



European Microfinance Credit Risk Management and Credit Scoring

State of the art and perspective

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ABSTRACT:

In this paper we provide an analysis of credit risk management and the use of credit scoring among European MFIs. With this aim, we designed and sent a survey to the full set of known MFIs operating in Eastern and Western Europe.

58 MFIs completed the survey. We observe that the European microfinance industry has already dedicated substantial effort to risk management, noting that more than half of the respondents to the survey that have a specialised risk management unit and almost half of the sample already use credit scoring to support the operations of its loan officers. However, efficiency and outreach remain low while credit risk is still quite high.

Our results underline the potential of credit scoring to support a more resilient microfinance sector in terms of risk, efficiency and outreach. We hope that information contained in this report will be useful to build a sound, efficient and sustainable microfinance industry in Europe.

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EXECUTIVE SUMMARY

Risk is intrinsic to every financial transaction. The objective of risk management is not to eliminate risk, but rather to understand the risks of an institution's activities, reduce the risk exposure to a level that meets the institution's risk appetite and employ the right procedures to manage the residual risk.

The present paper is among the first documents to investigate the credit risk management of European Microfinance Institutions (MFIs), and in particular their use of credit scoring. The objective is to draw the state of the art for the sector and explore the relation between credit scoring and risk, efficiency and outreach.

To reach this objective, we have designed an online survey that has been submitted to 386 MFIs operating in 36 European countries. 58 MFIs responses were retained for the data analysis.

The majority of the respondents have a specialised risk management unit (RMU), while another quarter of respondents aim to develop a RMU within the next two years. Almost half of the European MFIs responding to our survey claim to use credit scoring (CS), while another quarter aim to develop CS within the next two years. RMUs employ, on average, 37% of MFI total staff with an average of 8.8 years' experience and 23.3 hours of dedicated training in risk management. The stated objectives of RMUs are, in order: to screen clients, follow up credits and improve product design.

On average, MFIs started using CS around 2008 and handle approximately 80% of the loan applications. The majority of the MFIs use qualitative credit scoring developed on the qualitative credit risk experiences of internal and external credit experts. However, nearly half of the respondents also claim to employ quantitative credit scoring using statistical procedures based on past loans performance data of the MFI while some other MFIs simply buy it from other institutions. The principal sources of information used to design CS are: client credit history, business or personal financial data, socio-economic factors and data reported to credit bureaus. The majority of the respondents (76%) employ CS to screen loans, but also report credit follow up (48%) and product design (40%) as uses of CS. Almost all respondents claim that CS is used as a support tool and the decision to disburse or reject a loan is based on combining CS with: other hard data (83.3%), or the loan officer's opinion (83.3%) or with other soft data (75%). The majority of the respondents believe that the use of CS reduces credit risk (80.8%) and increases MFI efficiency (65.4%), while only 30.8% believe that CS can increase outreach.

Eastern European MFIs are more likely to have an RMU or use CS compared to Western MFIs. However, Western MFIs are planning to offset this difference as more than 30% of Western MFIs claim that they will employ a RMU and develop a CS within two years.

The legal status of the MFIs, on average, seems to influence the development of RMUs and/or the use of CS: banks are the most likely to have an RMU, while NBFIs are more likely use CS. MFIs with RMUs are, on average, older than those without RMUs, while MFIs with CS are on average slightly younger.

On average, MFIs with RMUs have a higher PaR30, while MFIs PaR30 remains constant whether or not an MFI uses CS. Larger MFIs are more likely to have an RMU, while MFIs with CS are typically smaller. MFIs with RMUs appear to be more efficient than MFIs without RMUs, however MFIs with CS seem to have lower efficiency compared to peers without CS. MFIs with RMUs have lower ROA, while MFIs with CS have higher ROA.

Some of these possibly surprising results are explained by observing the evolution of the various risk, efficiency and outreach indicators. Indeed, it seems that MFIs with higher risk and lower efficiency are more likely to develop CS, and that the use of CS has positive effects on credit risk by increasing resiliency and reducing the probability of bad performing loans, on efficiency by reducing operating costs and on outreach by supporting the growth of the institution.

However, nowadays, credit risk remains relatively high while the efficiency and the number of clients reached per institution remains quite low in the European Microfinance (MF) industry. Moreover, the financial crisis, the high rate of unemployment and potentially high over-indebtedness require more careful management of risk.

Utilisation of CS could be one tool to support the fulfilment of these objectives. We hope this first report will encourage the European MF sector to collaborate to build more adapted and efficient tools to improve credit risk management. We believe that the possibility to build an adaptable credit scoring tool for the various European MF markets could be further explored in the near future.

01.

INTRODUCTION

Risk is intrinsic to every financial transaction. Risk is the result of the interaction between an external factor: the hazard (changes of market prices, clients unwilling to repay, etc.) and the internal vulnerability of the institution (existence and quality of strategies, operations, procedures, etc.). Internal procedures and strategies, such as: portfolio diversification, credits tailored to the client's needs, efficient controls of internal operation, etc.; can reduce the impact of the external hazard, minimise the risk and increase the institution's resiliency.

The objective of risk management is not to eliminate the risk, but rather to:

- understand the risks of the institution's activities;
- reduce risk exposure to an acceptable level in line with the institution's risk appetite; and,
- employ the right procedures to manage the residual risk.

In this document, we investigate the credit risk management of European Microfinance Institutions (MFIs). Credit risk is the risk that clients will not fulfil their repayment obligations.

Each loan application brings potential social and economic opportunity, but at the same time carries a certain level of risk for the MFI. Consequently, MFIs should be able to assess this risk and to know how to manage it. However, **how can an MFI effectively and efficiently assess client risk?**

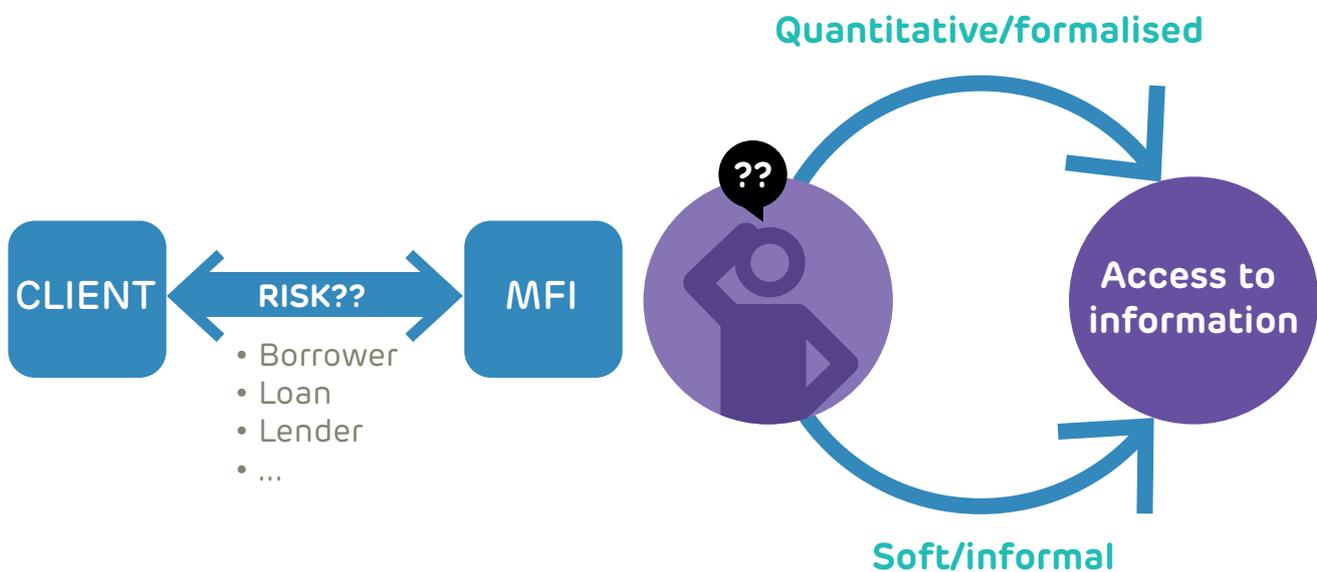


Figure 1

The figure represents the issue of credit risk. The client applies for a loan and the MFI has to assess the credit risk. The risk depends not only upon the clients, but also the loan, the institution, the environment etc. The MFI needs to obtain relevant information about the client to assess their credit risk. The MFI should decide the most effective and efficient way to obtain such information. The figure illustrates two possible procedures that an MFI could adopt: the use of quantitative and formalised procedures or the use of more informal procedures.

Figure 1 provides a simplified cartoon capturing this issue. First, it is important to understand that the risk is not simply intrinsic to the client but also depends on the lending institution, the product structure (repayment schedule, activity financed, etc.) and the socio-economic environment (market prices, regulations, etc.).

Credit risk is the result of the interaction among the client, the institution and environment.

It is often quite difficult for an MFI to assess credit risk: effective risk management implies accessing the right information in a cheap and quick fashion. Information is often one of the most valuable assets, but at the same time it can be extremely complex to obtain.

Banks have developed automatic procedures to assess the risk of their clients and minimise their transaction costs. However, MFI clients, due to their activities and social conditions, often do not have such information: no formal guarantee, no reported credit history, etc. Moreover, bank procedures assessing risk are not typically adapted to this population. Consequently, this population is often automatically excluded by the screening procedure of the banks despite being bankable. MFIs have developed alternative procedures to assess the credit risk of their clients.

These alternative procedures often consist of a relationship-based credit methodology between the loan officer and the client or the utilisation of a particular credit structure (joint liability) that formalise the informal capital of potential clients, allowing the MFI to access soft information regarding the client and hence assess their credit risk.

Unfortunately, very little is known on European MFI credit risk management. However, the topic is of fundamental importance for the socio-economic missions of European MFIs. To fill this gap, the European Microfinance Network (EMN) has established an Idea-Lab with the objective to better understand the credit risk management of European MFIs and, in particular, the use of formalised statistical credit risk assessment procedures. The deliverables of the Idea-Lab include: a desk research (EMN, 2015) and an empirical study that is the topic of the present paper.

The objectives of the present paper incorporate:

- 1) providing the state of the art of credit risk assessment and the use of scoring models among European MFIs;
- 2) analysing the main variables used for client credit risk analysis in the European microfinance industry; and,
- 3) assessing if there is a relationship between the use of credit scoring, or other credit risk management tools, and credit performance, outreach and the operational efficiency of MFIs.

To this end we have designed an online survey that has been sent to MFIs operating within Europe. This article reports the analysis of the survey results..

The rest of the paper is organised as follows. In section 2, we provide a short literature review on credit risk and credit scoring. Section 3 describes the dataset. In section 4, we describe the state of the art of credit risk management and in particular credit scoring for the European MF sector. In section 5, we report the motivations of MFIs to use RMUs or CS. In section 6, we provide a first description of the characteristics of MFIs with RMUs or CS. Moreover, we provide a first assessment of the relation between RMUs and/or CS and the risk, efficiency and outreach of European MFIs. Section 7 concludes.



LITERATURE REVIEW

Of particular relevance for the MF industry, credit risk has been an intensive field of study for both practitioners and academics. However, the majority of research has been performed for MFIs in developing countries while the literature is quite scarce for European MFIs. This paper aims to partially fill this gap.

In the academic literature, various factors have been found to influence the credit risk of MFIs, see for example (Cull et. al., 2006; D'Espallier et. al. 2011; Schreiner, 2000; Nawai and Shariff, 2012).

According to the various dimensions, a non-exhaustive list of factors that has been found to have an impact on the credit risk of a MFI¹:

- **Clients:** performance on past loans and the number of loans received: good credit history reduces credit risk; gender, with women having lower credit risk; distance between clients and branch officer, with clients nearer to lender's offices having lower risk; and, activity type performed by the client. In some cases the cultural understanding of debts and religious education are found to influence the repayment decision of a client.
- **Products:** loan structure plays an important role, with repayment schedule, lending methodology, burden of application formalities, loan amount, etc. influencing the risk, for example, with delay in loan approval increasing the credit risk;
- **Loan officers:** the experience of loan officers and the existence of loan monitoring procedures reduce credit risk;
- **Institution:** yield, date of foundation, loan to asset ratio, e.g. higher loan to asset ratios lower credit risk; geographical location, total assets, and portfolio growth, e.g. larger MFIs and higher portfolio growth indicate less risk.
- **Environment:** with competition (number of MFIs per country) increasing the credit risk, and the level of development of a country (measured in terms of Human Development Index - HDI) influencing credit risk: more developed countries have lower risk.

Moreover, the use of guarantees is known to reduce credit risk for standard financial institutions.

The last EMN Overview Survey on microcredit in Europe (Bendig et. al. 2014) provides a snapshot of credit risk levels for European MFIs. The level of non-performing loans is quite high, PaR30 being 13.1% in 2013 on average. However, the risk distribution among countries is quite heterogeneous as reported in (Bendig et. al. 2014), with PaR30 below 3% for some countries and above 18% for others.

PaR30 decreased in 2013 compared to the value attained in 2009; however, it remained constant since 2011. The average write-off ratio was 3.5% in 2013, smaller than in previous years.

Even with a positive trend in the medium term, PaR30 underlies a potentially high credit risk for the European MF sector. Moreover, the financial crisis, high rate of unemployment and the potentially worrying level of over-indebtedness in Europe (Eurofound, 2013) underscore the importance of credit risk management for European MFIs.

1. This is a partial summary of what found in literature, and not the result of a specific study. According to the socio-economic and political environment certain factors can be more or less influent, or have the opposite effect. The list do not pretend to be exhaustive.

In the traditional banking sector, the use of statistical procedures to evaluate the level of client credit worthiness has been quite effective² and efficient. However, even if the use of more formalised and quantitative tools could be useful for some institutions, it is not clear a priori that they will not exclude people that need microcredit³. This population tends to be involved in the informal sector, with small revenues, more difficult family conditions and with less available information for credit risk assessment.

It is then natural to formulate the question:



“Can the use of more systematic loan approval procedures support the social and financial mission of European MFIs, reducing risk and preserving social impact?”

2.1. Credit Scoring

Credit scoring are tools used by lending institutions to systematically assess the risk level of a potential borrower. At a practical level, credit tools are formulae that predict the credit risk based on the performance of past loans with characteristics similar to current loans (Schreiner, 2000; Salazar, 2004; Caire et. al, 2006; Bumacov et. al., 2014).

Credit scoring assigns points to a set of borrower features. The full score is obtained by combining all of the risk factors. The output is a numerical value that estimates how a particular loan is expected to perform relative to other loans.

Credit scoring can be used to support various activities, for instance:

- **loan disbursement:** screen bad loans;
- **loan follow up:** following the evolution of loan performance and deciding upon prompt action to reduce risk; and,
- **product design:** pricing, incentives, and strategies according to borrowers' features.

Credit scoring should be calibrated against ex-post observed credit losses to maintain/improve accuracy. Indeed, the performance of credit scoring can be tested with the current credit risk and performance of active loans, and the scoring can therefore be adapted to better match the actual credit risk observed by the MFI. Calibration should also be carried out to take into account new events (change in population, changes in risk policies, etc.).

To implement credit scoring, however, requires access to sufficient and well-suited information. Relevant information used can be divided as internal and external to the institution:

- **Internal:** information based on the MFI's client data⁴ and history;
- **External** information coming from:
 - A. public credit registries and private credit bureaus; and,
 - B. social media (internet), mobile phones, etc.

2. Of course this is mainly true when there is enough available information. The accuracy tends to be better for current costumers compared to non-costumers.

3. Some discussion can be found for example in Frame et. al, (2001) where it is argued that the use of credit scoring for banks is beneficial for small business lending.

4. Such data can include also soft information such as psychometric data from borrower, etc.

Commercial banks commonly employ credit scoring to reduce their cost of risk and improve their performance. MFIs are typically less used to employ credit scoring techniques. Indeed, MFIs have developed alternative credit methodologies, based on the relationship between clients, primarily consisting of soft information between the loan officer and client to secure the credit. The formalised information required by credit scoring, such as wages, bills or other information from the credit bureau are not usually easily accessible for the population targeted by MFIs. The various alternative technologies developed by the MFIs to secure loans (group loans with joint liability, non-standard guarantees, social pressure, incremental loan amounts, field visits, loan officer-client relationships, etc.) are the fundamental drivers of the MF industry, allowing MFIs to provide credits without formal guarantees to populations that are normally excluded by the banking sector.

However, such relationship-based methodologies are often costly and subjective. It is therefore natural to wonder if the introduction of more formalised credit assessment tools could reduce costs and improve efficiency, outreach and risk control for MFIs. Prior to this study, there were reports that some MFIs in developing countries, but also in Eastern Europe, had started to implement credit scoring. However the existing literature on credit scoring for MFIs is quite modest, and very little is known about the use and practices of credit scoring in the European MF industry, in particular for Western Europe.

Existing literature on credit scoring for MFIs is rather limited (Schreiner, 2000; Karlan and Zinman, 2007; Van Gool et. al., 2012; Bumacov et. al., 2014). In Bumacov et. al (2014), analysis of an extensive online survey shows that the use of credit scoring can reduce costs, increase loan officer productivity and improve MFI outreach. However, Schreiner (2000) underlines various difficulties:

- **access to data is often complex:** information related to clients' credit history, approved or refused loan applications and loan performance for informal activities and poor households are not usually recorded in enough detail to be used in credit scoring;
- **data management:** it is often difficult for MFI staff to accept new technologies and learn how to correctly use and understand their strengths and limitations; and,
- **implementation:** even if credit scoring is developed and accepted by MFI staff members, it then needs to be integrated into the MFI's operations and information management system. This is often a complex procedure.

In Van Gool et. al. (2012) it is argued that credit scoring is not yet able to replace the role played by loan officers, although it could be an important tool for refining the lending process of an MFI. Karlan and Zinman (2007) underline the potential of credit scoring to assist MFIs in reducing risk and increasing efficiency and outreach.

It seems natural to conclude that credit scoring has some interesting advantages, but at the same time, possesses some important limitations for MFIs. The peculiarity of MF operations and clients activities indicates that credit scoring can complement traditional MF's lending methodologies but, as of today, it does not replace current MF technologies.

2.2. Desk Research by EMN Idea-Lab

Recently, the EMN Idea-Lab implemented a desk research concerning the use of credit scoring in European MFIs (EMN, 2015). We briefly summarize the main findings. The two most interesting topics (and potential sources of valuable information for credit scoring) are credit bureaus and big data.

Credit Bureaus

From the research, credit bureaus appear to increase financial access and productivity, provide aggregate data on risk, and are useful for small companies. However, credit bureaus seem to contain less useful information for MFIs.

From a sample of five countries participating in the study (Belgium, Hungary, Ireland, Italy and Spain), findings indicate:

- the majority of the credit bureaus are private (except one public bureau);
- the majority of credit bureaus are for profit;
- they are subjected to data protection and privacy⁵;
- obligations to report or consult credit bureaus depend on country specific regulation;
- the majority of the credit bureaus report only loan information, but can also report on energy bills, telecom payments, etc. in some cases;
- the majority of the credit bureaus report only negative information: bad credits; only a few report data concerning well-performing loans, i.e. positive data;
- in the majority of the cases, lenders register loan information in the credit bureau on a daily base, others input on a weekly or monthly basis;
- according to the kind of credits recorded, the data are retained by credit bureaus for a period of one month up to ten years after credit application, or the closure of the loan; and,
- credit bureaus utilise fees, they have reduced data for informal credits, and they provide heterogeneity of data.

The study concludes that, to be useful for MFIs, data coming from credit bureaus should be complemented by other sources of data.

Big Data

From the desk research it appears that big data can be an interesting alternative source of credit information. Indeed, some companies are developing new credit risk and credit scoring tools using the so-called "big data". They indeed leverage mobile and Internet data to create financial profiles and build credit worthiness and facilitate access to loans. Some sources of information include social networks (Facebook, Twitter, LinkedIn) or mobile phone payment history.

More and more web lending platforms are emerging. For example, DemystData, Tiaxa, EFL and First Access have developed unique platforms connecting social network data, psychometric principles (based on personality traits) and mobile phone payment history to create credit identities and support access to credit.

Other interesting platforms that have emerged recently are Cignifi who use mobile data to produce scores mainly with banks in Africa and VisualDna, a psychometric scoring company.

The study then leaves open the question:



How could MFIs use these important sources of information to improve credit risk management?

5. Primarily when dealing with personal customers. Moreover, there exists the ambiguity for various potential MF clients of being at the same time a self-employee and a personal customer.

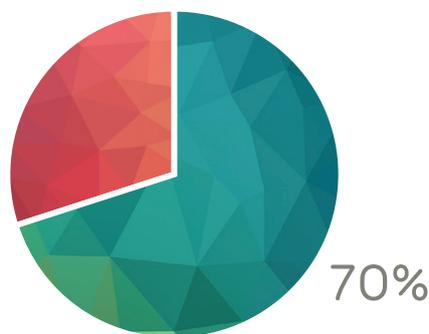
03.

DATA COLLECTION: THE SURVEY

To assess the actual use of credit scoring tools and the level of risk management among European MFIs, an online survey has been designed and submitted to 386 MFIs operating in 36 European countries⁶. The survey was sent on the 17th of March 2015. Participants had two and half weeks to complete the survey. The deadline was then extended for another two weeks, and the data collection was then closed on the 17th of April. 68 MFIs responded to the survey. After a careful review of the answers, we kept 58 MFIs for the data analysis. Ten MFIs were disregarded due to inaccuracy or incompleteness of the answers, or because they did not pass consistency checks among the various answers.

In the survey, we asked about a number of features of the credit risk management of the MFI, the use of credit scoring, and some MFI characteristics.

The first interesting information emerging from the survey is that 70% of the respondents (53 MFIs) would be interested in contributing to develop a European microfinance 'scoring model' which could be used by, adapted or customized to individual MFIs. This clearly shows the interest in credit scoring among practitioners in the European MF industry.



INTEREST IN CREDIT SCORING AMONG PRACTITIONERS IN THE EUROPEAN MF INDUSTRY

The main characteristics of the MFIs answering to the survey are reported in Table 1.

The majority of the respondents are NGOs or NBFIs, followed by banks, which is consistent with the findings in (Bendig et.al, 2014). Responding MFIs are relatively older than the average European MFI and with more clients. PaR30 is quite high but in line with industry standards. The operating expense ratio is slightly higher than the European MF industry average.

6. Austria, Belgium, Bulgaria, Cyprus, Croatia, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, the United Kingdom, Iceland, Montenegro, Republic of Macedonia, Serbia and Turkey, Albania, Bosnia and Herzegovina, Kosovo.

Table 1: main characteristics of MFIs responding to the survey

Dimesions	Survey % of MFIs	Number of Observations
West/East	40% / 60%	58
Legal Status		
Banks (Savings or Commercial)	16%	50
NBFI	34%	50
NGO or Foundation	34%	50
Credit Union/Cooperative	8%	50
Government body	2%	50
Other	6%	50
Survey - Mean value		
Date of establishment	1991	48
Number of outstanding Clients	8,729	47
PAR 30	11.1%	37
Write Off	3.1%	35
Operating Expense Ratio	19.2%	27
Number of Clients per Loan Officer	144.8	45
ROA	2.1%	31

The next sections analyse the main findings of the survey. Results are reported in summary tables and then commented upon in subsections. Together with the mean scores, we also report the number of observations (the actual number of respondents per question). If not specified, the data reported refer to 2014.

Limitations

Due to the low number of responses to the survey, the heterogeneity of responses, and the fact that some MFIs provided only partial answers to the survey, it is not possible to perform a sound statistical analysis⁷. We are therefore limited to a qualitative analysis. However, the qualitative analysis is valuable considering that it is among the first studies on the topic and it underlines some very interesting trends for the European MF industry.

7. For dimensions where this analysis is possible the results turn out to be statistically insignificant.

04.

STATE OF THE ART

To properly manage credit risk, MFI need to allocate specialised staff members and apply appropriate tools and strategies. These initiatives are often channelled through the operation of a risk management unit (RMU): a specific MFI department dedicated to managing the risk of the institution. Table 2 shows that the majority of the respondents have an RMU while another quarter intend to develop an RMU within the next two years. Also quite surprising is that nearly half of the MFIs responding to our survey claim to have use credit scoring (CS), while another quarter are aiming to develop CS within the next two years. In the following two subsections we briefly analyse the characteristics of RMUs and CS systems employed by European MFIs.

Table 2: Existence of dedicated risk management department and credit scoring

	Yes	in 1 year	in 2 years	No	Number of Observations
RMU	67.2%	3.4%	17.3%	12.1%	58
CS	46.6%	6.9%	18.8%	27.7%	58

4.1. Risk Management Unit

In Table 3, we report the main characteristics of RMUs for European MFIs. It appears that on average, among the respondents, MFIs dedicate a significant amount of resources to manage their risk with an average of 37% of employees working within RMUs. Moreover, employees in RMUs seem to have substantial experience (on average 8.8 years) and completed training dedicated to risk management (on average 23.3 hours per RMU staff members).

Table 3: Risk Management Unit - Characteristics

	Starting date	Number of full time staff in RMU	% full time staff in RU / Tot staff	RMU staff Years of experience	Training on Risk per staff in RU (hours)
Means	2008	5	37%	8.8	23.3
Number of Observations	38	35	35	33	28

In Table 4, we report the declared objectives of the RMUs for European MFIs. For the great majority of MFIs (83.8%) the objective of their RMU is to screen clients, namely to assess the creditworthiness of clients and provide a credit decision. However, an important number of MFIs use the RMU also to follow up on credits and assess the probability that a client is going to have repayment troubles; some RMUs also design products to meet client needs.

Table 4: Aims of the Risk Management Unit (% of MFIs)

Screen clients (decide to approve or not a loan application)	83.8%
Credits follow up (monitor if a client is going to have repayment troubles)	78.4%
Product design and tailoring (decide loan amount, interest rate, instalment, repayment period, etc.)	64.9%
Other	48.6%
Number of Observations: 37	

In the category "other", respondents described some additional objectives of the RMU, respectively:

- assess and monitor the MFI's risk;
- develop procedures to manage risk;
- manage financial, operational and reputation risk, and manage the MFI's portfolio; and,
- report on MFI's risks.

Among the MFIs that do not have a specific RMU dedicated to manage the risk of the institution, we find that the majority allocate part of the operations of other departments to manage the MFI's risk, as reported in Table 5.

Table 5: Departments dedicated to risk management for MFIs without RMU (% of MFIs)

Operation Department	47.4%
Financial Department	68.4%
Commercial Department	10.5%
No clients' risk assessment	5.3%
Other	15.8%
Number of Observations: 19	

Regardless of the level of MFI risk management, there is always a residual risk that a client does not fulfil his debt obligations. For this reason, it is important that the MFI has clearly defined formal collection processes to minimise the real losses of the MFI on the overdue credits of its clients. The existence of formal collection processes is an important element for a sustainable MFI business model.

In Table 6, we report the characteristics of a formal loan collection service dedicated to collect bad loans.

Table 6: Existence of a Formal Loan Collection Service

Internal unit	External collection services company	Internal unit overseeing external service	No formal loan collection service	Other
69.2%	15.4%	2%	23.1%	2%
Number of Observations: 52				

We observe that the majority of MFIs have a loan collection service. However, one quarter of the respondents do not have formalised collection procedures.

4.2. Credit Scoring

In this section, we analyse in detail the use of credit scoring among European MFIs. It is probably worth underlying that, to the best of our knowledge, this paper is the first paper reporting on microfinance credit scoring for both Western and Eastern Europe. For this reason, we believe that the information reported could be valuable for follow up actions, however there are still unfortunately no reporting standards. In Table 7, we report the main characteristics of credit scoring employed by MFIs in Europe. We observe that the use of credit scoring in the European MF industry is quite recent: on average, MFIs started using it around 2008. However, MFIs employing credit scoring use it in the assessment of the majority of their loans. The frequency with which MFIs calibrate their credit scoring varies substantially as reported in the table.

Table 7: Characteristics of Credit Scoring among European MFIs

	Starting date	% of loan applications assessed	Calibration Frequency (% MFIs)			
			More than a year	Every Year	Less than a year	No Calibrated
Means	2008	79%	20.8%	33.3%	12.5%	8.3%
Number of Observations	23	22	24			

When speaking about credit scoring it is important to assess what MFIs mean by it and how it has been developed. Indeed, credit scoring tools can vary from sound statistical tools developed using past empirical data of the MFI and MF sector, to qualitative assessment tools used to formalise staff member and loan officer knowledge on credit risk, to the use of credit scoring developed by other institutions. Of course, the efficacy of credit scoring could change according to its specific characteristics. In Table 8, we group the credit scoring tools used by European MFIs according to their main characteristics.

We observe that the majority of MFIs use a qualitative credit scoring developed using the qualitative experience of internal and external credit risk experts.

However, almost half of the respondents also claim to employ quantitative credit scoring using sound statistical procedures and based on past loan performance data.

Table 8: Which kind of scoring model does the European MFIs use? (% of MFIs)

Quantitative	The scoring model was developed using a sample of past good and bad borrowers and using statistical procedures to determine scores and selected factors	45.8%
Qualitative	The scoring model was developed during meetings with the MFI's and invited credit experts and using their qualitative experience on credit risk	62.5%
Bought	The scoring model was acquired from another institution	12.5%
	The scoring model was acquired from another institution, but was then adapted to the MFI's characteristics	12.5%
	The MFI does not calculate scoring, but it buys the credit score from another institution	4.2%
Number of Observations: 19		

As we have discussed in a previous section, the data used to develop credit scoring can vary substantially. In Table 9, we report on the data used by European MFIs. We observe that the most used source of data is client credit history, followed by business and personal financial data and socio-economic factors.

Although the desk research (EMN, 2015) observed that data reported in the European credit bureaus is probably not the most appropriate to develop credit scoring, in Table 9 we observe that, at practical level, the majority of the MFIs use also credit bureaus to develop their credit scoring. The use of data captured by social websites (the so called big data), even if very promising (e.g. EMN, 2015), remains marginal at the moment for the European MF industry.

Table 9: Data used to develop the credit scoring model (% of MFIs)

Socioeconomic factors (age, income, working conditions, marital status, ...)	76%	Personal financial data	76%
Credit bureau data	64%	Psychometric factors	12%
Clients credit history	92%	Social sites (Facebook, Twitter, ...)	4%
Business financial data	80%	Other external data (please specify)	24%

Number of Observations: 25

The MFIs responding to our survey declare that their first credit scoring objective is to screen bad loans applications, secondly they use credit scoring to follow up on credits and assess the risk of outstanding loans, finally credit scoring is used to support decisions on how to tailor credit according to clients' needs and characteristics. We report this information in Table 10.

Table 10: Aims of Credit Scoring (% of MFIs)

Screen clients (decide to approve or not a loan application)	76%
Credits follow up (monitor if a client is going to have repayment troubles)	48%
Product design and tailoring (decide loan amount, interest rate, instalment, repayment period, etc.)	40%
Other	36%

Number of Observations: 25

Among the category "other", we mainly find that the MFIs use CS as an objective tool to support loan officer and credit committee decisions. A number of the MFIs that declared using CS indeed underline that CS is used only as support of other more traditional MF relationship strategies concerning credit approval. Moreover, the MFIs underline that the results of the scoring do not automatically exclude the client or approve the credit application. Indeed, the MFIs responding to have credit scoring say that their decision to disburse or reject the loan depend on various dimensions as reported in Table 11.

Table 11: Criteria to disburse or reject a loan (% of MFIs)

Entirely on Credit Scoring	4.2%
Combining credit scoring with other hard data (financial, credit bureau, credit history, etc.)	83.3%
Combining credit scoring with other soft data (personal information, peers' opinions, etc.)	75%
Combining credit scoring with loan officer opinion	83.3%
Other	16.6%

Number of Observations: 19

In the category "other" the MFIs underline the importance of the credit committee and clients' guarantees.

It is also interesting to understand the variables used to assess client credit risk by MFIs that do not use CS. In Table 12, we report this information. We find that the data used by MFIs that do not employ CS are quite similar to those criteria reported in Table 9 by MFIs to develop the CS.

Table 12: Variables used to assess clients' credit risks for MFIs without credit scoring

Client's income	88.8%	Client's collateral	55.6%
Client's debts performance	81.5%	Client's past credit history	88.8%
Client's working conditions: (unemployed, employed/ long short term contract etc.)	63%	Client's activities	85.2%
Client's cash flow	81.5%	Other client's characteristics	48.2%
Client's family condition	66.6%	The MFI does not assess client's risk	3.7%

Number of Observations: 27





THE OPINIONS OF THE MFIs ON RISK MANAGEMENT

In this section, we briefly report the opinions of the MFIs concerning risk management, RMUs and the use of CS. All respondents except one (46 respondents) believe that there should be a positive relationship between the activities of a risk management unit and better risk performance. Among their motivations we find:

- RMUs allow for better monitoring of default rates and loans performance;
- RMUs better support understanding of the clients, and the standardisation and tailoring of products;
- the operation of an RMU assures better coordination with other departments; and,
- RMUs assure faster response in case of credit issues;

The MFIs who have developed credit scoring models provide their motivations. We report them in Table 13.

Table 13: Reasons to implement credit scoring (% of MFIs)

It increases the institution's efficiency	65.4%
It provides better insights on client worthiness	73.1%
It reduces the credit risk of the institution	80.8%
It increases the institution's outreach (number, kind of clients)	30.8%
It was required by funders	11.5%
Other	15.4%
Number of Observations: 26	

As we discussed in section 2, Bumacov et. al (2014) found that CS increases the outreach of an institution. This result seems reasonable considering the time reduction provided by the use of pre-approved loan techniques. However, the fact that only 30.8% of our sample believe this to be true, it implies that the rationalities and outcomes for the European MF industry concerning CS may be different. We will discuss this point in detail during the following sections.

In the category "other", MFIs report the following reasons: regulatory requirements and the perceived benefit of using credit scoring as supporting tool for decision making. The respondents that do not employ a credit scoring tool provide the motivations reported in Table 14.

Table 14: Reasons for NOT USING credit scoring (% of MFIs)

Bad experience with the use of credit scoring	7.1%
Trusting more the decision of loan officers	32.1%
The MFI does not know the principle of credit scoring	0%
Lack the required budget to implement the Credit Scoring	21.4%
The economic advantages of the Credit Scoring are below the costs	28.6%
Other	53.6%
Number of Observations: 28	

The category "other" is chosen by the majority of the MFIs. Among this category, MFIs report the following reasons: the institution is judged to be too young or too small to develop CS, or the MFIs are waiting for an adapted tool become available, or they are in the process to develop a CS tool themselves. Moreover, MFIs report that they do not have the required software support, or they do not have access to the required data to develop CS tools.



RISK MANAGEMENT, CREDIT SCORING AND CHARACTERISTICS OF MFIs

In this section, we compare the use of RMUs and CS among the survey respondents. The aim is to provide a first analysis on the possible characteristics of MFIs that develop RMUs or CS, and the potential effects on the credit risk, efficiency and outreach of the MFIs.

Unfortunately, the sample of institutions responding to the survey is quite small, and not all the institutions answered questions related to their characteristics and performance. Moreover, some of the data provided lacked adequate accreditation. For this reason, we are not able to perform a sound statistical analysis and we are limited to compare average values among subsamples. In addition, with our dataset we cannot assess causality; namely, we cannot assess if a certain characteristic of an MFI influences the establishment of an RMU or the use of CS, or if the RMU or CS influence the performance of the MFIs.

However, this paper is among the very first studies on risk management and CS among European MFIs and thus a qualitative analysis is already an important asset for the industry.

Figure 2 reports on the distribution of RMUs and CS between MFIs operating in Eastern and Western Europe. We observe that Eastern MFIs are more likely to have an RMU or CS compared to Western MFIs. However, Western MFIs plan to offset this difference as more than 30% of Western MFIs claim that they are going to employ an RMU and develop CS tools within two years.

Figure 2: Comparison between RMU and CS (actual, employed and under development) between Western and Eastern MFIs (% of MFIs in the sample)

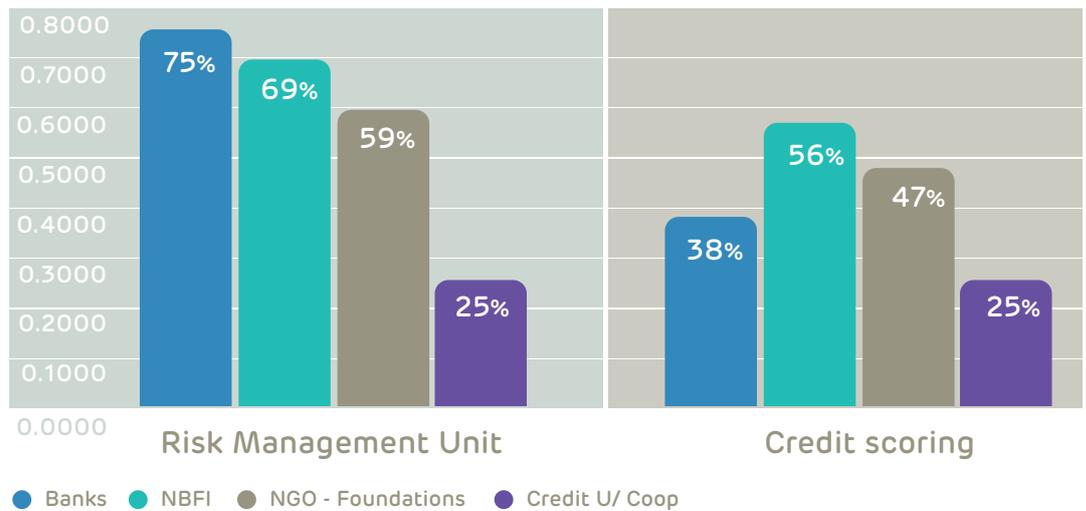
RISK UNIT and CREDIT SCORING in Eastern and Western Europe



The legal status of the MFIs seems on average to influence the development of RMUs or CS. In Figure 3, we report the percentage of MFIs with RMU or CS according to their legal status. Expectedly, banks are more likely have an RMU, however NBFIs are more likely have CS. Half of the NGOs or foundations have an RMU or CS, while credit unions or cooperatives are the most unlikely to have an RMU or CS.

**Figure 3: RMU and CS for the various legal status of the MFIs
(% of MFIs in the sample)**

RISK UNIT and CREDIT SCORING per Legal Status



In table 15, we report the average value of credit risk indicators (PaR30 and Write-off), outreach (number of outstanding clients in 2014), efficiency (operating expense ratio, and clients per loan officer), profitability (ROA), and the year of foundation of the MFI, for both MFIs with and without RMUs or CS. The aim of the table is to provide a first assessment of characteristics that influence the development of RMUs or CS. However, we do not assess causality. Moreover, mean comparisons turn out to be statistically insignificant, implying that they should be interpreted as a first qualitative analysis.

Table 15 provides some interesting results:

- Credit Risk:** On average, MFIs with RMUs have higher PaR30 and higher write-off ratios, while similar levels of PaR30 are shown for MFIs with or without CS. MFIs with CS have slightly lower write-off ratios. These quite surprising results need an interpretation. A first hypothesis could be that RMUs and CS procedures are not well utilised and instead of reducing the risk, they do not or they negatively influence it. Another hypothesis could be that MFIs develop RMUs or CS as a reaction to a perceived or real higher level of credit risk of the institution with the aim to reduce it. This would imply that MFIs with higher credit risk are more likely to employ credit risk management procedures, because they are more aware of the potential risk: higher PaR30 or Write-off ratios are more likely to be motivations to develop RMUs or CS rather than the results of their use. We analyse this hypothesis further in the following subsection.
- Outreach:** Larger MFIs are more likely to have an RMU, as it seems reasonable due to the resources needed to develop an RMU. However, it seems that MFIs with CS are smaller compared to those without CS. We analyse this dimension further in the following subsection. However, it is already worth underlying that this result seems to be in agreement with our findings in section 5 where less than one third of the MFIs claimed that CS could improve the outreach of the institution.
- Efficiency:** MFIs with RMUs seem to be more efficient than MFIs without RMUs. On average, the operating expense ratio is lower, while the number of clients per loan officer is higher. However, MFIs with CS seem to have lower efficiency compared those that do not have CS. On average, operating expense ratios are higher and the number of clients

per loan officer is lower. As in the case of credit risk, there are two reasonable hypothesis for this apparent surprising result: the CS could be poorly implemented or in the pilot phase, which would imply higher cost; another hypothesis is that CS is implemented by MFIs that are less efficient with the objective to improve their efficiency. This indicates that a lower efficiency would be a cause rather than the outcome of CS. We explore this point further in the next subsection.

- **Profitability:** From the table, it appears that MFIs with RMUs have lower ROA, while MFIs with CS have higher ROA. This result seems to be consistent with the fact that the use of CS could improve the profitability of the MFI.
- **Experience:** MFIs with RMUs are on average older than the ones without RMUs, while MFIs with CS are on average slightly younger. These results could be justified by an "innovation attitude" more likely found in younger institutions, while RMUs take time to be developed and older MFIs may be therefore more likely to have RMUs.

Table 15: Comparisons of average values of MFI characteristics and performance between MFIs with or without RMU or CS

	YES RMU	NO RMU	YES CS	NO CS	Number of Observations
PAR 30	11.3%	9.4%	10.6%	10.6%	36
Write Off	3.32%	2.41%	2.71%	3.2%	34
Number of Clients	10,905	4,971	4,422	13,002	46
Operating Expense Ratio	18.5%	20.3%	21.4%	17.3%	27
Clients Loan Officer Ratio	143.7	96.4	118.9	134.8	44
ROA	2.89%	3.43%	3.32%	2.86%	31
Year of Foundation	1989	1994	1991	1990	47

6.1. Evolution of risk, efficiency, and outreach

In the subsection above, we found some apparently surprising results concerning the relation between RMUs, CS on the one hand and the risk, efficiency and outreach of MFIs on the other. In this section, we investigate these results a bit further, in particular for CS. Indeed, in Table 15, it is reported that although, on average, MFIs with CS have the same credit risk level as the MFIs without CS, they seem to be less efficient and to have fewer clients. These results seem to contradict previous results that credit scoring can reduce cost, increase loan officer productivity and improve MFI outreach (Bumacov et. al., 2014). Moreover, the finding that the use of credit scoring reduces only the write off but does not seem to have a relevant influence on the PaR30 is quite disappointing.

However, a more careful analysis of the data provides a satisfactory qualitative answer to these apparently surprising results. Indeed, already in the previous subsection, we have hypothesised that these results could be explained by the fact that MFIs with higher risk, lower efficiency and less clients could be stimulated more than other MFIs to develop CS to improve credit risk management, efficiency and increase outreach. This hypothesis would imply that higher

risk, lower efficiency and less clients are the causes for the MFIs to implement CS, and not the outcomes. Moreover to really understand the effect of CS on risk, efficiency and outreach of an institution, we should compare the evolution of credit risk, efficiency and outreach for MFIs with and without CS.

We use the data collected in the last EMN Overview survey (Bendig et. al., 2014) to check the influence on the evolution of the indicators concerning credit risk, efficiency and outreach for the MFIs in our sample from 2012 till 2014. We report the result of this analysis in Table 16.

Table 16: Evolution of credit risk, efficiency and outreach in the period 2012-2014: comparison between MFIs with and without CS

	With CS	No CS	Number of Observations
PAR30			
Reduced	50%	50%	14
Increased	11%	89%	9
Operating Expense Ratio			
Decreased	71%	29%	7
Increased	0%	100%	5
Number of Clients in the period 2012-2014			
Decreased	0%	100%	7
Increased	52%	48%	23

Unfortunately, we can perform this analysis only on a reduced sample. However, the results are still quite interesting:

- **MFIs with CS seem to be more resilient:** although the number of MFIs that reduced their PaR30 in the last 3 years is the same for MFIs with and without CS for our sample, virtually no MFIs with CS increased its PaR30 while the great majority of MFIs that increased their PaR30 (89%) are without CS.
- **MFIs with CS decreased their operating costs in the last three years,** while less than 30% of the MFIs without CS decreased their operating cost. Moreover, no MFI with CS increased its operational costs, while some non-CS MFIs increased operational costs.
- **No MFI with CS decreases the number of their clients,** while some MFIs without CS decreased the number of clients. Moreover, the number of MFIs that increase the number of clients in the last three years is similar for MFIs with and without CS.

We conclude that size of the institution, its credit risk and its operating costs provide more motivation for MFIs to develop credit scoring, rather than outcomes.

Table 16 provides anecdotal evidence that the use of CS has positive effect on: credit risk by increasing its resiliency and reducing the probability of bad performing loans, efficiency by preventing growing operating costs and outreach by supporting the growth of the institution, while protecting the institution against the loss of clients.



CONCLUSIONS

In this paper we have provided the first analysis of risk management in European MFIs including both Western and Eastern Europe, with specific focus on the existence and operation of specialised risk management units and credit scoring. More than half of the MFIs responding to the survey have an RMU and almost half utilize CS. Moreover, another quarter claim that they are going to develop an RMU or CS system within two years. Although European MF is a quite young and heterogeneous field, MFIs seem quite involved with risk management and the implementation of more systematic tools, such as credit scoring, to better manage their credit risk. Around 70% of the respondents are interested to help develop a European credit scoring model.

However, nowadays, credit risk remains quite high while the efficiency and the number of clients reached per institution is quite low in the European MF industry. Unfortunately, we are experiencing hard times for European citizens and even more so for poor households or micro enterprises. Effects of the financial crisis remain and the rate of unemployment is still very high, in particular among fragile populations. Over-indebtedness seems to be an important and growing phenomenon. In light of these tough conditions, it is even more important to build a sound MF sector that can provide services to people that need them, and at the same time be sustainable and efficient. Reducing risk, improving efficiency and outreach are key instruments.

CS could be one of the tools to support the fulfilment of these objectives. We hope that after this first report, the European MF sector could collaborate to build more adapted and efficient tools, and thereby improve the credit risk management. We believe that the possibility to build an adaptable European MF CS based on various markets and local realities is a nice occasion that could be further explored in the near future.

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