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# DETERMINANTS OF THE PERFORMANCE OF REFUNDING IN MICROFINANCE: EMPIRICAL APPLICATION FOR THE CASE OF ENDA-INTERARABE OF TUNISIA [*]

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## ABSTRACT

This paper aims as an objective to analyze the performance of refunding of Enda-Inter-Arab established in Tunisia as a model of microfinance, its specificities in terms of the refunding of microcredit and also its key factors of success and its critical factors of failure. With this intention, we will focus ourselves mainly on three subjacent factors of the performances of refunding of this association of microcredit that are in particular: determinants related to its characteristics, those related to the specific characteristics of its environment and finally those related to the characteristics of its customers.

**Keywords:** Rate of refunding; Microfinance; Micro-borrower; Enda-Interarabe, Tunisia.

## INTRODUCTION

The emergence of the microfinance as a new fashion of financing in the developing countries is the result of the exclusion of the vulnerable social categories by the formal financial system (Agier, and Szafarz, 2012; Agier and Assunção, 2011). Therefore, the microfinance is comparable with an instrument which makes it possible to finance the precarious agents and the micro-projects through microcredit (Servet, 2004-2006), which being able to play a crucial role in the economy since they make it possible to achieve the goals as regards the regional development[‡], the creation of jobs, the generation of income and the reduction of poverty. These considerations seem to be present in the policies adopted in Tunisia[§].

Which is with lucrative goal or not, any institution of microfinance (IMF) seeks to carry out highest possible rates of refunding[**], and therefore, benefit rose for it, as for its micro-borrowers (Abdou, Pointon, and Masry, 2008).These raised rates of refunding, make it possible the IMF to lower the interest rates which it practices on its loans and thus, to reduce the financial cost of the credit and to make the credit accessible to a higher mass of micro-

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[†] Corresponding author is PhD student in Finance and Accounting Methods Laboratory RTIGE, University of Sfax, Faculty of Economics and Management of Sfax
[‡] See Morduch., 2000, p.619-620 and Acclasato and Denis., 2006
[§] See Benarous, M, 2004 and N. Ben Nasr., 2005
[**] For example see B. Aghion and Morduch, J, 2000; Zeller and al., 1998 and Simbaqueba, L., Salamanca, G. & Bumacov, V., 2011; Alonso, P., Palenzuela, V., A and Merino, E., 2009

borrowers, while limiting the subsidies. Indeed, the improvement of the rates of refunding can also make it possible to reduce the dependence to the subsidies of the IMF (Kim, 2010 and Güttler, 2011). It is then, necessary even impossible to stop on this problem: the performance of refunding of the microcredit and to examine the variables related on the characteristics of the IMF[††], the environmental and the personal characteristics specific to the micro-borrowers, which can be the possible sources of the performance of refunding (Charreaux, 2005). For that, our central question, which we will approach in this research, is: Which are the principal explanatory factors of the performance of refunding related to the various characteristics which make it possible to distinguish the solvent micro-borrowers from those insolvent?

This research, falls under this objective to explore the context of the microfinance as regards the performance of refunding and to find solutions to minimize this risk of insolvency (Rosenbusch, 2011). In other words, it is a question here of identifying the influence of these characteristics on the rate of refunding.

To study the determinant variables of the rate of refunding of the micro-borrowers[‡‡], this paper is divided into four principal paragraphs: First of all, on the basis of the theoretical framework, we will focus ourselves particularly on the explanatory factors of the rate of refunding in microfinance and we will try to formulate the fundamental assumptions of our research and this, while basing ourselves on a review of the literature and the conceptual framework which will be useful to us in the empirical part (Richards, Lee, Kim, 2010)**.** Then, in a second paragraph, we will discuss our sample and our methodology adopted to treat our question of research**.** After that, we will try to empirically analyze the validity of the assumptions pre-discussed by the presentation and the analysis the principal results, in order to identify the explanatory factors of the rate of refunding of the microcredit**.** Lastly, we will be devoted to the conclusions and the implications of the study (Riopel, 2008)**.**

## A SUMMARY OF THEORETICAL LITERATURE

We focus ourselves in what follows on three principal determinants of refunding in the specific cases of an Institution of Micro Finance (IMF) (Rhee, 2008; Roy, 2006 and Redis, 2005): factors related to its characteristics, those related to its environment, and finally those related to the characteristics of its micro-borrowers.

### Determinants of Refunding in Microfinance related to the Characteristics of the IMF

The analysis of the literature having for objective to identify the causes of unpaid (Anderson, 2007; Honlonkou, 2006) shows that the insufficiency of the amounts of credit to finance the projects is a decisive cause of a bad performance of refunding. In the same way, found that the coefficient of the amount of the loans is significant and negative. This result was also confirmed by Labie and Mees (2005). Indeed, the negative sign is theoretically explained by the fact that the amount of the loans increases the profit associated with the moral risk. However, Hartarska and Nasdolnyak (2007) showed that the majority of the not refunded loans at the maturity were completely refunded a year later. In this context, the moral risk is interpreted as the choice of a project with a longer maturity than that of the loan rather than the choice of a riskier project (Bellucci, Borisov, Zazzaro, 2010). The negative sign relating to the amount of the loan can also be associated with the obstacles which the

[††] See Olszyna-Marzys, R., 2006; Ouedraogo, A., 2004; Lanha., 2001a and Reille, X and Timothy, R. Lyman., 2005

[‡‡] Mighri, Z., and Jarboui, A., 2013. Entrepreneurial culture, profile of the leader and entrepreneurial orientation: Empirical application in the case of the Tunisian companies, *International Journal of Managing Value and Supply Chains (IJMVSC)* Vol.4, No. 3, September 2013, pp. 45-54

micro-borrower can face to refund a higher amount over a given period (usually a year). It may be that for a given maturity, the loans of significant size do not go in par with the requirements of the borrowers and are not appropriate to the local economy (Basel Committee on Banking Supervision, 2010).

For a particular borrower and a given duration of loan, it is shown (Bhagavatula, and Alii, 2010; Bedecarrats and Angora, 2009; Lhériau, 2005, p.23; 24) that, the probability of refunding decrease with the size of the loan. The speed of the evolution of the probability of no refunding with the size of the loan changes according to the initial equipments of the micro-borrowers[§§] and the costs which they associate with the strategies of the moral risk and the strategic defect. Thus, the IMF cannot reach a rate of perfect refunding on the basis of the several inciting mechanism of its methodology of loan[***]. The IMF will have to lay down a new objective as regards the performance of refunding. With an aim of not exceeding the new target threshold of defect, the IMF will grant higher loans to the slightly risky borrowers (Brennan, and Torous, 2009).

According to the bank must offer contracts which are below the threshold (Biais and Weber, 2009; Helms, 2007; Berguiga, 2007). The micro-borrower could borrow more with the interest rate of the market if he could in a credible way be committed to not undertake the risky project. In this case, the IMF has two manners of managing the risk of the loan of group in microfinance: The group and the size of the credit which must be small in microfinance (Charness, and Gneezy, 2010). This rationing by the size implies that the poor secure loans of size limited to decrease the risk for the IMF (Caudill, Gropper, Hartarska, 2009).

It is a form of rationing of the credit which concern identical groups of micro-borrowers (Croson and Gneezy, 2009). Those who do not obtain the credit cannot be financed at higher interest rate because the lenders will not take this risk owing to the fact that the micro-borrowers will make the risky project. It is starting from this result that the model introduces the peer monitoring.

In this case, the lender wants to create an environment in which, it is in the interest of each micro-borrower to supervise the other and to announce to the bank any fraud (Sievers, and Vandenberg, 2007).

Thus, the IMF will offer loans to micro-borrowers only if one person agrees to co-sign[†††]. The type of contract of debt offered in microfinance will thus include a system of guarantee which will be represented by the co-signature (Cornée, 2007). This phenomenon can exist only by the presence of the reputation of the agents between them (Cull, Demirguc-kunt, and Morduch, 2006). Indeed, an agent will not want to stand as co-signatory for somebody who does not have a good reputation (Vincent, 2005). Consequently the IMF carries out an intermediation by the group to incite the members of the group to be supervised between them. It is the common responsibility which creates this incentive (Rosenbusch, 2011).

Moreover, by applying the game theory, Besley and Coate (2008) establish a model of refunding which represents the incentive to refund (De Andres and Valledo, 2008). This model is characterized by the introduction of a social sanction made by the group (Dinh and leimeier, 2007). The study concentrates on the informational advantage of the loan of

[§§] See V. Bumacov and A. Ashta., 2011 and Albert N. Honlonkou, Denis H. Acclassato and Célestin Venant C.Quenum., 2006; Armendáriz d'Aghion, B., and Morduch, J., 2005 and M. Labie, and J. Sota (2004, p.19)

[***] See Navajas, S and al., 2000 and Bedecarrats, F. and Marconi R., 2009 and Adair, P and Hamed, Y., 2004; Andersson, P., 2004; Littlefield and al., 2003; Morduch and al., 2002 and Cassar, G; Craig, J.B. Moores, K., 2006

[†††] See Servet, J.-M., 2009; Shimon. K., 2009; Servin, R., Lensink, R., Van den Berg, M., 2011

group[‡‡‡]; i.e. best information available to the members of the group on the effort and/or the capacities of the individuals compared to the bank (De Briey, 2007). This model shows that the common responsibility affects the will of the agents to refund.
In the light of what was advanced, we formulate our following central hypothesis:

> ***Hypothesis 1:*** *There is a positive and significant relation between the characteristics of the IMF and its performance of refunding*

Moreover, we will try in this research to validate the following axial assumptions which are derived from our central hypothesis H.1:

> *H.1.1: There is a positive relation between the interest rate and the rate of refunding;*
>
> *H.1.2: There is a positive relation between the amount to be refunded and the rate of refunding;*
>
> *H.1.3: There is a positive relation between the duration of the loan and the rate of refunding;*
>
> *H.1.4: There is a positive relation between the credit of group and the rate of refunding;*
>
> *H.1.5: There is a positive relation between the individual credit and the rate of* refunding.

**Determinants of Refunding in Microfinance related to the Characteristics of the Environment**

The problems associated with the socio-economic characteristics of the micro-borrowers can be concretized by a whole of factors which can assign the delay of refunding[§§§]. Among these factors we can quote the branch of industry represented by the agriculture, the service, the small the trades (the artisanal one), the breeding[****].

De Briey (2005) and Acclassato (2006) identified other factors affecting refunding in microfinance and they are focused on the bond between the financed branch of industry, the nature of the project of the micro-borrowers and the delay of refunding. We note that according to their studies, the institutions of microfinance finance frequently the activities belonging to the innovating sectors in the service, the small trades, the artisanal industry and the agriculture. Indeed, Khawari (2004) and Ndimanya (2002, p.14), found that, the percentage of credit allocated to the agriculture influences negatively the performance of refunding[††††]. This result can be explained by the threats attached to the rain agriculture and justifies the little of passion of the IMF to finance the agriculture (Laurence, 2005). Moreover, the branch of industry represents for the Tunisian bank of solidarity a criterion of its strategy of granting the microcredit.

Honlonkou et al. (2006) led a study on the performances of refunding of the credits of group for Bengladesh and showed that the rate of refunding is high when the borrower does

[‡‡‡] Such as Vliamos S.J. and Tzeremes N., 2011; Daniel Kahneman., 2011 and Mersland; R. Strøm.,(2008 and 2009) Chuang, C. L., and Lin, R. H., 2009 and Daniel Pierre, Dangoumau Nathalie, Bigand Michel., 2007 and CulI, R. Demirguc-kunt, A. et Morduch, J., 2006; Council Of Microfinance Equity Funds., 2006 and Dugas-Irequi, S., 2007

[§§§] Feroze, S.M., Chauhan, A.K., Malhotra, R., Kadian, K.S., 2011; Van Gool, J., Verbeke, W., Sercu, P., Baesens, B. (2011); Van Bastelaer, T., Zeller M., (2006)

[****] Such as Farsi J.Y., Imanipour, N., Mahlouji, S., 2012; B. Patrick , E. Annekathrin, G. Andre ., 2011 and Cefis, E., Marsili O., 2005; Chao-Beroff and al. (2000); Hartarska, V., Nadolnyak, D., 2008.

[††††] For example see K. Marius-Gnanou, and J. M. Servet, 2005; I. Guerin I, J. Palier., 2006 and Boye, S., Hajdenberg, J., Poursat C., 2006; Guerin Isabelle, Palier Jane and Prevost Benoit., 2009

not practice the agriculture as a principal activity, its nonagricultural incomes being riskier[‡‡‡‡]. Moreover, Vincent (2005) analyzed the rationing of credit by proving that it is dependent on a whole of determinants such as the branch of industry to be financed. These authors also recommend that the needs and the risks of financing differ according to the branch of industry of the borrower (production, services or trade). At this level, Dittrich and Yunus (2003); Field and Pande (2008); Erica and Rohini (2008) stipulated that the agricultural loans are risky, expensive and are particularly difficult to set up.

Güth and Maciejovsky (2005); Doligez and Gouvernail., (2005) think that the practice of the breeding combined with the agriculture increases the risks and makes dubious the probability of refunding. The results of their studies confirm that these two activities which belong to the exposure to the risks affect negatively the rates of refunding. In the same way, discovered that the number of years of experiment of the borrower in the agriculture had a negative impact on the capacity of refunding. Lastly, more the borrower is old, less it is innovating and this impact is close with that to the age of the owner; the age and the number of years of experiment being strongly correlated, because in the rural mediums, the agriculture is the principal activity. Moreover, Honlonkou et al. (2006); Guérin, Palier, (2006) and Gaillard, (2005) have leads at the end of a study on the rural applications of credit in Asia, showed that the more the producers had liquid assets being able to generate provisions, the more it preferred to pay rather than to support the costs of a failure.

The preceding discussion materialized by the branch of industry represented by the agriculture, the service, the small trades, the Breeding, suggest that, these factors influence significantly and positively the rate of refunding of the micro-borrowers. Our objective is to check this influence (Hudon and Périlleux, 2008). Consequently, in the light of what was advanced, hypothesis 2 which we will try to validate is as follows:

> ***Hypothesis 2:*** *There is a positive relation between the branch of industry represented by the agriculture, the service, the small trades, the breeding and the rate of refunding.*

**Determinants of Refunding in Microfinance related to the Characteristics of the Micro-orrowers**

The problems associated with the demographic characteristics of the micro-borrowers can be concretized by a whole of factors which can assign the delay of refunding which are: the gender, the age, the marital status, the number of dependent children, the level of study, the former experiment with the IMF and the type of the financed activity (Hertzberg, Liberti and Paravisini, 2010). With regard to the relation between the gender of micro-borrower and the delay of refunding[§§§§], Katsushis, Thankom and Samuel (2010); Kono and Takahashi (2010) showed that the borrowers of female gender do not present significantly a higher performance of refunding. Even if the coefficient is positive, it is not significant (Khawari, 2004). The fact that on average, the women present a probability of defect weaker can be partially justified by the fact that they receive on average smaller loans (Koloma, 2005). Moreover, Honlonkou et al. (2006) and Vincent (2005) note that the cases which have a strong young male composition have likely to record good performances of refunding (Koskinen and Vanharanta, 2002). Therefore, the gender influences refunding and the men have tendency to better refunding than the women (Dokou, 2004 and Adair, 2005) noted that the gender is not a significant factor of the rate of refunding in Malawi (Lasch et al., 2004).

[‡‡‡‡] Such as Giné, X., Jakiela, P., Karlan, D., Morduch, J., 2010; Foliard, S., 2012; Galema, R., Plantinga, A and Scholtens, B., 2008; G.Gloukoviezoff, J. Palier, J. Lazarus., 2008

[§§§§] For example see Krieger, E., 2001R. CulI, A. Demirguc-kunt and J. Morduch., 2006 and Loup., 2004; Labie, M., 2005; Berger, A.N., Frame, W. Scott., Miller, Nathan H., 2005; Lheriau, L., 2005; Lelart, M., 2002

Moreover, Granger (2006); Yunus (2006) and Lelart, (2007) stipulate that Grameen Bank is had by the poor (particularly and primarily women) whereas, the other banks are hold by the rich person (primarily men).

Concerning the relation between the age of the borrower and the delay of refunding, Briey (2005) and Brana (2008) found in several investigations that, the young people are compared to very risky micro-borrowers (Ledgerwood and White, 2006).

Therefore, the risk of delay decreases with the marriage of the borrower and thus, a married customer is less risky than a single person (Lapenu and Reboul, 2006). In fact, it is the family stability of married which pushes the latter to be powerful in its refunding (Lelart, J.M., 2006). It is logical to think that the experiment also plays in favor of the borrower and thus, to envisage a weaker rate of refunding for the youngest borrowers (Louizi, 2006; Brana, 2008; Campion, Linder and Knotts., 2008).

With regard to the relation between the marital status and the number of dependent children of the borrower and the delay of refunding, we note that, the women, more often unmarried, will have a priori less guarantees (only one source of income, less inheritance) to offer to obtain external financings (Cull, Demirgüç-Kunt, Morduch, 2007; Servet, 2006; Bujeje and Rusimbi, 2005). In other words, the marital status of the borrowers can condition the capacities of the latter to refund their loans. Moreover, Doligez (2004) identified that the proportion of dependent children and the percentage of women in the group affect negatively the rate of delinquency. More there are children in a household, more this one is insolvent.

The preceding discussion challenging the gender, the age, the marital status and the number of dependent children suggests that, these factors significantly influence the delay of refunding of the micro-borrowers (Lapenu, 2002).

The relation between the level of study and the number of experiment of the borrower in an institution of microfinance and the delay of refunding, we note according to Zeller (2006), that the rate of refunding was influenced by the human capital: more the borrowers can read, more the rate of refunding is high (Mersland and Strøm 2008). Indeed, formal education makes it possible to structure the ways of thinking and to reinforce the cognitive capacities of the active and the future micro-borrowers (Hardy, 2007), and it can be comparable with a significant source of competences, capacity to solve problems, motivation, knowledge, and self-confidence, etc. (Morduch, J. and Al., 2005). In the same way, according to Servet (2006), the majority of the studies on the determinants of the rates of refunding integrate variables related to the level of study and the number of former experiment of the borrower with his bank (Morduch and Al 2005). Moreover, Fuentes et al. (2010) showed on the basis of sample of 2793 contractors, that the experiments passed in the branch of industry do not have an influence on the number of identified and developed opportunities (Manaï & Manaï, 2005).

In addition to the experiences gained in the branch of industry, See Krieger (2001) note that the managerial experiments of the contractors are positively related to the use of the personal networks to obtain information necessary in order to launch a new company (Nawai, and Shariff, 2010). The preceding discussion materialized by the gender, the age, the number of dependent children, the level of study and the former experiment with the IMF suggest that, these factors influence significantly and positively the rate of refunding of the micro-borrowers (Fernando, 2008). This is why, we will try in what follows to validate the series of the subjacent hypothesis:

*H.3.1: There is a positive relation between the female gender and the rate of refunding;*

*H.3.2: There is a positive relation between the age represented by the old ones and the rate of refunding;*

*H.3.3: There is a positive relation between the number of dependent children of the micro-borrower and the rate of refunding;*

*H.3.4: There is a positive relation between the level of education represented by the illiterate ones, the higher level, the secondary level, the primary education level and the rate of refunding;*

*H.3.5: There is a positive relation between the number of former experiment of the customer with his IMF and the rate of refunding.*

## METHODOLOGY OF RESEARCH

Two methodological approaches were used: A descriptive approach and an econometric approach. These two approaches made it possible to initially appreciate the importance of the microcredit in the financing of the micro-projects and a second to raise the determinants of the performance of refunding of the microcredit of Enda-IA.

To examine the determinants of the performance of refunding of the microcredit in Tunisia, we were interested in a sample made up of 1000 loans granted by Enda-IA in Tunisia between 02 May 2009 and 17 November 2013.

The descriptive approach primarily rested on the construction of the simple and Crossed Tables of frequency to appreciate not only the importance of the recourse to the institutions of microcredit by the micro-projects according to the characteristics of the micro-borrowers, the characteristics related to the IMF and the characteristics related to the environment, but also the impact of the microcredit on the rate of refunding.

The econometric approach primarily seeks to raise the explanatory factors of the performance of refunding of the microcredit in an institution of microfinance which is Enda-IA. In other words, it is a question of identifying the relevant factors of the refunding of the microcredit of the customers of Enda-IA.

The study also seeks to emphasize the factors which encourage or block the refunding of the microcredit by the micro-borrowers of Enda-IA. With this intention, we postulate that there is a certain number of characteristics related to the IMF (The interest rate, the type of financed activity, the amount to be refunded and duration of the loan), characteristics specific to the micro-borrowers (the gender, the age, the number of children, the educational level, the number of its former experiments with the IMF) and the characteristics related to the environment (the branch of industry) which are relevant in the refunding of the microcredit. The definition, the measurement and the awaited impact of the explanatory variables are consigned in the following Table:

**TABLE 1**
Explanatory Variables of the Model

| Variables | Measure |
|---|---|
| RR | The rate of refunding of microcredit I It is calculated by dividing the difference between the amount to be refunded and the late amount by the amount to be refunded. |
| Gender of the *micro-borrower* | Dummy variable which takes value 1 when credit is contracted by a man and 0 if not. |
| Age of the *micro-borrower* | Age of micro-borrower (expressed in a number of years) |
| *Dl_INSTRUCTION* | Dummy variable which takes value 1 if the educational level of the borrower is primary and 0 if not. |
| *D2_INSTRUCTION* | Dummy variable which takes value 1 if the educational level of the borrower is secondary and 0 if not. |

| Variables | Measure |
|---|---|
| *D3_INSTRUCTION* | Dummy variable which takes value 1 if the educational level of the borrower is higher and 0 if not. |
| *TYPRET* | Dummy variable which takes value 1 if the loan is granted to a group of borrowers and 0 if not. |
| *EXPANT* | The number of former experiments of the borrower with the IMF. |
| *TINTERET* | The interest rate. |
| *MREMB* | The amount to be refunded (equal to the amount of the loan + interests). |
| *ACHARGE* | The number of dependent children. |
| *Dl_SECTEURi* | Dummy variable which takes value 1 if the activity of the borrower is of commercial type and 0 if not. |
| *D2_SECTEURi* | Dummy variable which takes value 1 if the loan will be invests in the sector of services and 0 if not. |
| *D3_SECTEURi* | Dummy variable which takes value 1 if the borrower operates in the sector of breeding and 0 if not. |
| *DUREMB* | Duration of the loan expressed in a number of months |

After the elimination of the aberrations (the observations which take values very high or very low compared to the total of the sample) because they can skewed the estimate, we estimate the sample with 956 observations.

Moreover, to see the variables influencing the rate of refunding in each sector, we made estimates by subdividing the sample according to branches of industry.

In addition, with an aim of seeing which are the variables which have a significant impact on the rate of refunding, while taking account of the educational level of the borrowers (illiterate, primary, secondary), we carried out estimates for each educational level.

Considering the credit of group is among the innovations of the microfinance which is used to improve the rate of refunding, we subdivided our sample according to the type of loan (group or individual) to make an estimate separated for each type of loan.

Lastly, to identify the variables to which must be interested the IMF to improve its performance of refunding when the borrowers are women and the variables which have a significant impact on the rate of refunding if the borrowers are men, we carried out estimates according to the gender.

## EMPIRICAL RESULTS AND DISCUSSION

This part of research has as objectives the presentation as well as the interpretation of the results of the various stages of our empirical study. The estimate of the model makes it possible to note the following results of the estimate:

**TABLE 2**

Results of the Estimate of the Stage 1

| Variable | Std | Coefficient. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.071667 | 0.193165 | -0.371015 | 0.7107 |
| GENDER | -0.055773 * | 0.021589 | -2.583357 | 0.0099 |
| AGE | 0.002204 * | 0.000689 | 3.200607 | 0.0014 |
| EXPANT | -0.008379 * | 0.003914 | -2.140615 | 0.0326 |
| LTINTERET | -0.101583 * | 0.050429 | -2.014365 | 0.0443 |
| LDUREM | 0.277824 * | 0.037078 | 7.492893 | 0.0000 |
| Probability (LR stat) | 0.212482 | | | |
| R-squared 0.151465 | | Mean dependent VAr 0.712138 | | |

| | |
|---|---|
| Adjusted R-squared 0.138814 | S.D. dependent VAr 0,217589 |
| S.E. of regression 0.201923 | Akaike information criterion -0.346264 |
| Sum squared resid 38.28568 | Schwarz criterion -0.269838 |
| Log likelihood 180.1679 | F-statistic 11.97235 |
| Durbin-Watson stat 0,720801 | Prob (F-statistic) 0,000000 |

* Statistically Significant.

The Table above shows that the variables relating to the level of education, the type of loan, the amount to be refunded, the number of dependent children and the variables relating to the branch of industry are not statistically significant. Moreover, the variables relating to the GENDER, AGE, EXPANT, LTINTERET and the variables relating to the LDUREM are statistically significant.

The result obtained by the application of the method of logistic binary regression estimated by the maximum of probability on this equation is summarized in Table 2. Indeed, according to these results, we notice that the specification of the model does not make it possible to give better results in the field of the statistical significant.

According to the results of the estimate, we notice that the variable GENDER has a negative influence on the rate of refunding of microcredit of the micro-borrowers (Nawai and Shariff, 2010). This result indicates that the probability that the credit is refunded is weaker for the men compared to the women. What translates the preference to answer favorably at the request of credit addressed by the women who in addition are strongly representative in the generating activities of income? This result confirms our assumption.

In addition, we notice that the variable age has a positive and no significant influence on the rate of refunding of microcredit of the micro-borrowers. In other words, more the age of the applicant of credit increases more the probability than the credit is granted improves what rather explains the preference for the granting of credits to the old micro-borrowers than the young people. What confirms our hypothesis? In addition, the criterion of age is significant in the strategy of Enda because the young people have a significant role in the development of the companies of which they are not only the recipients but also, the potential actors.

Moreover, our empirical results show that more the number of former experiments of the customer increase more his performances as regards refunding (Behr, Entzian, Güttler, 2011). This result is unexpected but can be justified by the fact that in the first loans with the IMF, the micro-borrower seeks to show himself to the institution as a faithful customer who refunds his loans at the limit to be able to reach higher amounts. As for the variable LTINTERET, the coefficient acts negatively on the probability of the RR (Richards, Lee and Kim, 2010). This result can be related to the fact that a high interest rate generates an increase in the loads to be supported by the customers of the IMF and consequently a deterioration of its capacity to be refunded. This result cancels our assumption.

Concerning the variable related to the duration of the loan, more it is high more the performance of refunding improves. Thus, in the case of our sample, Enda-IA would gain as regards refunding, if it is interested in the GENDER of the micro-borrower, his AGE, his experiments with it, the interest rate used on the loans and in the duration of the credit (Simbaqueba, Salamanca and Bumacov, 2011). But, for the other variables such as those which relate to the branch of industry, the IMF can be based on certain criteria before granting the credit with an aim of increasing the probability of refunding. For that, in our second stage, we subdivided our sample in three samples where each one of it corresponds to a given sector.

Moreover, for the variables of the educational level, the IMF cannot neglect the illiterate customers or with a low educational level considering main goal of the microfinance is the fight against poverty and several poor are illiterate.

The third stage of the estimate consists of the division of the sample in three samples: illiterate, primary and secondary education. Another stage (stage 4), which consists of the estimate according to the type of credit (credit of group and individual credit) is necessary since the credit of group is among the innovations of the microfinance. Lastly, considering that the most of the customers of Enda-IA are women, we wonder whether there is a difference between the determinants of refunding according to the gender, which will be the subject of our fifth stage.

**Estimate by Branch of Industry**

The estimates are carried out here separately for the sectors of trade, services and production/artisanal.

**TABLE 3**

Results of the Estimate of the Stage 2: Sector of the Production /Artisanal

| Variable | Std | Coefficient. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 0.477544 * | 0.105479 | 4.527395 | 0.0000 |
| D3_INSTRUCTION | 0.121661 * | 0.040910 | 2.973893 | 0.0034 |
| EXPANT | -0.021513 * | 0.008596 | -2.502686 | 0.0133 |
| Probability (LR stat) | 0.212482 | | | |
| R-squared 0.159136 | | Mean dependent VAr 0.728443 | | |
| Adjusted R-squared 0.104405 | | S.D. dependent VAr 0.179346 | | |
| S.E. of regression 0.169726 | | Akaike information criterion -0.645270 | | |
| Sum squared resid 4.868340 | | Schwarz criterion -0.433215 | | |
| Log likelihood 70.39695 | | F-statistic 2.907606 | | |
| Durbin-Watson stat 0.267446 | | Prob(F-statistic) 0.001553 | | |

* Statistically Significant.

To this end, Table 3 shows that except for the variable D3_INSTRUCTION and variable EXPANT, all the other variables do not influence significantly the rate of refunding. Indeed, for variable D3_INSTRUCTION, it is statistically significant and carries a positive sign what shows that the micro-borrowers having a higher level refund better than the others in the sector of production/artisanal (Servin, Lensink and Berg, 2011). Moreover, the micro-borrowers who have broader experience with Enda-IA refund less. Thus, it is possible to advance in the light of these results, that Enda-IA may find it beneficial to reinforce the share of the credit granted to the graduates of the superior and to reduce the credits granted to the former micro-borrowers in the sector of production/artisanal.

**TABLE 4**

Results of the Estimate of the Stage (2): Sector of the Trade

| Variable | Std | Coefficient.Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 0.39662* | 0.065393 | 6.065181 | 0.0000 |
| GENDER | -0.0477 * | 0.028078 | -1.700433 | 0.0895 |
| AGE | 0.002369* | 0.000880 | 2.693029 | 0.0073 |
| EXPANT | -0.0127 * | 0.004560 | -2.796091 | 0.0053 |
| TINTERET | -0.6543 * | 0.386616 | -1.692544 | 0.0910 |
| DUREM | 0.0439 * | 0.009545 | 4.600402 | 0.0000 |
| Probability (LR stat) | 0.21248 | | | |

| | |
|---|---|
| R-squared 0.135020 | Mean dependent VAr 0.706646 |
| Adjusted R-squared 0.120083 | S.D. dependent VAr 0.226723 |
| S.E. of regression 0.212675 | Akaike information criterion -0.239789 |
| Sum squared resid 28.81185 | Schwarz criterion -0.157038 |
| Log likelihood 89.81146 | F-statistic 9.039365 |
| Durbin-Watson stat 0.097745 | Prob(F-statistic) 0,000000 |

* Statistically Significant.

In addition, it is advisable to deduce starting from the estimates exposed by the Table 4 that except for the variable D3_INSTRUCTION and variable EXPANT, all the other variables are not statistically significant (Servet, 2009).

For the variables GENDER, AGE, EXPANT, TINTERET and DUREM, we found the same results of the first stage. Consequently, by granting loans to individuals who have as an activity the trade and to reach a rate of raised refunding, Enda-IA must be interested in the gender of the micro-borrower by reinforcing the share of the women, by increasing the share of the loans to the oldest, with her former EXPERIMENTS and by decreasing the share of the loans to those whom had already profited. Moreover, it must lower the interest rate and lengthen the duration of refunding.

**TABLE 5**

Results of the Estimate of the Stage (2): Sector of Services

| Variable | *Std* | Coefficient. Error | *t-Statistic* | *Prob.* |
|---|---|---|---|---|
| C | 0.694701 * | 0.176828 | 3.928674 | 0.0002 |
| *D1_INSTRUCTION* | -0.147234 * | 0.083483 | -1.763635 | 0.0811 |
| *ACHARGE* | -0.009163 * | 0.004280 | -2.141099 | 0.0349 |
| *Probability* (LR *stat*) | 0.212482 | | | |
| *R-squared* 0.138480 | | *Mean dependent* VAr 0.719131 | | |
| *Adjusted R-squared* 0.036580 | | *S.D. dependent* VAr 0.220568 | | |
| *S.E. of regression* 0.216496 | | *Akaike* information *criterion* -0.115280 | | |
| *Sum squared resid* 4.358955 | | *Schwarz criterion* 0.188030 | | |
| Log *likelihood* 18.05217 | | *F-statistic* 1.358980 | | |
| Durbin-Watson *stat* 2.041692 | | *Prob(F-statistic)* 0.205678 | | |

* Statistically Significant.

Moreover, according to Table 4 it arises that except for the variable D1_INSTRUCTION and variable ACHARGE, all the other variables are not statistically significant.

On the basis of estimate relating to the sector of the services, we notice the significance of only two variables: Dl_INSTRUCTION and ACHARGE. For Dl_INSTRUCTION, it carries the negative sign what means that primary education individual of level has a weak probability to ensure a high level of refunding (Shimon, 2009). The rate of refunding is indeed weaker 14.7% for this category of individual. Variable ACHARGE is significantly negative and means that more the number of children is high more the rate of refunding is weak.

Therefore, for the sector of services, one cannot identify several criteria, except the variables ACHARGE and Dl_INSTRUCTION, on which the IMF must rest to improve its performance of refunding. Thus, it may find it beneficial to limit in this sector, the share of the loans granted to the customers having a primary education level and much of dependent children.

**Estimate for each Educational Level**

In this paragraph, separate estimates are carried out according to whether it acts illiterate borrowers, borrowers a primary education level and borrowers having a secondary level.

**TABLE 6**

Results of the Estimate of the Stage (3): Illiterate Borrowers

| Variable | *Std* | Coefficient.Error | *t-Statistic* | *Prob.* |
|---|---|---|---|---|
| C | 0.671681 * | *0.1l5775* | 5.801624 | 0.0000 |
| *EXPANT* | -0.011003 * | 0.005718 | -1.924250 | 0.0558 |
| *D2_SECTEUR* | 0.078345 * | 0.042875 | 1.827299 | 0.0692 |
| *Probability* (LR *stat*) | 0.212482 | | | |
| *R-squared* 0.080607 | | *Mean dependent* VAr 0.736716 | | |
| *Adjusted R-squared* 0.028744 | | *S.D. dependent* VAr 0.193925 | | |
| *S.E. of regression* 0.191117 | | *Akaike* information *criterion* -0.415637 | | |
| *Sum squared resid* 7.122527 | | *Schwarz criterion* -0.222436 | | |
| Log *likelihood* 55.01844 | | *F-statistic* 1.554228 | | |
| Durbin-Watson *stat* 0.300844 | | *Prob(F-statistic)* 0.115126 | | |

* Statistically Significant.

The result obtained following the application of the method of logistic binary regression estimated by the maximum of is summarized in Table 6.To this end, it is advisable to deduce starting from the estimates that except for the variable EXPANT and variable D2_SECTEUR, all the other variables are not statistically significant (Brana, 2008). The estimate of a sample which contains only illiterate borrowers makes it possible to show the existence of two significant variables: EXPANT and D2_SECTEUR. The variable EXPANT carries the negative sign already found and variable D2_SECTEUR is significantly positive (Sievers and Vandenberg, 2007). This last result can be explained by the fact that, in the sector of services and for activities related for example to the services of hairstyle or restoration, one does not need a very high level of education. On the basis of this result, one can advance that by comparing the rate of refunding of the illiterates in the various sectors, one finds that they have the rate of the most significant refunding in the sector of services. These results also imply that Enda-IA, by granting loans to the illiterates, it may find it beneficial to privilege those exerting in the sector of the services and to penalize those with whom it had already engaged in activities of loans.

**TABLE 7**

Results of the Estimate of the Stage (3): Primary Level of Education

| Variable | *Std* | Coefficient.Error | *t-Statistic* | *Prob.* |
|---|---|---|---|---|
| C | 0.371544 * | 0.076593 | 4.850912 | 0.0000 |
| AGE | 0.002465 * | 0.001148 | 2.148067 | 0.0323 |
| *EXPANT* | -0.022103 * | 0.006781 | -3.259548 | 0.0012 |
| *DUREM* | 0.048307 * | 0.014845 | 3.253959 | 0.0012 |
| *Probability* (LR *stat*) | 0.212482 | | | |
| *R-squared* 0.175771 | | *Mean dependent* VAr 0.704663 | | |
| *Adjusted R-squared* 0.153105 | | *S.D. dependent* VAr 0.228012 | | |
| *S.E. of regression* 0.209833 | | *Akaike* information *criterion* -0.256320 | | |
| *Sum squared resid* 17.61189 | | *Schwarz criterion* -0.139202 | | |
| Log *likelihood* 64.80182 | | *F-statistic* 7.754720 | | |
| Durbin-Watson *stat* 0.293546 | | *Prob(F-statistic)* 0,000000 | | |

* Statistically Significant.

We can deduce starting from the estimates according to Table 7 that except for the variable AGE, variable EXPANT and variable DUREM, all the other variables are not statistically significant. From the Table hereafter, we note that variables GENDER, TYPRET, TINTERET, MREMB, ACHARGE, Dl_SECTEUR, D2_SECTEUR and D3_SECTEUR are not statistically significant. Therefore, for the borrowers who have a primary level of education, Enda-IA must be interested in these three variables. Thus, it would support the oldest borrowers and would lengthen the duration of these loans and would avoid the borrowers having already been given several loans with an aim of increasing the rate of refunding.

**TABLE 8**
Results of the Estimate of the Stage (3): Secondary Educational Level

| Variable | *Std* | Coefficient. Error | *t-Statistic* | *Prob.* |
|---|---|---|---|---|
| C | 0.381116 * | 0.067235 | 5.668448 | 0.0000 |
| AGE | 0.002978 * | 0.001130 | 2.635925 | 0.0088 |
| *EXPANT* | -0.011192 * | 0.006104 | -1.833527 | 0.0677 |
| *TINTERET* | -1.102615 * | 0.531255 | -2.075490 | 0.0388 |
| *ACHARGE* | 0.010227 * | 0.005941 | 1.721486 | 0.0862 |
| *DUREM* | 0.046329 * | 0.013277 | 3.489560 | 0.0006 |
| *Probability* (LR *stat*) | 0.212482 | | | |
| *R-squared* 0.163071 | | *Mean dependent* VAr 0.709886 | | |
| *Adjusted R-squared* 0.132787 | | *S.D. dependent* VAr 0.213929 | | |
| *S.E. of regression* 0.199220 | | *Akaike* information *criterion* -0.351577 | | |
| *Sum squared resid* 12.06537 | | *Schwarz criterion* -0.208954 | | |
| Log *likelihood* 67.54911 | | *F-statistic* 5.384788 | | |
| Durbin-Watson *stat* 0.328865 | | *Prob(F-statistic)* 0,000000 | | |

* Statistically Significant.

It arises starting from Table 8 that except for the variables AGE, EXPANT, TINTERET, ACHARGE and DUREM, all the other variables are not statistically significant.

With regard to variable ACHARGE, it is significantly positive, i.e. more the number of dependent children increases more the rate of refunding rises. This result can be related to the fact that the borrower feels more the need to make a success of his project since he is responsible for a family of big size and consequently his capacity to be refunded will improve. However, it is contradictory with the result found in the estimate of the sample of the borrowers who have as a branch of industry the services.

Therefore, while being addressed to the borrowers who have a secondary educational level, Enda-IA must take account of their age, their number of former experiments with it by reinforcing the share of the most recent borrowers and the number of dependent children while granting more of the loans to the fathers and to many mothers.

Moreover, it must adopt a lower interest rate and a longer duration of the loan to improve its rates of refunding.

**Estimate by Type of Loan**

In this paragraph we break up our sample into two groups according to the type of the loan. This manner enables us to estimate an equation for the individual loans and another for the loans of the group.

**TABLE 9**

Results of the Estimate: Credits of Group

| Variable | Std | Coefficient. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 0.587638 * | 0.079488 | 7.392752 | 0.0000 |
| AGE | 0.002546 * | 0.000845 | 3.014755 | 0.0027 |
| D3_INSTRUCTION | 0.005754 * | 0.001519 | 3.787560 | 0.0002 |
| EXPANT | -0.024893 * | 0.011686 | -2.130078 | 0.0336 |
| TINTERET | 2.936042 * | 0.953869 | 3.078034 | 0.0022 |
| MREMB | 0.000212 * | 8.00E-05 | 2.649815 | 0.0083 |
| DUREM | -0.064396 * | 0.020333 | -3.167058 | 0.0016 |
| Probability (LR stat) | 0.212482 | | | |
| R-squared 0.070889 | | Mean dependent VAr 0.723015 | | |
| Adjusted R-squared 0.048228 | | S.D. dependent VAr 0.201088 | | |
| S.E. of regression 0.196179 | | Akaike information criterion -0.394320 | | |
| Sum squared resid 20.51308 | | Schwarz criterion -0.284152 | | |
| Log likelihood 121.8466 | | F-statistic 3.128199 | | |
| Durbin-Watson stat 0.525557 | | Prob(F-statistic) 0.000161 | | |

* Statistically Significant.

The result of the estimates exposed in Table 9 shows that except for the variables AGE, D3_INSTRUCTION, EXPANT, TINTERET, ACHARGE, MREMB and DUREM, all the other variables are not statistically significant.

Therefore, the performance of refunding of the loans of the group varies positively with the age and a higher level of education and negatively with the existence of last loans.

Variable TINTERET is significant and carries an unexpected and even a contradictory positive sign to the results found previously. However, this result can be justified by the fact that the more the interest rate increases, the more the social pressure and the mutual monitoring between the members of the group will be strong, which will generate a rise of the rate of refunding. This explanation can also justify the positive and unexpected sign variable MREMB which is significant. Thus, more the loads of the micro-borrower are high more the effectiveness of credit of group as a guaranteed refunding will be significant.

Variable DUREM is significantly negative what is different from what it found in the other estimates, but it confirms the result related on the interest rate and the amount of the credit. A long maturity of the loan can indeed weaken solidarity between the members of the group and also it can cause many problems and thereafter a fall of the rate of refunding.

Therefore, the rates of refunding of the credit of group granted by Enda-IA are an increasing function of the age, higher instruction, interest rate and amount of the credit. They are a decreasing function of the existence of an old relationship to the group contracting the credit and a long duration of the loan.

The estimate of the model makes it possible to note the results of the estimate of the stage (4) in the following Table:

**TABLE 10**

Results of the Estimate of the Stage (4): Individual Credits

| Variable | *Std* | Coefficient. Error | *t-Statistic* | *Prob.* |
|---|---|---|---|---|
| C | 0.444790 * | 0.077663 | 5.727145 | 0.0000 |
| GENDER | -0.064580 * | 0.029115 | -2.218086 | 0.0271 |
| *EXPANT* | -0.010826 * | 0.004346 | -2.490869 | 0.0132 |
| *TINTERET* | -1.037548 * | 0.388269 | -2.672238 | 0.0078 |
| *DUREM* | 0.057174 * | 0.009003 | 6.350211 | 0.0000 |

| Variable | *Std* | Coefficient. Error | *t-Statistic* | *Prob.* |
|---|---|---|---|---|
| *Probability* (LR *stat*) | 0.212482 | | | |
| *R-squared* 0.251811 | | *Mean dependent* VAr 0.697520 | | |
| *Adjusted R-squared* 0.227062 | | *S.D. dependent* VAr 0.237443 | | |
| *S.E. of regression* 0.208752 | | *Akaike* information *criterion* -0.261546 | | |
| *Sum squared resid* 17.12594 | | *Schwarz criterion* -0.123650 | | |
| Log *likelihood* 67.22453 | | *F-statistic* 10.17451 | | |
| Durbin-Watson *stat* 0.518169 | | *Prob(F-statistic)* 0,000000 | | |

* Statistically Significant.

It is advisable to deduce starting from the estimates appearing in the Table 10 that except for the variables GENDER, EXPANT and TINTERET all the other variables are not statistically significant.

In other words, by granting individual credits and with an aim of increasing the rate of refunding, Enda-IA must target the women more than the men, to increase its pressure on the micro-borrowers who have several cycles of credit with it, to adopt an interest rate which is not exaggerated too much i.e. which takes account of the conditions of the micro-borrowers, and also a longer duration of loan.

**Estimate by Gender**

The women are the principal component of the wallet customer of Enda-IA. Thus, it would be interesting to see whether their performance of refunding does not vary in the same way in comparison with the men according to the variables of the model.

**TABLE 11**

Results of the Estimate of the Stage (5): Gender of Borrowers

| Variable | *Std* | Coefficient.Error | *t-Statistic* | *Prob.* |
|---|---|---|---|---|
| C | 0.444079 * | 0.056651 | 7.838919 | 0.0000 |
| AGE | 0.001689 * | 0.000747 | 2.261948 | 0.0240 |
| *EXPANT* | -0.014327 * | 0.004433 | -3.231853 | 0.0013 |
| *DUREM* | 0.043011 * | 0.009474 | 4.540060 | 0.0000 |
| *Probability* (LR *stat*) | 0.212482 | | | |
| *R-squared* 0.137732 | | *Mean dependent* VAr 0.721296 | | |
| *Adjusted R-squared* 0.123561 | | *S.D. dependent* VAr 0.210947 | | |
| *S.E. of regression* 0.197485 | | *Akaike* information *criterion* - 0.389069 | | |
| *Sum squared resid* 30.84930 | | *Schwarz criterion* -0.307489 | | |
| Log *likelihood* 170.6001 | | *F-statistic* 9.719113 | | |
| Durbin-Watson *stat* 1.129167 | | *Prob(F-statistic)* 0,000000 | | |

* Statistically Significant.

To this end, it arises from the estimates exposed in Table 11 that except for the variable GENDER, EXPANT and DUREM, all the other variables are not statistically significant.

It is advisable to deduce starting from this estimate that by targeting the women, the IMF cannot refer on a given educational level in its search for a rate of higher refunding, since the three variables relating to the level of education are not significant. Thus, they are the oldest women, having the shortest experience with Enda-IA, and whose loans are associated with the longest times of refunding whose have the best performances as regards refunding.

**TABLE 12**
Results of the Estimate of the Stage (5): Amount of Credits

| Variable | *Std* | Coefficient. Error | *t-Statistic* | *Prob.* |
|---|---|---|---|---|
| C | 0.337640 * | 0.171261 | 1.971492 | 0.0507 |
| AGE | 0.004337 * | 0.001890 | 2.294378 | 0.0233 |
| *EXPANT* | -0.016449 * | 0.007414 | -2.218706 | 0.0282 |
| *MREMB* | 0.000126 * | *5.97E-05* | 2.101657 | 0.0374 |
| *Probability* (LR *stat*) | 0.212482 | | | |
| *R-squared* 0.101843 | | *Mean dependent* VAr 0.662661 | | |
| *Adjusted R-squared* 0.015354 | | *S.D. dependent* VAr 0.245370 | | |
| *S.E. of regression* 0.243479 | | *Akaike* information *criterion* 0.101674 | | |
| *Sum squared resid* 8.003058 | | *Schwarz criterion* 0.383924 | | |
| Log *likelihood* 6.425290 | | *F-statistic* 1.177521 | | |
| Durbin-Watson *stat* 1.661699 | | *Prob(F-statistic)* 0.302349 | | |

* Statistically Significant.

Result of the estimates of Table 12 show that except for the variable AGE, EXPANT and MREMB all the other variables are not statistically significant.

For variable MREMB, it is significantly positive i.e. more the amount to be refunded increases more the rate of refunding rises. This result can be justified by the fact that the more the amount to be refunded increases, the more the effect provided by the borrower to make a success of his project is significant, which would reinforce his refunding.

The results of these five stages are summarized in the following Table:

**TABLE 13**
Summary of the Results (Validation of the assumptions)

| | | Variables of which the effect is significantly positive | Variables of which the effect is significantly negative |
|---|---|---|---|
| Stage 1 | | AGE and *LDUREM* | GENDER, *EXPANT* and *LTINTERET* |
| Stage 2 | *Production/artisanat* | *D3* INSTRUCTION | *EXPANT* |
| | *Trade* | AGE and *DUREM* | GENDER, *EXPANT* and *TINTERET* |
| | *Services* | | D L INSTRUCTION and *ACHARGE* |
| Stage 3 | *illiterate* | *D2* SECTOR | *EXPANT* |
| | *primary education* | AGE and *DUREM* | *EXPANT* |
| | *secondary* | AGE, *DUREM* and *ACHARGE* | *EXPANT* and *TINTERET* |
| Stage 4 | *Credit of group* | AGE, *D3* INSTRUCTION, *TINTERET* and *MREMB* | *EXPANT* and *DUREM* |
| | *Individual credit* | *DUREM* | GENDER, *EXPANT* and *TINTERET* |
| Stage 5 | *Women* | AGE and *DUREM* | *EXPANT* |
| | *Men* | AGE and *MREMB* | *EXPANT* |

## CONCLUSIONS AND IMPLICATIONS

In the light of our empirical analysis a whole of results were worked out and which are synthesized as follows: with an aim of improving its rate of refunding, Enda-IA must be interested in the gender of the micro-borrower by targeting more women, their age, their former experiments with it, the interest rate used on the loans and in the duration of the loan (Vliamos and Tzeremes, 2012; Unger, Rauch, Frese& Rosenbusch, (2011); Van, Verbeke, Sercu, & Baesens, 2012).

Moreover, while being based on the branch of industry, Enda-IA can improve its performance of refunding while being interested in certain specific criteria for each sector. For the sector of production/artisanal, it must take account of the level of education and the number of former experiments of the borrower with it (Basel Committee on Banking Supervision, 2010). With regard to the sector of trade, Enda-IA must be interested in the gender of the micro-borrower and his former experiments with it (Bellucci, Borisov & Zazzaro, 2010). Also, it must adopt a lower interest rate and a longer duration of loan. Lastly, for the sector of services, it must attach more importance to the level of education and number of dependent children of the borrower. However, for each sector, the IMF can be based on certain criteria before the granting of the credit with an aim of increasing the probability of refunding (Van & Zeller, 2006; Bhagavatula & Alii, 2010). While basing itself on the second stage of the estimate, we divided the sample according to the branch of industry and it led us to note that: for the sector of production/artisanal, Enda-IA may find it beneficial to reinforce the share of the loans granted to the graduates of the superior and to reduce the loans granted to former borrowers (Bedecarrats & Angora, 2009; Bedecarrats & Marconi, 2009; Brennan & Torous, 2009). With regard to the sector of trade, it must be interested in the gender of the micro-borrower by reinforcing the share of the women, by increasing the share of the credits of oldest and having former experiments with it by decreasing the share of the loans of those whom had already profited. It must also lower the interest rates and lengthen the duration of refunding. Lastly, for the sector of services Enda-IA must limit the share of the credits granted to the customers having a primary education level and much of dependent children (Biais & Weber, 2009).

The variables which have a significant impact on the rate of refunding differ from an educational level with another. Indeed, for the illiterates, this association must be interested in the number of former experiments of the micro-borrower with it and in the branch of industry chosen by the customer (Charness & Gneezy, 2010). For the primary education level, one finds that the variables age, a number of former experiments with it and the duration of the loan have a remarkable influence on the rate of refunding. Lastly, to be sure of a high capacity of refunding of the micro-borrowers who have a secondary level of education, Enda-IA must take account of their age, their number of former experiments with it, the number of children t, the interest rate and the duration of the loan. Thus, by offering credits to all the categories of the customers, the IMF can identify certain variables for each level of education to improve the rate of refunding (Kahneman, 2011; Kahneman & Tversky, 1979). This made the objective of the third stage which enabled us to conclude that while being addressed to the illiterates, Enda-IA must be interested in the numbers of former experiments of the borrower with it and in the branch of industry chosen by the customer.

Considering the importance of the type of loan that it is individual or of group, the IMF can improve its rate of refunding by granting more interest to certain specific criteria for each type. For the credit of group, the criteria are the age, the level of education, the amount to be refunded, the number of former experiments with it and the interest rate. Whereas, for the individual credit, Enda-IA must be interested in the gender, the number of former experiments with it, the interest rate and the duration of the loan. Moreover, in the fourth stage, we subdivided our sample according to the type of loan. This distinction is necessary

because the agreement of a loan to a group of borrowers differs enormously with the agreement with only one borrower. Lastly, while being based on the results of the first stage where we have concludes that the women refund better than the men, we showed in the fifth stage of the estimate which the criteria which influence the rate of refunding for the women. Which are the age, the number of former experiments and the duration of the loan and the age, the number of former experiments and the amount to be refunded, for the men.

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