables | | | |
| Age | Numerical | AGE | Customer's age |
| Levels of subjective poverty | Dichotomous | VERY POOR | It takes the value of 1 if the beneficiary is very poor and 0 otherwise |
| | | POOR | It takes the value of 1 if the beneficiary is poor and 0 otherwise |
| | | INTERM CLASS | It takes the value of 1 if the beneficiary is intermediate class and 0 otherwise |
| Education | Dichotomous | PRIMARY SCHOOL | It takes the value of 1 if the beneficiary studied at only primary school and 0 otherwise |
| | | SECONDARY SCHOOL | It takes the value of 1 if the beneficiary studied at secondary school and 0 otherwise |
| | | HIGH SCHOOL | It takes the value of 1 if the beneficiary studied at High school and 0 otherwise |
| Gender | Dichotomous | GENDER | It takes the value of 1 if the beneficiary is Female and 0 otherwise. |
| Marital status | Dichotomous | MARITAL | It takes the value of 1 if the beneficiary is Marrie and 0 otherwise. |
| Business sector | Categorical | ARTISAN | 1 if the beneficiary is artisan |
| | | SERVICE | 2 if the beneficiary is service sector |
| | | TRADE | 3 if the beneficiary is trade sector |
| Family assistance | Dichotomous | FAMILY AS | It takes the value of 1 if the client has family support and, 0 if not |
| Loan variables | | | |
| Number of loans granted previously | Numerical | LOAN_GRANT | Number of loans granted previously by the MFI |
| Amount of Microcredit | Numerical | AMOUNT | Amount of loan (TND) |
| Repayments unmet | Numerical | UNPAID | Number of payments in default |
| Repayment deadline | Numerical | DEADLINE | Number of monthly instalments |

Notes: TND is the currency of Tunisia.

Source: Prepared by the researchers based on the outputs of the statistical program STATA 12.

The Socio-demographic Variables include “The Borrower’s Age; Levels of subjective poverty; Education ; Gender ; Marital status; Business sector and Family assistance.

Various studies have concluded that microloan repayment is affected by the **age of borrowers**. Due to lack of experience, younger borrowers have a higher risk of default compared to older borrowers (Armingier et al., 1997; Dunn and Kim, 1999; Mokhtar et al., 2012; Holonkou et al., 2006; Dorfleitner et al. 2017). Some authors suggest that older borrowers

tend to be wiser, more risk averse, more knowledgeable, and more responsible than younger borrowers and therefore less likely to default (Baklouti.I, 2013). Therefore, age might have a determinant effect on loan repayment rates. In addition, Different studies have actually found that **female borrowers** have a higher repayment rate than the male ones (Beisland. R., Déspallier, B., &Mersland, R., Isabelle.G, 2011) and constitute a significant proportion of the lenders' clients (Maria.P and al., 2021). They are less likely to default on loans because they generally have a strong work ethic and a culture of financial discipline (Bhatt and Tang, 2002). Only studies conducted by Chirwa (1997), Godquin (2004) and Gutiérrez-Goira and Goitisoio (2011) concluded that woman and male borrowers do not display extensively distinctive repayment performances. According to Foster, (1995) and Kurosaki, (2006), the poorer are more vulnerable to repayment risk. Masahiro Shoji (2010) confirms that the rescheduling of credit repayment can help the **poor** to repay these loans.

Joy MueniMainaKiiru (2007) showed that the popular explanation of how the poor reimburse their credits is situated in the guideline of dynamic motivation to advance reimbursement. This alone is supposed to be an incentive to the clients to finish repaying their current loan and qualify for a larger one. Proponents of joint responsibility borrowing argue that dynamic incentives make microfinance for the poor operate in a similar fashion to the credit card in developed countries, whereby clients repay because they want to access more credit in the future

Concerning The “Borrower’s Educational Level” variable, several research led in third-world nations utilizing various approaches, shows that educated borrowers have lower risk of default. Regression analysis of the study by Lin, Li, and Zheng., (2017); Elloumi and Kammoun., (2013) showed that the risk of default is lower when MFI customers have a more significant level of schooling.

Oyekan.M and al. (2023) show a positive relationship between employee’s education and anti-fraud programs among SMEs in Abuja. Therefore borrowers with graduate and higher instructive level might have the best monetary achievement. According to Dinh and Kleimeier (2007), the charges for married borrowers (Marital Status) are higher as married borrowers are typically associated with some of dependents (such as children), which in flip displays a monetary stress at the borrower’s capacity to pay off a loan. Moreover, Beisland, Déspallier, &Mersland (2019) and Cozarenco, A., &Szafarz, A (2018) showed that responsibility and trustworthiness inside the monetary framework are cultivated by the presence of a strong family

core. They add that customers who have a good “Family assistance” present a lower risk of default.

The borrower's area of business activity (Sector) has an effect on the probability of default;

According to Baesens et al., (2011), Agriculture is believed to be the most secure sector because of the better social manage and usual lower volatility. However, services and small trades are assumed to be positively associated with the categories with excessive default threat thanks to their inherent volatility and their dependence to a certain degree of technology (Baklouti., 2013).

The Loan Characteristic Variables might also influence the probability of default; Feroze et al. (2011) led a study in India to recognize the primary elements influencing reimbursement execution. He showed that the loan amount has a negative impact on the repayment performance. Hietalahti and Linden (2006); Baesens and al (2011), argue that the bigger amounts increment the frequency of reimbursement problems.

Maria P. D-G, Juan Lara.R, Andrés. N-G, (2021), focusing on loan repayment rates among Bolivia, highlight the influence of idiosyncratic factors on payment default. They found that the number of loans granted previously is negatively associated with payment default. However, in the case of the MFIs located in Colombia, they found a positive association with payment delay, average arrears, the interest rate and the debt ratio. Furthermore, Koc̃enda and Vojtek (2009) argue that loans granted previously by the MFI are the main behavioural characteristic, showing that the more extended the set of experiences between the customers and the bank is, the less the possibility for default risk is. Subsequently, the number of loans granted previously can be a proxy of the borrower' default risk.

According to the table (2), we can draw the following results: The repayment performance of our sample represents 73.44%. The bias that exists in relation to the (99.7%) mother population allows us to have more bad beneficiaries and better analyze the causes of delay.

The average age of respondents is 43, of whom 34% are very poor, 26% are poor and 39% are middle class. Most of the recipients surveyed are married (84%), 83% of whom are women, and the rest are men. In terms of educational level, the majority of our sample is from a primary level, i.e (39.7%), where most of them (44%) are involved in services and (38%) in commercial activities.

Table 2. Descriptive statistics

| | N | Min | Max | Average | SD |
|-------------------------|-----|--------|---------|---------|-----------|
| Very poor | 320 | 0 | 1 | 0.3438 | 0.4757 |
| Poor | 320 | 0 | 1 | 0.2579 | 0.43815 |
| Interm class | 320 | 0 | 1 | 0.3938 | 0.48935 |
| Gender | 320 | 0 | 1 | 0.8344 | 0.37233 |
| Marital | 320 | 0 | 1 | 0.8406 | 0.3666 |
| Primary school | 320 | 0 | 1 | 0.3969 | 0.50885 |
| Secondary school | 320 | 0 | 1 | 0.1531 | 0.40951 |
| High school | 320 | 0 | 1 | 0.0438 | 0.47964 |
| Age | 320 | 24 | 68 | 42.7062 | 9.96363 |
| Artisan | 320 | 0,00 | 2,00 | 0,1156 | ,32992 |
| Service | 320 | 0,00 | 3,00 | 0,44 | ,51544 |
| Trade | 320 | 0,00 | 1,00 | 0,38 | ,48568 |
| Family as | 320 | 0 | 1 | 0.4984 | 0.50078 |
| Amount | 320 | 400.00 | 5000.00 | 1000 | 624.22366 |
| Unpaid | 320 | 2,00 | 30,00 | 5,0969 | 5,09902 |
| Deadline | 320 | 6,00 | 18,00 | 10,8875 | 1,95077 |

Source: Prepared by the researchers based on the outputs of the statistical program STATA 12

Statistical Methodology

In our case, the exogenous variable P is binary to choose, it takes the value 1 if there is repayment delay and 0 otherwise. This technique makes it possible to predict the values taken by a discrete variable from a series of continuous or binary explanatory variables (Trabelsi .M and Chichti, J, 2011). We propose the following logistic regression model:

$$Y = \log\left(\frac{p}{1-p}\right) \quad (1)$$

In Maximum Likelihood Estimation (MLE), the dependent variable is transformed into an appropriate log function, the coefficients are estimated, the change in the coefficients to maximize the likelihood is determined and has a linear relationship with the natural logarithm of probabilities (odds ratio), through an interactive process. Therefore, by applying the value of the independent variables, it is possible to calculate the Probability indicated as following way:

$$P = \left(\frac{e^z}{1 + e^z}\right) = \left(\frac{1}{1 + e^{-z}}\right) \quad (2)$$

Where :

$$Z = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k$$

The statistical significance of the model and the individual importance of each variable can be tested using multiple inference procedures, and LR can be integrated into decision-making processes. We will estimate the model using the Stata 12 software which will allow us to better appreciate and analyze the factors aggravating the repayment difficulties for Enda-inter-Arab customers. As a result, in order to compare our model with alternatives, we need to set a probability threshold for classifying users within the limits of 0 and 1. We chose the one that minimizes the 10-fold cross-validation error (Blanco et al., 2013), Therefore, obtaining 0.40 for the samples from Enda-Inter-Arab in Tunisia.

RESULTS AND DISCUSSION

The following table summarizes the results of the model estimation.

Table 3. Results of Binomial Logit model

| Variables | Coefficients | Ecart-type | T de Student |
|-------------------------|--------------|------------|--------------|
| Very poor | 0.32 | 0.07 | (4.40)* |
| Poor | -0.13 | 0.037 | (-3.54)* |
| Interm class | 0.02 | 0.028 | (0.72) |
| Gender | -0.33 | 0.185 | (-1.79)*** |
| Primary school | 0.75 | 0.051 | (14.49)* |
| Secondary school | 0.02 | 0.037 | (0.51) |
| Age | -0.008 | 0.003 | (-2.55)** |
| Family as | -0.22 | 0.059 | (-3.81)* |
| Artisan | -1.02 | 0.075 | (-13.63)* |
| Service | -0.947 | 0.049 | (-19.05)* |
| Trade | -1.07 | 0.007 | (-149.95)* |
| Amount | -0.0001 | 0.00004 | (-2.63)* |
| Unpaid | -1.06 | 0.22 | (-4.76)* |
| Deadline | 0.035 | 0.020 | (1.72)*** |
| CONS | 0.82 | 0.10 | (8.20)* |

Source: Prepared by the researchers based on the outputs of the statistical program STATA 12.

As shown in the table above, the probability of delay decreases with poor clients, but increases with the very poor and the middle class. This result confirms that the poor are the targets of microfinance institutions. Thus, it can be said that receiving microcredit for poor beneficiaries reduces the likelihood of repayment delay by about 13%. In addition, the loan amount is negative and significantly associated with the delay (-0.0001). This result is explained by the fact that the increase in the loan amount relates to the financing of a more profitable project and leads to more supervision and control to ensure its repayment. The renewal of the loan granted to the client, is an index of success of projects borrowers and reflects a healthy relationship between lender and borrower. On the other hand, the repayment term is positive and significantly associated with the risk of delay. This result is possible since the time factor

is a risk in itself. Also, among the benefits of microfinance institutions is the provision of short-term credit that is considered a success factor for these institutions.

Concerning the Gender variable, the results show that female borrowers reduce the risk of delinquency. Thus, confirming the results of Sharma and Zeller (1998), Papias and Ganesan (2008), Derban et al. (2005), and Roslan and MohdZaini (2009) who found that female borrowers are more solvent than male borrowers.

Moreover, the female gender is the favored target of Enda-inter-Arab programs. This privilege is due to the responsible behavior of women, which allows them to value their contribution to the well-being of the community and to reveal the living conditions of the family. In addition, all business lines and loan categories are found to be negative and significantly associated with late repayment. Thus, the selection of the activity sector and the loan category from the microcredit institution has an influence on the regularization of the repayment period, where the growth of the activity sector and the corresponding product generates a decrease in the probability of delay which is justified by the fact that micro-projects become profitable after a certain period facilitating the payment of credits.

For the level of education and the number of loans received, the results show that the primary and secondary levels and the number of loans are positive and significant at the 1% threshold. It is an understandable result because of political instability and the evolution of corruption rate especially after the Jasmine Revolution in Tunisia (January 2011), on the one hand, as well as the illiteracy rate which is very low in our country unlike other African countries, on the other. It should be noted that the link between the secondary level and the default level is insignificant, which indicates that the target population of Enda is at a primary and secondary level.

Finally, the risk of delay decreases with age and family assistance for the borrower. This result is linked to the increase in the beneficiary's experience and family stability. In this case, the microcredit institution can distinguish, in a relative manner, between a good and a bad borrower.

Table (4) presents the estimation results of the marginal effects. Actually, there is evidence that the results found are similar to those reached in the previous estimate. In fact, there is an inverse relationship between the poor, the type of borrower, the amount of microcredit, the sectors of activity, the products of the microcredit institution, age and family assistance, and the delayed repayment, confirming that these elements are necessary to ensure the repayment performance of microfinance institutions.

Table 4. Results of marginal effects

| Variables | dy/dx | Ecart-type | T de Student |
|-------------------------|----------|------------|--------------|
| Very poor | 0.06 | 0.01 | (4.30)* |
| Poor | -0.02 | 0.067 | (-3.60)* |
| Interm class | 0.003 | 0.005 | (0.72) |
| Gender | -0.06 | 0.038 | (-1.71)*** |
| Primary school | 0.14 | 0.009 | (14.38)* |
| Secondary school | 0.003 | 0.007 | (0.51) |
| Age | -0.001 | 0.0006 | (-2.54)** |
| Family as | -0.042 | 0.011 | (-3.82)* |
| Artisan | -0.19 | 0.014 | (-13.73)* |
| Service | -0.18 | 0.009 | (-19.24)* |
| Trade | -0.19 | 0.001 | (-178.17)* |
| Amount | -0.00002 | 0.00001 | (-2.64)* |
| Unpaid | -0.19 | 0.037 | (-5.04)* |
| Deadline | 0.007 | 0.004 | (1.72)*** |

Source: Prepared by the researchers based on the outputs of the statistical program STATA 12.

The predicted probability of the level of delay according to levels of subjective poverty and the activity sector (see Table 5) shows the gradual increase of the poor microcredit beneficiaries and TRADE activity. Thus, poor borrowers with trade activity have had the highest repayment performance.

Table 5. Predicted probability of risk reimboursment

| | Predict-value; 95% Conf. Interval | |
|--|-----------------------------------|--------------------------|
| | Pr(y): | 0.5173 [0.1502, 0.1644] |
| | Variable | pr (y) |
| According to the Levels of subjective poverty | VERY POOR | 0.4173 |
| | POOR | 0.2279 |
| | INTERM | 0.0593 |
| | CLASS | |
| According to the Gender | GENDER | 0.0112 |
| According to the level of Education | PRIMARY | 0.4973 |
| | SCHOOL | |
| | SECONDARY | 0.1929 |
| | SCHOOL | |
| | HIGH SCHOOL | 0.0615 |
| According to the activity sector | Artisan | 0.3200 |
| | Service | 0.1161 |
| | Trade | 0.4563 |
| According to the Amount of Microcredit | AMOUNT | 0.0773 |
| According to the Repayments unmet | UNPAID | 0.2207 |
| According to the Repayment deadline | DEADLINE | 0.0415 |

Source: Prepared by the researchers based on the outputs of the statistical program STATA 12.

According to table 5, the predicted probability of delay of reimbursement for microcredit beneficiaries with a PRIMARY SCHOOL level increases by 2% (0.5173 - 0.4973) while it decreases by 32% (0.5173- 0.1929) when the beneficiary is a SECONDARY SCHOOL level. This indicates that the target population of Enda is at a secondary education level.

We observe a decrease in the predicted probability of the level of poverty with the increase in the level of education.

Finally, the predicted probability of delay of reimbursement according to the amount and the repayment deadline shows the gradual decrease of risk of reimbursement. Thus, the higher the credit amount and the longer the repayment period are, the lower the probability of delay of reimbursement for microcredit beneficiaries

The impact studies of microfinance are a learning process in which the successes and problems of an intervention are highlighted and the learned lessons are documented.

CONCLUSION

The current study aimed at examining the main factors affecting repayment performance in microcredit programs in Tunisia. The research analyses the relationship between microfinance repayment deadlines and other independent variables as well as borrowers' socioeconomic characteristics and Loan Characteristics variables.

The study found that the increase in loan amount and the selection of products that meet the need of poor borrowers, taking into account the age and family assistance of beneficiaries, will increase the repayment performance of borrowers. Therefore, the monitoring and the control as well as the training of borrowers, such as the manner of marketing their products and their financial management are necessary to help them improve their project and ensure compliance with repayment deadlines.

Statistics have shown that the lack of repayment may arise from certain characteristics related to the borrower: the very poor and the middle class, his age, his level of education, and the increase in the repayment term.

In this paper, we will provide some valuable insights into the microfinance institution's repayment performance by understanding more about its relevant determinants. These factors are considered as credit rationing and scoring policies, applied by the various microfinance institutions, to address the various problems of non-repayment of microloans (Trabelsi .M and Chichti, J, 2011).

The Tunisian experience in microfinance is rich and has benefited from the arrival of new players in the 1990s. The micro-credit policy is the main stage of this development approach. In collaboration with other organizations such as NGOs and specialized financing funds, the Tunisian Bank of Solidarity and Enda-inter-Arab play a crucial role in the demand

for financing micro-projects and in the fight against poverty and improvement of household living conditions.

This paper has been designed to provide some valuable contributions in improving the repayment performance and can be significant political involvement, derived from the strong relationship between the level of poverty and the success of loan repayments. Indeed, the level of borrowers' poverty must be given considerable weight before the loan is disbursed.

In addition, for borrowers who are already taking microfinance loans, monitoring, and controlling these activities will help them improve their businesses and repay their loans successfully. Also, a project with a term repayment period is found to be more effective at being successfully repaid, while projects with a long-term repayment period are deemed to be in default. This is due to the positive and significant relationship between the target date and the loan repayment delay. This suggests that the repayment period must be resolved in a way that takes into account the financial viability of the project, the size of the loan and the market situation.

The negative and significant relationship between business lines and borrowers' repayment backlog implies that Enda-inter-Arab should critically assess the feasibility of project activity prior to disbursement. In addition, the microfinance institution's credit policy should also consider service projects a priority.

An important political implication influences the strong relationship between the type of product offered by the microcredit institution and the repayment performance of employee loans. In addition, the qualification and age of the workforce should be considered a basic requirement before the granting of loan

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