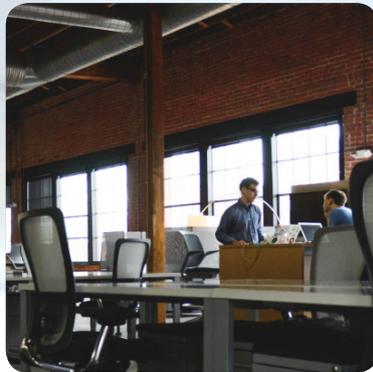


April
2015

Idea-lab

Credit Scoring in the European (Micro)finance Sector



EUROPEAN
MICROFINANCE
NETWORK



emn

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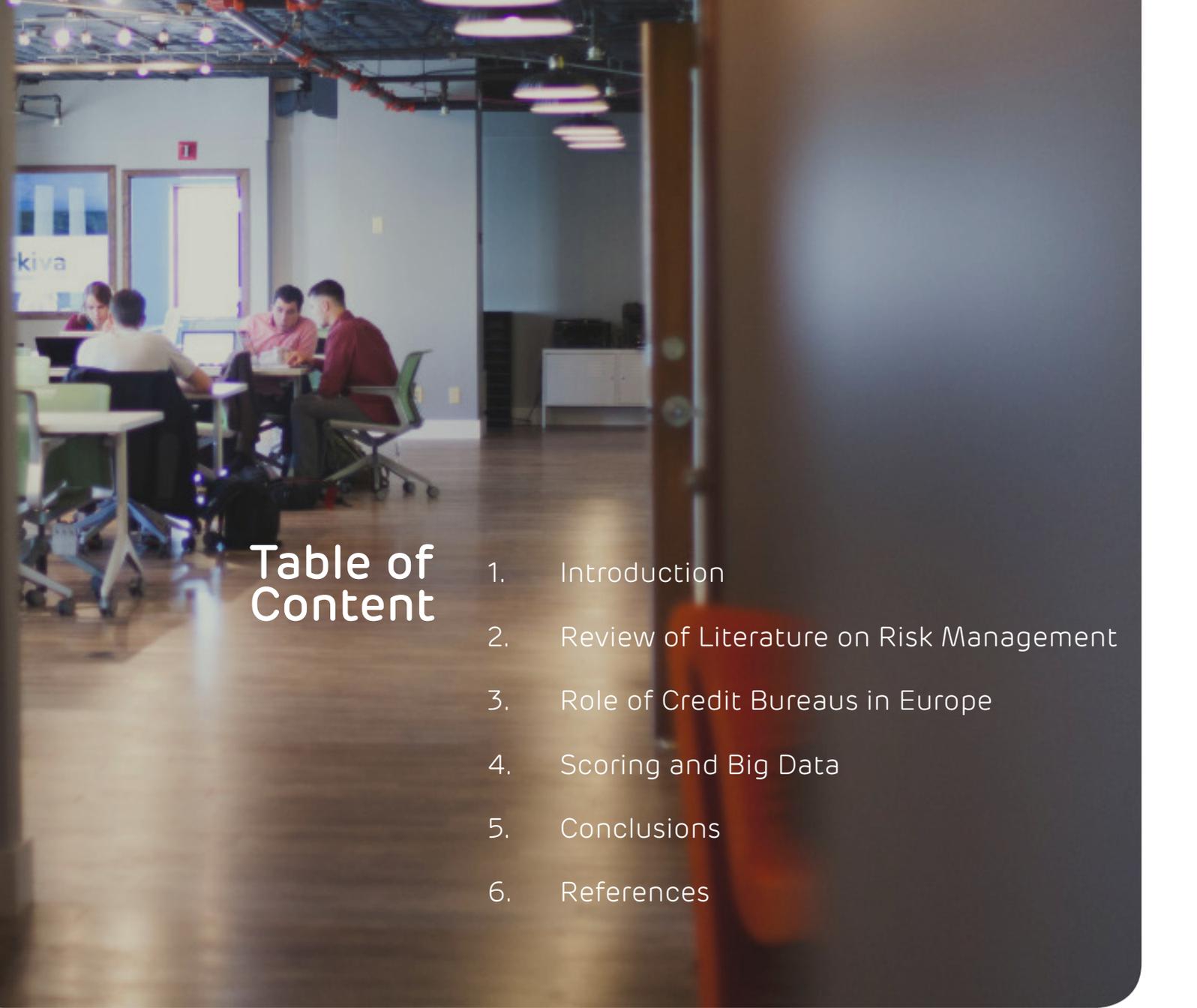


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1. Introduction

Access to credit is an essential pre-requisite for the successful ascension and operation of small businesses. Some research findings have supported this assertion (OCDE, 2012). Engraved in the fundamentals of loan transactions (consumer or business loans) is the management of credit risk based on the relationship between risk and guarantee (EMN, 2010). This idea can be extended to both retail banks and microfinance institutions. However, each actor works through a different procedure: while banks make loan transactions and forecast risk based on statistical credit scoring with quantified characteristics recorded in a database, microfinance institutions analyse businesses and credit risk based on subjective analysis of cash flows and personal parameters such as experience in the business, net margin of the business, profitability and disposable income (Schreiner, 2003).

What can these two methods teach each other? On one hand, some national governments in Europe are putting pressure on the banks to downscale their activities in the microfinance area (EMN, 2010), which will force them to adopt a more personalized approach to collect data for scoring. On the other hand, growing microfinance practitioners will set up scoring systems as a tool to improve loan officers' analysis.

The growing importance of scoring for all categories of loans will create incentives for better and cheaper credit bureau data and also require additional effort to analyse huge volumes of data (commonly known as "Big Data") that can complement the information provided by credit bureaus for the scoring process. Typical Big Data includes information generated by traditional business activities and from new sources such as social media such as store point-of-sale terminals, bank ATMs, Facebook posts and YouTube videos (Financial Times, 2014). The analysis of these data can identify hidden consumption/business patterns, trends or other insights that they can use to better tailor their financial products/services to customers anticipate demand or improve performance (Financial Times, 2014).

The purpose of this paper is to analyse the state of the art of scoring and credit risk assessment amongst the European Microfinance Network's members. This research is an outcome of a bigger discussion originally developed in the Idea-lab for Scoring in the European Sector.

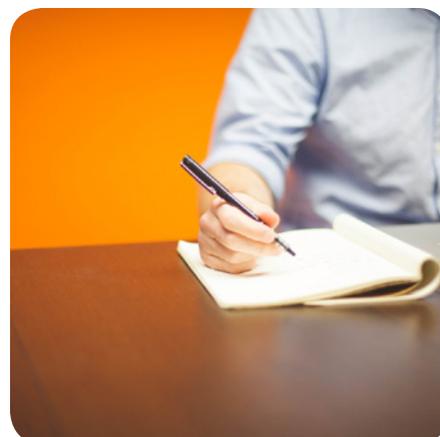
More precisely, the main goals of this desk research are the following: carry out a literature review of Risk Management; define credit default in accordance to the various regulators in Europe; comprehend and compare risk management practices from the retail banking sector; identify scoring programmes used by some of the EMN members; analyse the main variables

used for the client credit risk analysis in Europe; analyse the role of different Credit Bureaus in the Risk Management process and how fin-tech companies use an increasing amount of big data, as can be seen in the most recent trends, such as social media (i.e. LinkedIn, Facebook etc.) to perform a credit risk analysis rather than use data from Credit Bureaus. Moreover, another goal of this Idea-Lab is to evaluate if there is a potential relationship between the use of scoring or other credit risk management tools and a better performance of delinquency rates.

The Idea-lab will share and disseminate the best practices identified.

Members:

Microbank La Caixa (Spain)	Roman WEISSMANN (RW)
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2. Review of Literature on Risk Management

Risk is the uncertainty or likelihood that a negative event takes place. Risk management is the broad term to control and regulate the risk to the extent possible. In financial terms, a negative event is a loss.

Financial Institutions face different categories of risk that need to be recognized, understood, evaluated and controlled. The Basel II Capital Accord focused on improving risk management among internationally active banks, requiring them to evaluate a corporate borrower's risk management and governance structure in addition to its credit rating and history (BIS, 2006). The Basel II standards identified several main sources of risk: credit risk, market risk, operational risk, liquidity risk, reputation risk etc. (BIS, 2006). Basel III, developed in 2010, established more stringent capital requirements in response to the global financial crisis in 2008 with new regulations at a micro-prudential level (concerned with the solvency of individual banks) and a macro-prudential level (concerned with the resilience and the systemic risk of the financial system) (BIS, 2010a).

This desk research focuses on the most evident risk of a financial institution: credit risk. With respect to possible losses, credit risk is typically the greatest category of risk. Credit risk is the risk that a borrower defaults and does not accomplish its obligation of debt service. Default can happen when the corresponding person or company is incapable to pay or cannot pay on time. The non-payment of a few customers may cause a huge loss for a financial institution.

One of the most important characteristics of the credit risk is represented by the default risk. The default risk is the likelihood that a default event happens. There are many definitions of a default event. According to the economic literature, the most common definition of a default event is a payment delay of at least 3 months (Baesen and Van Gestel, 2009). Other definitions from various regulators may add specific events. Basel II defines default as the debtor being 90 days past due on the debt (prolonged to 180 days for some products) (BIS, 2006) whereas International Financial Reporting Standards (IFRS) refers to actual breach of contract (i.e. one missed capital or interest payment) (IFRS, 2013). The issue of timing is an important difference between these two definitions. While IFRS looks more conservative, Basel II considers all defaults that may take place in the next twelve months while IFRS only identifies impairments up to the balance sheet date. According to Annex VII, Part 4, point 44 of Directive 2006/48 from the European Commission "a default shall be considered to have occurred with regard to a particular obligor when either or both of the two following events has taken place: 1) the credit institution considers that the obligor is unlikely to pay its credit obligations to the credit institution, the parent undertaking or any of its subsidiaries in full, without recourse by the credit institution to actions such as realising security (if held); 2) the obligor is past due more than 90 days on any material credit obligation to the credit institution, the parent undertaking or any of its subsidiaries" (EC 2006: 232; EC 2013: 112).

It is important to highlight that national supervisors issue guidance on how the reference definition of default is to be interpreted in their jurisdictions. Supervisors assess individual banks' application of the reference definition of default and its impact on capital requirements. In particular, supervisors focus on the impact of deviations from the reference definition (by using external data or historical internal data not fully consistent with the reference definition of default) (BIS, 2006).

Bank-specific data on (mainly) impaired and defaulted exposures is publicly available (see the retail banking benchmark in the next section of this paper) and current supervisory reporting requirements enable supervisors to monitor trends in these exposures. However, this information does not allow them to accurately assess non-performing exposures and forbearance activities at the EU-level, due to differences in definitions and practices. The European Bank Authority (EBA) has also been working to settle common descriptions for non-performing exposures and forbearance, which will be included in the new reporting framework, as corresponding data will first be communicated to supervisors in December 2014 (EBA, 2014). The definitions should be seen as an addition to current concepts for evaluating asset quality, and not as a substitute to the existing ideas of impairment and default, which preserve their importance related to incurred losses and capital requirements calculations. The EBA definitions do not modify or substitute accounting standards (EBA, 2014). Their target is to act as harmonised asset-quality indexes for classification of exposures as forborne or non-performing for supervisory reporting purposes. They provide common elements in terms of scope and identification criteria, which will present supervisors with a common understanding of these concepts and strengthen the supervisory tools available for asset-quality assessment and corrective actions. The EBA definitions will be used on a best-efforts basis in asset-quality reviews across the EU in 2014 (EBA, 2014). The financial crisis highlighted the need to identify reporting practices and definitions across Europe in order to provide regulators a more complete view of risk. European regulators have since worked to ensure the availability of comparable credit risk data across the European Union – an essential step to manage the risk across the region.

However, some prudential norms (i.e. government involvement in the protection of the financial health of providers) developed for traditional retail banking do not translate well to the risks and requirements of microfinance, which involves different products and services (CGAP, 2012). Whether microfinance is being represented by deposit-taking MFIs, financial cooperatives or a special product division within retail banks, the regulatory terms still need to be reviewed by different regulators. In 1997, the Basel Committee for Banking Supervision (BCBS), in cooperation with supervisors from member and non-member countries and other international standard-setting bodies (SSBs), identified 25 Core Principles for Effective Banking Supervision that establish guidance to institutions engaged in microfinance (BIS, 2010b). The principles were revised in 2006 to incorporate important modifications in worldwide banking regulation, and again in 2012 to reflect the financial crisis. Most principles, however, require some degree of tailoring in their implementation compared to conventional retail banking.

Discrepancies between microfinance and commercial banking should be considered when evaluating risk management processes (BIS, 2010b). Regarding MFIs, the loan portfolio is their primary asset so supervisors should focus on credit risk in particular and should have specialized knowledge of the labour-intensive microlending methodology (BIS, 2010b). Regulations that often tie unsecured lending by a bank to a specified percentage of the institution's equity is another important difference. This is not suitable for unsecured microcredit portfolios that have a common microlending methodology (CGAP, 2012). In general, such portfolios have performed well without traditional collateral. On one hand, limiting microlending to some percentage of an institution's equity (as for banks) would increase the difficulty for MFIs to perform credit transactions. On the other hand, microcredit would not be interesting for diversified banks. Moreover, according to Basel II and III Capital Accord, banks are required to make a high loan-loss provision for all unsecured loans (except loans to other licensed intermediaries) at the time they are made, even before these loans become non-performing, which is something infeasible for a MFI (BIS, 2006; BIS, 2010a). According to the 25 Core Principles for Effective Banking Supervision, although the supervisor should have enough flexibility to deal with unique situations, microcredits normally should be risk-classified and provisioned for based on the number of days of non-performance, missed payments and/or times rescheduled. Since microcredits are generally repaid in short, frequent intervals (sometimes even weekly), monitoring and reporting systems, provisioning and classification standards should be tailored accordingly. Even if the MFI might recover the provision expense when the loan is collected, the accumulated charge for current loans would produce a substantial under-representation of the MFI's real net worth (CGAP, 2012).

However, this does not imply that microloan portfolios will always deteriorate. On the contrary, credit risk is relieved by a well-implemented microlending methodology. Once a microloan is in default, however, a borrower's willingness and ability to pay are challenged.

The most powerful source of security to avoid this default situation in the microfinance sector tends to be the strength of its analysis, lending, tracking, and collection procedures, as well as the credibility of the institution to grant access to services in the future for clients who honour their obligations (CGAP, 2012).

Clearly, default risk has a multidimensional aspect for both microfinance and retail-banking. Credit risk depends on many features: individuals or companies with a fragile financial situation, high debt weight and/or unstable/low income all tend to have a higher default probability. Furthermore, qualitative factors such as sector information and management quality also help identify the degree of risk. In markets with increased competition, a reducing net margin of the business and/or negative macroeconomic indicators, the default rates are expected to be higher (Baesen and Van Gestel, 2009). How can we measure this risk? After performing a detailed analysis of public and private data gathered from all relevant sources recorded in a database, the financial institution will obtain a rating as a result. The rating process includes both quantitative and qualitative analysis, which looks at the personal data, debt structure, financial statements and sector information. Information is obtained from portfolio history in a firm's database and from public sources, such as, credit bureaus.

3. Role of Credit Bureaus in Europe

As previously mentioned, financial institutions complement their credit risk analysis with variables brought externally from public credit registries and private credit bureaus. These establishments gather data from various financial institutions and/or public authorities. Financial institutions can obtain access to their client's financial profile by using these data from a credit bureau. Therefore, the assumption is that banks will increase access to credit where they are more confident that customers will accomplish loan repayment or where banks could effortlessly enforce contracts in case of default (Baesen and Van Gestel, 2009).

Obtaining credit references is a common procedure in many countries to help lenders make better decisions. The type of data collected by the credit registries can vary from country to country. There are agencies that only collect negative information (loan defaults), whereas others also collect positive information (non-default loans granted). Financial institutions can deal with these data in different ways: they can either incorporate these data directly into the scorecard or use them as an additional policy rule above and beyond the scorecard (ACCIS, 2010).

Credit bureaus offer a wide range of advantages. Institutions that receive information on their clients' activity at other companies will have more efficient credit risk models. The number of inquiries at the credit registries is a key indicator of the over-indebted levels of clients. This indicator can be correlated to the default risk and therefore may be an important feature to help financial institutions identify better clients. Credit registries can also provide an overview at an aggregated level and report risk assessments at a geographical level, indicating which regions have proportionally more defaulters than others. Moreover, credit bureau data can be a key tool for creditors who want to "market a new product to a consumer with whom there is no current account relationship" (Mays 2001: 61) and small institutions that do not have sufficient resources to set up their own scorecard systems (Baesen and Van Gestel, 2009; ACCIS, 2010). Accurate data verifies the positive relationship between the existence of credit bureaus and the growth in access to finance and growth in productivity. Countries with public or private credit bureaus enjoy higher financial penetration with higher private credit to the Gross Domestic Product (GDP) ratios (World Bank, 2013; Djankov, McLiesh and Shleifer, 2007).

Credit bureaus are typically associated with commercial banks. However, in microfinance, client profiles have their own particularities. In microfinance, most customers are self-employed, entrepreneurs whose businesses are usually in the informal economy and do not have records of their incomes or credit references in the local credit bureau (WWB, 2003). The lack of detailed customer information means that a typical characteristic in microloan scoring is harder to forecast as a typical characteristic in a scoring model as opposed to the retail banking sector.

As a result, in microfinance, more variables are required to build a robust credit scoring model (WWB, 2003).

Nevertheless, credit bureaus are playing a very important role in today's microcredit environment. This role has been reinforced by the guidelines of the Basel Core Principles to institutions engaged in microfinance (BIS, 2010b). According to Principle 21 (Supervisory reporting), "Participation in credit bureaus should be required of all supervised microfinance providers, if relevant data for microfinance borrowers is available" (BIS 2010b: 5). In addition to the advantages mentioned above, credit bureaus can also act as a benchmarking partner for the microfinance providers that allow MFIs to validate and measure the performance of their internal scorecards, comparing key indicators against performance data in the peer group (BIS, 2010b).

Even though Basel recommends the presence of credit bureaus, the reality is completely different. Many microfinance practitioners in various countries blamed the increase in multiple lending on the lack of credit registries and inaccurate borrowing obligation data (CSFI, 2012). Over-indebtedness is closely related to multiple borrowing. Customers may request many loans from different lenders for diverse reasons: to increase available cash, to pay off remaining loans, or simply to take advantage of competition among lenders. Furthermore, since credit bureaus charge fees for providing their information, the question of whether the benefits (e.g., added discriminatory power, benchmarking, validation...) offset the administrative costs needs to be investigated.

In a nutshell, credit referencing occurs in many countries of the world with a primary purpose of collecting and providing information to help lenders make better decisions. For the purpose of this article, it will be sufficient to call attention to the following Credit Bureaus in the countries that are participating in this desk research:

TABLE 1: LIST OF CREDIT BUREAUS

COUNTRY	CREDIT BUREAU	ABBREVIATION USED	WEBSITE
Belgium (BE)	Banque Nationale de Belgique	NBB	www.nbb.be/ Click on "central Credit Register"
Hungary (HU)	BISZ Central Credit Information Plc.	BISZ	www.bisz.hu
Ireland (IE)	Irish Credit Bureau	ICB	www.icb.ie
Italy (IT)	CRIF S.p.A.	CRIF	www.crif.com
	Consorzio per la Tutela del Credito	CTC	www.ctconline.it
	Experian Information Services S.p.A.	Experian (IT)	www.experian.it
Spain (SP)	Experian Bureau de crédito S.A.	Experian (SP)	www.experian.es
	Ewuifax (Asnef) Spain	Equifax	www.equifax.com/home.es_es

Source: own elaboration by using data from ACCIS (2012) and including data from Irish Credit Bureau

We can verify the presence of both public credit registers (operated by Central banks or supervisory authorities) and private credit bureaus. From our sample above, the National Bank of Belgium is the only public credit register. The Irish Credit Bureau is owned and financed by its members that are mainly financial institutions.

From our sample above, we can also verify that the compilation and redistribution of credit information in Europe is a for-profit business with few exceptions. The following table shows that credit bureaus that offer their services only on a non-profit basis are Belgium (a state-owned entity) and the bank-owned CTC in Italy that operates as a not-for-profit in contrast to credit bureaus with similar ownership structures in the country.

TABLE 2: TYPE OF CREDIT BUREAUS

COUNTRY	CREDIT BUREAU	TYPE	FOR-PROFIT	NON-PROFIT
Belgium (BE)	Banque Nationale de Belgique	Public Credit Register		•
Hungary (HU)	BISZ Central Credit Information Plc.	Public Credit Register	•	
Ireland (IE)	Irish Credit Bureau	Public Credit Register	•	
Italy (IT)	CRIF S.p.A.	Public Credit Register	•	
	Consorzio per la Tutela del Credito	Public Credit Register		•
	Experian Information Services S.p.A.	Public Credit Register	•	
Spain (SP)	Experian Bureau de crédito S.A.	Public Credit Register	•	
	Ewuifax (Asnef) Spain	Public Credit Register	•	

Source: own elaboration by using data from ACCIS (2012), EC (2009) and including data from Irish Credit Bureau

Regarding the regulatory framework, when a borrower signs a loan application he/she automatically gives their lender permission (consent) to send repayment information to a credit reference agency and to seek information about his/her credit history. However, the access to these data is subject to privacy concerns and legislation. Both at the EU and national levels, credit bureaus have to comply with various laws and regulations. From an EU perspective (EC, 1995), "credit registers must comply with national legislation implementing the Data Protection Directive 1995/46/EC that stipulates how to collect, retain, process, access and delete personal data and outlines the way to exchange data cross-border, between EU countries and also outside Europe. This is mostly described in the Article 7 of the Directive." (EC 2009: 16). The existence of personal data protection legislation promotes confidence among borrowers regarding the treatment of their data.

From a national perspective, credit bureaus have to act in accordance with national laws on the protection of personal data, consumer protection, banking laws and other sectorial regulations. In Belgium, Hungary, Ireland and Spain, credit registers' activities are regulated by a specific act. In Italy, besides the national law, they have to respect a binding Code of Conduct, often issued by national Data Protection Authorities (EC, 2009; ACCIS, 2010). The regulatory framework and the specific legislation by country can be seen in the table below:

TABLE 3: OVERVIEW OF NATIONAL REGULATORS AND PRINCIPLE REGULATION

OVERVIEW OF NATIONAL REGULATORS AND PRINCIPLE REGULATION		
COUNTRY	PRINCIPAL NATIONAL REGULATOR	PRINCIPAL NATIONAL REGULATION
Belgium (BE)	The Ministry of Finance (for the NBB)	Loi centrale des crédits aux particuliers (10 August 2001)
	The Ministry of Economic Affairs (for the credit register)	
Hungary (HU)	Parliament	Act CXII of 1996 on credit institutions and financial enterprises
		Act CXXII of 2001 on central credit information system
Ireland (IE)	Data Protection Commissioner (Government)	Data Protection Act 1988 and the
		Data Protection (Amendment) Act 2003
Italy (IT)	Data Protection Authority	Data Protection Code
		Code of Conduct*
Spain (SP)	Agencia Española de Protección de Datos	Ley Orgánica 15/1999, de 13 de diciembre, de Protección de Datos de Carácter Personal. Real Decreto 1720/2007, por el que se aprueba el Reglamento que desarrolla la Ley Orgánica 15/1999. (Retention periods according to article 29.4 & 29.3 Organic Law 15/1999)

* Code of conduct and professional practice applying to information systems managed by private entities with regard to consumer credit, reliability and timeliness of payments"

Source: own elaboration by using data from ACCIS (2012), EC (2009) and including data from Irish Credit Bureau

Regarding the obligation of creditors to consult clients' credit information, the table below shows that creditors in the majority of countries may decide to consult credit information databases when assessing a (potential) borrower's creditworthiness, but lenders are not legally required to perform this task in all countries (ACCIS, 2012).

TABLE 4: VOLUNTARY VS. REQUIRED SHARING OF AND ACCESS TO CREDIT DATA

VOLUNTARY VS. REQUIRED SHARING OF AND ACCESS TO CREDIT DATA	IS CREDIT DATA SHARING REQUIRED BY NATIONAL REGULATION?		DO LENDERS HAVE THE OBLIGATION TO CONSULT CREDIT REPORTING DATABASES?	
	YES	NO	YES	NO
COUNTRY				
Belgium (BE)	●		●	
Hungary (HU)	●			●
Ireland (IE)	●		●	
Italy (IT)		●		●
Spain (SP)		●		●

Source: own elaboration by using data from ACCIS (2012), EC (2009) and including data from Irish Credit Bureau

Information on the type of the products covered by credit bureau can be seen below. The table shows that the majority of credit bureaus save information on “loans” (mortgages, retail loans, credit card) but disregard “telecoms” and “utilities” activity (ACCIS, 2012).

TABLE 5: PRODUCTS COVERED BY CREDIT BUREAU (GROUPED BY COUNTRY)

WHAT PRODUCTS ARE COVERED?	Belgium (BE)	Hungary (HU)	Ireland (IE)	Italy (IT)	Spain (SP)
Home purchase / mortgage					
Loans					
Credit and store card					
Retail / instalment					
Energy - gas, electricity, oil					
Education loans					
Overdraft					
Fixed line Telecoms					
Telecoms - mobile					

Source: own elaboration by using data from ACCIS (2012), EC (2009) and including data from Irish Credit Bureau

The collection and storage of negative/positive data is the main activity of consumer credit bureaus. Essentially, negative information is information about any default on credit repayments, such as arrears, missed payments and/or bankruptcies. Positive information is information relating to your overall financial standing, such as your overdraft limit, the limit on your credit card and records of your repayments. From the table below, we can see that the majority of credit bureaus collect and store both positive and negative data on individuals, except in Spain where, due to more stringent legislation, there are restricted possibilities to store positive information (ACCIS, 2012).

TABLE 6: STORAGE OF POSITIVE AND NEGATIVE DATA ON CLIENTS BY COUNTRY

STORAGE OF POSITIVE AND NEGATIVE DATA ON CLIENTS PER COUNTRY		
COUNTRY	POSITIVE AND NEGATIVE	NEGATIVE ONLY
Belgium (BE)	●	
Hungary (HU)	●	
Ireland (IE)	●	
Italy (IT)	●	
Spain (SP)		●

Source: own elaboration by using data from ACCIS (2012), EC (2009) and including data from Irish Credit Bureau

Regarding how often these companies refresh their system and how long data stay registered, table 7 shows that lending institutions typically register information with their respective credit bureaus on a daily basis, except in Ireland and Spain. The level of detail on retention of data held by credit bureaus is also important. On this specific point, we can see how it varies among the countries selected (ACCIS, 2012).

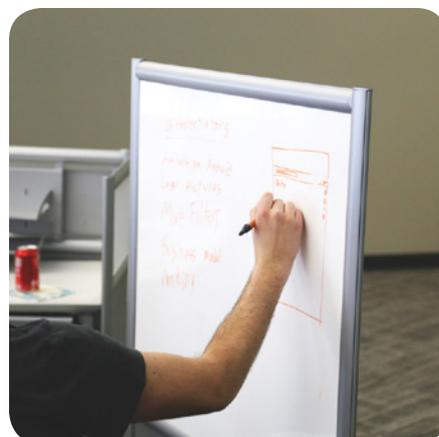
TABLE 8: HOW LONG DOES DATA STAY ON FILE?

COUNTRY	HOW LONG DOES DATA STAY ON FILE?
Belgium (BE)	Until the end of the credit if no default payment. Default: 10 years
Hungary (HU)	Data stays on file while the loan is existing or maximum 5 years after the loan has closed. Defaults stay 1-5 years after repayment
Ireland (IE)	The ICB holds information about borrowers and their loans for 5 years after the loan is closed. This information is held in an individual credit "report" that is kept by the ICB about each borrower
Italy (IT)	Credit applications: for max 6 months after application date; rejected/renounced application: for 1 month after last update; open and closed accounts: 3 years after last update or closing date
Spain (SP)	6 years, according to article 29.3 Organic Law 15/1999. (6 months for footprints, according to 29.3 Organic Law 15/1999) 3 years for public data. Closed accounts cannot be kept for legal reasons

Source: own elaboration by using data from ACCIS (2012), EC (2009) and including data from Irish Credit Bureau

There are a number of advantages and challenges when applying data from credit bureaus to assess credit risk/credit scoring in the microfinance sector. On one hand, these credit registries may assist lenders establish conditions on procedures for loan sanctioning and repayments, reducing the incidence of over-borrowing, multiple-lending and coercive recovery methods. On the other hand, data from Credit Bureau are difficult to use or may not be a good source of info for MFIs due to the following: 1) credit bureaus charge fees to access their information, which may be unaffordable for microfinance institutions; 2) credit bureaus have a discriminatory power because many entrepreneurs, whose business usually are in the informal economy, have neither records of their incomes nor credit references in the local credit bureau; 3) credit bureaus register data for different products (consumer credit, mortgage loans, retail credit, etc.) which may not always be comparable because different records may be covered; 4) the credit bureau may include positive or negative credit data only, the coverage of the bureau data varies by country: sharing positive credit data provides extra information leading to more informed decisions and improving clients' credit scores; 5) finally, credit registries do not gather information on the same population across countries, borrowers' minimum age for requiring a loan may vary across countries.

In conclusion, Credit Bureau data is not a not a good source of info for the microfinance sector and needs to be complemented by other sources of data. In the next section we explore the most recent scoring trends, showing that companies are stumbling their way towards new credit risk/credit scoring tools by using Big Data.



4. Scoring and Big Data

In order to measure the risk related to a credit transaction, financial institutions can choose to develop statistical models themselves or depend on external vendors for credit scoring solutions. According to the economic literature, credit scoring is a credit risk management practice that evaluates a borrower's risk (Baesen and Van Gestel, 2009).

Scoring allocates points to borrower features in order to calculate a numeric value that represents how likely a borrower is relative to other individuals to experience some event, in this case, how a particular loan is expected to perform relative to other loans (Mays, 2001). Credit scores are often segmented into homogeneous pools that are also known as risk classes and ratings. Previously, credit scoring concentrated on assessing the risk that a customer would not accomplish his/her debts and run into payment arrears. Recently, credit scoring has evolved to loss default (**Loss Given Default**: this reflects the percentage of exposure that could not be recovered in the event of a default) and exposure default (**Exposure at default**: maximum amount that could be lost as a result of a default). The quality of the credit score risk ranking and calibration can be confirmed by analysing ex-post observed credit losses per score. Scoring procedures are currently used during the life cycle of a credit as a decision support tool or automated decision algorithm for large customer bases. As can be seen in the previous section, recent banking regulation has been an important facilitator of the adoption and functioning of (semi-) automated scoring systems (Baesen and Van Gestel, 2009).

In the case of MFIs using external vendors, a data sample is provided to the vendor who then develops a credit scoring model. Some known specialist vendors of scoring models are Austin Logistics, Experian, Fair Isaac, Magnify, Mercer, Scorex and SAS (Baesen and Van Gestel, 2009). Other consultancy companies and rating consultancy firms like Moody's, Standard&Poor's Risk Advisory and Fitch Algorithmics also provide related services. Vendors and credit bureaus are also in a unique position to collect data across financial institutions across countries and establish data-pooling solutions. Their experience with diverse customer bases allows them to provide scorecards when a financial institution would have insufficient data history to make it on its own.

However, innovations are shifting the formalized risk-modelling to now embrace several forms of payment history and to leverage the wealth of mobile and Internet data to create new financial profiles.

Numerous organizations (both private and public sector) have been gathering and working with what is known as structured data for years. These data are already well-organised and, consequently, easy to work with. Recently, with the emergence of social media, an abundant amount of "unstructured" data like Facebook, Twitter has materialised. The lack of a classifiable structure makes them much more difficult to organize, select and analyse. However, this information holds great potential to provide the most valuable insights for company and to help decision makers predict new trends (Choi and Varian, 2009).

Companies like **DemystData**, **Tiixa**, **EFL** and **First Access** have developed unique platforms connecting social network data, psychometric principles and mobile phone payment history to create credit identities.

DemystData works at the intersection of big data, technology (mobile data) and banking. They assist financial services providers, like online lenders and banks, access and apply the booming amounts of customer data created online. They use this data to improve customer decision making in areas such as identity verification, credit underwriting, fraud management, marketing and more. DemystData is currently working with more than a dozen leading lenders, banks and other financial service providers around the world (DemystData website). A brief explanation of how their platform works can be seen by clicking here:

<http://www.finovate.com/asia12vid/demystdata.html>

Tiixa provides the mobile telecom market with infrastructure and revenue enhancement services, improving the efficiency with which the current prepaid user base is managed, and increasing revenues for major Operators around the world. In partnership with mobile Operators, Tiixa also provides innovative mobile financial service propositions to people, with the aim of improving their lives (i.e. performing and receiving transfers, making payments and accessing financial services through their mobile phones) through the application of mobile technology. Tiixa has a technological platform and financial service focused on providing cash to prepaid users when they have insufficient balance available. Based on user behaviour data, Tiixa uses proprietary and patented scoring methods and algorithms to analyse user behaviour, and perform segmentation and scoring processes to determine the correct amounts to advance to each user. This technology is currently implemented with eight Operators in Latin America including Movistar Colombia, Peru, Mexico and Argentina, as well as Vivo in Brazil.

First Access develops financial profiles based on prepaid mobile behaviour to predict credit risk for base-of-the pyramid, financially underserved consumers, billions of whom are still unbanked due to lack of collateral or quantifiable information about risk. The company pulls "digital footprints" (the set of data that an individual generates through use of digital platforms such as the internet, mobile phones, and financial transactions) from the customer and, based on an "Informed Consent" (which is an advance notification to consumers of how their information is to be used for a specific transaction or process, presented with the option for the consumer to accept or refuse the use of this information), they perform a credit score for each customer. First Access never shares personal information with anyone, never reads/hears text messages/calls and never asks PIN or bank details. First Access databases are refreshed on a monthly basis. The company does not work with Big Data from social media (i.e. Facebook, Twitter, etc.). However, they are developing new initiatives that can include these media into their credit scoring model. The company has recently signed a deal with Tanzania's largest mobile network operator, Vodacom, to provide instant risk scores for microfinance and other personalized loans. We had a meeting with First Access (Matt Hennessy – Client and Partnerships Director / Jessica Carta – Chief Operating Officer) to clarify and understand its business case. A brief explanation of how their system works can be seen by clicking here: <http://vimeo.com/88107668>.

EFL (Entrepreneurial Finance Lab) uses psychometric principles (such as character, abilities, attitude and beliefs, etc.) and entrepreneurial qualities (such as intellect, business acumen, ethics, etc.) to provide highly personalized credit scores for thin and no-file small business owners in emerging markets. EFL's goal is to empower financial institutions with the clarity they need to decrease their reliance on retrospective financial metrics, while carefully controlling risk, in order to approve clients that they may have otherwise rejected due to incomplete credit histories. We are currently performing an interview with EFL (Jared Miller – Director Latin America / Luis Sanchez – Product Specialist) in order to understand their business case. A brief explanation of how their platform works can be seen by clicking here:

<http://www.finovate.com/asia12vid/efinlab.html>

From a consumer/SME loans perspective, the most recent trends show that more and more web lending platforms are emerging. Companies like Ezbob and Lenddo have developed unique platforms connecting social network data to grant consumer/SMEs loans.

Ezbob is a web based and automated lending platform for SMEs in the UK backed by the UK government's Angel Co-Fund and supported by a guarantee agreement signed with the European Investment Fund (EIF). Ezbob algorithms are able to analyse the business and its directors' creditworthiness and affordability in real time, in less than 10 minutes with no paperwork and no face-to-face meetings, by pulling social network data from link accounts, webstores, accounting software, etc. Once a funding decision has been made, borrowers can choose their repayment schedule. Exact funding amount (up to 15 months) and funds (up to £120,000) are transferred directly to the business account within 30 minutes or less. A brief explanation of how their platform works can be seen by clicking here:

<http://www.finovate.com/europe14vid/ezbob.html>

Lenddo is another web based and automated lending platform that assists the emerging middle class how to use their social connections to build their creditworthiness and access loans to use for education, healthcare, home improvement or for a small business. It is important to highlight that Lenddo does not take deposits from the public and does not offer savings or checking accounts. On top of that, Lenddo does not require any physical collateral or co-signor and does not facilitate lending between members – the company lends their own capital and the capital of their investors and partners. Lenddo's investors include Accel Partners, Blumberg Capital, Omidyar Network, iNovia and Metamorphic Partners - some of the same investors behind the world's top technology companies, from Facebook and Groupon to Kiva and Prosper. Lenddo algorithms are able to use social data (i.e. Facebook, LinkedIn, Twitter and Yahoo!) to ensure the identity of the borrower. The system analyses borrowers' connections and how strong they are, taking into account only strongest interactions (family, best friends and close co-workers) in order to create a score. The platform also considers the borrower's financial performance: positive and negative actions related to making a payment early or on time, which can influence the borrower's score. Regarding the features of the loan, the specific loan minimum and maximum amounts vary by country, but the borrower can usually request to borrow up to 1 month's salary and choose a payback schedule from 3 months to 12 months. Interest rates also vary by country. Lenddo's

lending affiliates in each country where the company offers loans considers each applicant on a case by case basis. According to the company, if the loan application is complete with detailed information about the loan purpose, the loan is processed in 1 business day. A brief explanation of how their platform works can be seen by clicking here:

<https://www.lenddo.com/about>

Connecting the poverty assessment in this desk research, we wish to highlight other technological innovations emerging in developing countries helping to evaluate the impact of microfinance in the alleviation of poverty. In Paraguay, the Poverty Stoplight Methodology has been set up to allow families, through a visual survey which uses a series of photographs, self-assess their level of poverty across 50 indicators grouped into 6 dimensions of poverty which are: Income & Employment, Health & Environment, Housing & Infrastructure, Education & Culture, Organization & Participation and Interiority & Motivational. Each indicator is defined as Red (extreme poverty), Yellow (poverty) or Green (above poverty level). To apply the Poverty Stoplight survey, the Fundación Paraguaya uses software developed in conjunction with Hewlett Packard, providing a comprehensive analysis of the different levels of poverty and mapping them geographically. It would be interesting investigate how this self-assessment methodology could be also used to measure risk along with poverty level. We are currently performing an interview with the Fundación Paraguaya (our contact: Jimena Vallejos) in order to clarify this question.

A brief explanation of how this methodology works can be seen by clicking here:

http://www.fundacionparaguaya.org.py/?page_id=490

and the tool itself here:

<http://www.fundacionparaguaya.org.py/en/geomapa2.html>



5. Conclusion



Risk management has been gaining importance over the last decades in the microfinance sector. As we have seen, the Basel Committee on Banking Supervision has developed guidance for the application of the core principles to microfinance activities (BIS, 2010b).



Furthermore, many microfinance practitioners have highlighted their concerns related to credit risk, deteriorated by the over-indebtedness of their clients (CSFI, 2012). Credit risk is considered one of the main concerns of microfinance institutions. Most MFIs cannot capture the necessary data to identify the relevant financial variables to perform a proper statistical credit scoring. The information gathered by credit bureaus carries a cost and many MFI customers have neither a record of income nor credit references.



In this sense, Big Data can assist lenders by using social network data, psychometric principles and mobile phone payment history to easily create credit identities and customer scores in real time. There are many decision-making models for microcredit based on web platforms that have already been established and tested. This desk research illustrates some cases of a loan application and describes how the web platforms work. However, further research on the topic is needed.

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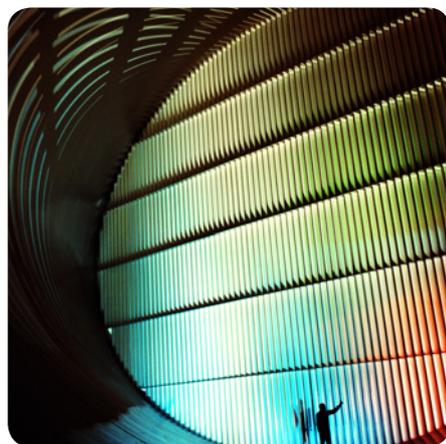
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