



# Microfinance et entrepreneuriat à Madagascar

Pierrick Baraton

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Université Clermont Auvergne  
Faculté des Sciences Economiques et de Gestion  
Ecole Doctorale des Sciences Economiques, Juridiques, Politiques et de Gestion  
Centre d'Etudes et de Recherches sur le Développement International (CERDI)

# MICROFINANCE AND ENTREPRENEURSHIP IN MADAGASCAR

Thèse Nouveau Régime  
Présentée et soutenue publiquement le 27 juin 2017  
Pour l'obtention du titre de Docteur *ès* Sciences Economiques

Par  
**Pierrick BARATON**

Sous la direction de  
MM. Vianney DEQUIEDT et Jean-Michel SEVERINO

## Membres du jury

Vianney DEQUIEDT	Professeur, Université Clermont Auvergne, CERDI	Directeur
Jean-Michel SEVERINO	Président, Investisseurs & Partenaires	Directeur
Lisa CHAUVET	Chargée de Recherche, IRD	Rapporteur
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Patrick PLANE	Professeur, Université Clermont Auvergne, CERDI	Suffragant
Sylvain MARSAT	Professeur, Université Clermont Auvergne, CRCGM	Suffragant
Cécile LAPENU	Directrice, Association CERISE	Membre Invité







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# Résumé

Les pays en développement, notamment en Afrique subsaharienne, sont confrontés au défi de réduire la pauvreté alors que peu d'entre eux ont réellement amorcé leur transition démographique. Les micro, petites et moyennes entreprises (MPME) sont un des principaux leviers de création d'emplois et de revenus. Cependant, elles font face à des obstacles importants, au premier lieu desquels le manque de financement.

Depuis les années 1970, les institutions de microfinance (IMF) jouent un rôle central pour diminuer la contrainte financière qui affecte les populations exclues du financement bancaire. Dans cette thèse, nous utilisons des données sur des MPME clientes d'une IMF à Madagascar pour étudier trois aspects de la relation entre les IMF et leurs clients.

Premièrement, nous nous intéressons à l'influence que peut avoir la contrainte financière sur le choix d'activités des micro-entrepreneurs. Nos résultats suggèrent que le manque de moyens financiers peut amener des individus à créer une activité dans un secteur différent de celui qu'ils souhaitaient initialement en raison de coûts d'entrée trop importants. Ce phénomène pourrait se traduire par une allocation sous-optimale des compétences entrepreneuriales. Dans notre second chapitre, nous suggérons que la stratégie de "montée en gamme" initiée par certaines IMF, c'est-à-dire le fait de proposer des crédits d'un montant de plus en plus élevé, peut conduire IMF et banques commerciales à entrer en concurrence pour attirer les MPME à plus fort potentiel. L'impact de cette stratégie demeure incertain selon qu'elle conduit les IMF à négliger les populations les plus pauvres et qu'elle détourne certains entrepreneurs du financement bancaire. Enfin, dans notre troisième chapitre, nous mettons en lumière le faible niveau d'éducation financière des entrepreneurs et ses éventuelles conséquences en termes de choix de prêteurs (entre IMF et banques).

En conclusion, nos travaux soulignent le rôle que peut jouer la microfinance dans le développement des MPME, tout en suggérant certaines pistes pour optimiser son impact économique et social.

**Mots clés:** micro petites et moyennes entreprises, microfinance, contrainte financière, entrepreneuriat, concurrence, éducation financière



# Summary

Developing countries, especially countries in Sub-Saharan Africa, are confronted with the need to reduce poverty while their populations are still increasing at high rates. Micro small and medium-sized enterprises hold the highest potential for job creation and income generation. However, lack of financing, among numerous other obstacles, significantly impedes their development.

Microfinance institutions have played, and continue to play, a significant role in meeting the growing financing needs of MSEs excluded from the formal financial sector. In this dissertation, we attempt to illustrate some points to pay particular attention to in order to increase microfinance impacts. Firstly, we highlight that initial financial constraints may prevent entrepreneurs from investing in their first-choice sector and that ultimately, this misallocation of talent could be detrimental for growth. This result emphasizes the need for start-up financing, which is one of the riskiest and most critical aspects of running a business. Secondly, we draw attention on the fact that up-scaling strategies implemented by MFIs may lead to competition with banks. The net economic impact of up scaling strategies will depend on how much MFIs neglect the poorest clients (mission drift) and to what extent clients with the highest growth potential can in fact resort to commercial banks. Finally, we shed light on the fact that the lack of financial knowledge among entrepreneurs may actually skew their financing choices and ultimately prevent them from obtaining more affordable sources of financing.

As a whole, MSEs need special attention to foster their growth and contribution to job creation. MFIs are a powerful tool to help MSEs meet growth objectives, but optimal development may require other forms of financial assistance and better suited funding

**Keywords:** micro small and medium-sized enterprises, microfinance, financial constraint, entrepreneurship, competition, financial education



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# Introduction

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## 1.1 A demographic challenge

In the last decade, Africa has emerged as one of the most promising areas in the world in terms of economic growth and poverty reduction, having moved from being referred to as "hopeless" in 2000 to "on the rise" in 2011 by the Economist <sup>1</sup>. The gross domestic product (GDP) of Sub-Saharan Africa, based on purchasing power parity, has risen an average of 5.3% per year since 2000, making the region the second-fastest growing economic area in the world behind South Asia.

This vigorous phase of economic growth has led to a significant decrease in the poverty head-count ratio, which has dropped from 57% to 49% since 2000. However, extreme poverty has not decreased in absolute terms. For instance, the total number of people living in extreme poverty (with less than \$1.9 US per day) in Africa increased by 6% during the 2000's and amounted to 389 million in 2015, compared to 371 million in 2000<sup>2</sup>.

The main reason for these mixed results is the massive demographic growth a large share of the continent is still experiencing. As noted by (Guengant and May, 2011), some African countries still have very high fertility rates<sup>3</sup> and have not yet begun their demographic transition. As illustrated by the Table 1.1 below, Sub-Saharan countries' fertility rates are on average two times higher than those in Asia. At the current rate, the Sub-Saharan population will reach 2.1 billion in 2050 and 610 million new people will have entered the labor market, i.e., 17.5 million per year, according to the median scenario of the United Nations (United Nations, 2015).

Currently, African unemployment is approximately at 50% (AfDB, 2016), which is a major threat to social cohesion. For policymakers and development practitioners, a critical policy question emerges: how do we create new jobs, and quickly?

### 1.1.1 MSMEs represent the large share of employment

While tight public budgets suggest that administration will be a limited source of employment, the private sector appears to be the engine of economic growth and jobs creation.

---

<sup>1</sup>See the cover of The Economist on May 2000 and on December 2011, respectively.

<sup>2</sup>World Bank Indicators, 2017

<sup>3</sup>The fertility rate is the average number of children that would be born to a woman over her lifetime if she were to experience the current age-specific fertility rates throughout her lifetime, and she were to survive from birth through the end of her reproductive life.

Table 1.1: Fertility rate comparisons over the last forty years, in %

Country	1975	1990	2000	2010	2014
World	4.17	3.28	2.66	2.5	2.45
East Asia and Pacific	3.94	2.55	1.76	1.77	1.78
South Asia	5.46	4.29	3.46	2.76	2.56
Sub-Saharan Africa	6.8	6.36	5.79	5.24	4.97
Niger	7.59	7.72	7.74	7.67	7.6
Somalia	7.03	7.4	7.61	6.87	6.46
Mali	7.15	7.17	6.9	6.55	6.23
Chad	6.78	7.31	7.35	6.59	6.16
Angola	7.35	7.21	6.91	6.42	6.08
Madagascar	7.21	6.26	5.55	4.65	4.41

However, debate has been ongoing as to what types of businesses have the highest potential for job creation and should therefore be given special focus by policymakers.

Due to the number of unregistered firms in Africa, the weakness of national statistical administrations, and the lack of a universal definition of "micro and small" (MSEs) and "small and medium-sized enterprises" (SMEs) (see box below), it is difficult to get a comprehensive view of the size distribution and employment contribution of these enterprises. However, we can broadly identify three stylized facts.

First, MSMEs constitute the largest share of private-sector enterprises and account for the bulk of employment across middle- and low-income countries (Ayyagari et al., 2011; Deijl et al., 2013; Ayyagari et al., 2014; International Labour Organization, 2015). Secondly, among MSMEs, micro enterprises and self-entrepreneurs represent the highest share of businesses (Mead and Liedholm, 1998; World Bank, 2013). It is estimated that across low and middle income countries, there are around 89 million MSMEs, of which about 83% are micro enterprises, including self-employed entrepreneurs (Kushnir et al., 2010). Given limited empirical metrics on the informal sector, these figures are probably underestimates (Maloney, 2004; Reeg, 2015). The second stylized fact is quite common to all economies. For instance, in OECD countries, enterprises with less than 9 employees account for 80% of the total number of enterprises (OECD, 2016). However, the fact that they represent the largest share of employment is specific to low income countries. Indeed, data suggest that large firms provide the highest share of employment in high-income countries, followed by medium-sized firms and small firms (International Finance Corporation, 2013). As economies develop, the average size of enterprises increase. The third stylized fact is the well-known "missing middle", i.e. the fact that developing countries lack medium-sized enterprises with growth and job creation potential (Krueger, 2013).

**Box : "Enterprise size classes definition"**

Definitions of micro, small and medium enterprises (MSEs) vary greatly across countries and even among different administrations within the same country (Kushnir et al., 2010). The most commonly referred to criterion is the number of employees, although other definitions may include size of assets, turnover, capital and investment (ibid.).

Enterprise size classifications must be defined according to economic country profiles, and can even be based on relative measures of particular distribution within an industry. However, thresholds used are generally quite arbitrary, as illustrated by the Figure 1.1 below, which is based on an inventory of the official and working definitions made by Kushnir et al. (2010). For instance, The World Bank Enterprise Survey (WBES) classifies enterprises with 5-19 employees as "small" and those with 20-99 as "medium", while The World Bank Group defines enterprises with 0-9 employees as "micro-enterprises", 10-49 employees as "small" enterprises and 50-299 as "medium-sized" businesses (ibid.). While some countries make a distinction between self-entrepreneurs, micro and small enterprises, in many cases countries include them in the small-enterprise definition (Reeg, 2015).

Because of varying definitions among varying entities and difficulty counting regular, permanent or part-time employees in developing countries, the umbrella terms "micro and small-sized enterprises (MSEs) and "small and medium-sized enterprises" are quite unclear. From the lower to the upper limits, micro, small and medium-sized enterprises (MSMEs) have zero to 499 employees, depending on the definition used. Therefore, MSMEs are a very heterogeneous group and should not be understood as fixed concepts.

However, Reeg (2015) suggests that among the broader group of MSMEs, we can distinguish enterprises depending on their level of organization and entrepreneurs' skills. Enterprises with high levels of organization and entrepreneurial skills profile appear to be starkly different above and below the threshold of 20 employees, respectively. Above this threshold, enterprises appear sufficiently well structured to continue growing and generating real productivity gains. Below 20 employees, organizations (in terms of management, accounting practices etc.) tend to be more rudimentary and growth more uncertain. As a result, Reeg (2015) considers firms with less than 20 employees "micro and small enterprises" (MSEs) and firms with over 20 employees "medium enterprises".

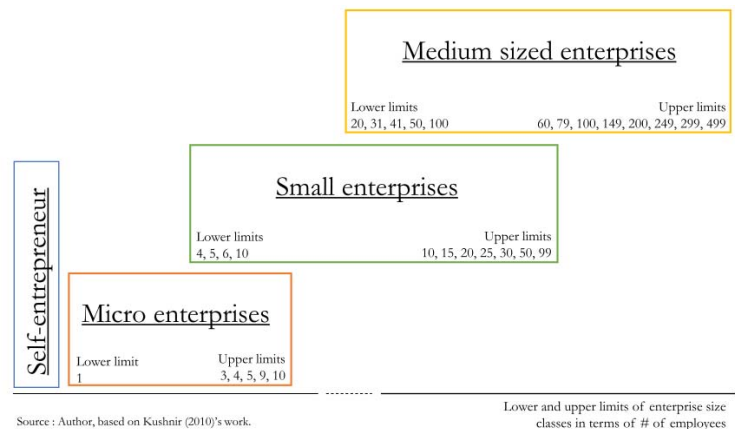


Figure 1.1: Enterprise size classes in lower income countries according to the number of employees



### 1.1.2 The missing middle, a noticeable absence

The MSE segment is predisposed to a so-called 'churning' process: firms are constantly being created or closed down and growing and contracting at high rates, especially in the small-size business segment. Evidence suggests that only very few MSEs grow into larger size categories (De Mel et al., 2008b; Hsieh and Klenow, 2009; Goedhuys and Sleuwaegen, 2010; Mel et al., 2012). Surveys of over 28,000 micro and small enterprises in Africa and Latin America reveal that less than 3% of MSEs expand to four or more employees after startup, and only 1% of enterprises that are initially micro or small expand to beyond 10 employees (Mead and Liedholm, 1998; Liedholm, 2002). In sub-Saharan Africa, few household enterprises hire more employees beyond the household (Kinda and Loening, 2010; Grimm et al., 2011, 2012). Another rigorous study in Mexico finds that in a given year, just 12 % of owner-only firms expand and that larger micro enterprises have a higher probability of contracting than expanding (Fajnzylber et al., 2006).

However, recent work has shown evidence of a small group of fast-growing MSEs - so called "gazelles" -, who vastly outperform their peers and drive aggregate employment growth for the small business sector (Nichter and Goldmark, 2009; Gries and Naudé, 2010; Mel et al., 2012; Grimm et al., 2012; World Bank, 2013).

## 1.2 Financial constraint: causes and solutions

### 1.2.1 Financial constraint, one of the main obstacle to MSME development

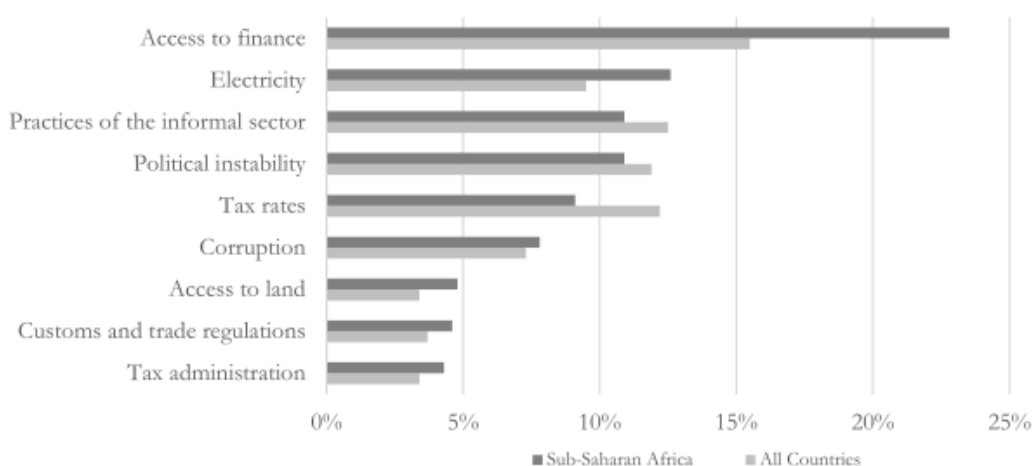
Only very few MSEs in low income countries manage to grow and become viable businesses. Research has shown many factors that impact whether a business will be successful (Nichter and Goldmark, 2009). These include entrepreneurs characteristics such as education level and training (De Mel et al., 2008b; Fafchamps et al., 2012; Mano et al., 2012), age (De Mel et al., 2008b) and gender (Fafchamps et al., 2011; McKenzie, 2012). Particular obstacles to MSEs survival cited in the literature include also enterprise characteristics such as firm age (Jovanovic, 1982), sector, industry focus (Mead and Liedholm, 1998) and location of the firm (Pyke and Sengenberger, 1992). Finally, other obstacles include unconducive regulatory environment such as regulatory ambiguity, deficits in law enforcement and unreliable infrastructure (Goedhuys and Sleuwaegen, 2010).

Among these growth drivers, two seem particularly significant. First, an entrepreneur's initial motivation at the time of business launch. The literature on MSEs distinguishes between "opportunity-driven" entrepreneurs who enter into entrepreneurship voluntarily in order to seize an economic opportunity and "necessity entrepreneurs", who launch a business because they have no better option for work (Reynolds et al., 2002). It is implicitly assumed that "necessity entrepreneurs" are lacking of skills and run their business solely to earn a livelihood. In developing countries, where the lack of formal jobs creation may decrease the advantages of a worker's situation, we can expect the distinction between "opportunity" and "necessity" entrepreneurs to be particularly meaningful. According to

the [Global Entrepreneurship Monitor \(2014\)](#), "necessity entrepreneurs" accounted for 30.2% of people who declared being in the process of starting a business or already running one in Africa<sup>4</sup>, compared to 22.4% in Europe and 13.9% in North America.

Second, as illustrated by Figure 1.2, obtaining financing is the largest constraint faced by entrepreneurs in Africa, and it disproportionately affects the smallest enterprises ([Beck and Demircuc-Kunt, 2006](#); [Beck et al., 2006a, 2008](#); [Ayyagari et al., 2008](#)). As illustrated by Figure 1.3, small firms finance a smaller share of their investment with formal sources of external financing and, unlike larger firms, any lack of bank financing is not compensated by the use of additional leasing or trade finance. In other words, small firms do not find a way around financing constraints and ultimately experience slower growth. According to [Beck et al. \(2005\)](#), financing obstacles have almost twice the effect on the annual growth of small firms' than on large firms'. The same results are obtained if we consider micro enterprises, i.e., those with less than five employees. For instance, [De Mel et al. \(2008a\)](#) randomly allocated grants to micro enterprises in Sri Lanka and observe a margin return of investment of around 60% a year. Using a similar approach in Mexico, [McKenzie and Woodruff \(2008\)](#) also underline that return are much higher (70-79 % per month) for firms that report themselves as financially constrained. Finally, using data from Cameroon, [Nguimkeu \(2014\)](#) documents that allowing individuals to borrow up to three times the value of their average income will increase their average earnings by more than 30%. All of these studies highlight to what point relaxing an MSME's financial constraints can actually generate substantial growth.

Figure 1.2: Biggest obstacles to private sector development



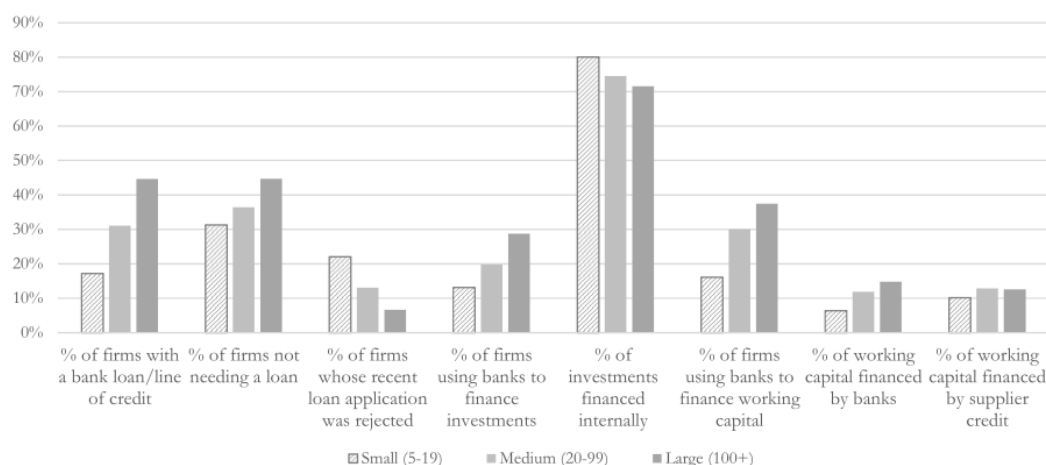
Source : World Bank Doing Business (website visited in April 2017)

Therefore, the private sector in developing countries consists mainly of micro and small enterprises that face numerous obstacles, especially lack of financing. Few of them succeeded in thriving in the unconducive business environment and became "gazelles". Others are mainly self-entrepreneurs, with at most one or two employees, that may have started their

<sup>4</sup>Countries included are: Angola, Botswana, Burkina Faso, Cameroon, South Africa, Uganda

business out of sheer necessity. However, both of these types of enterprises have high potential in terms of job creation and poverty reduction, and therefore deserve special attention from policy-makers and development practitioners.

Figure 1.3: Magnitude of the financial constraint depending on enterprises size, in Sub-Saharan countries



Source : World Bank Enterprise Survey (website visited in April 2017)

In the medium term, many low-income Sub-Saharan African countries need to initiate their structural transformation (AfDB, 2016). To do so, "gazelles" must be given central importance in policy decisions because it is these small firms that eventually grow into larger enterprises (International Finance Corporation, 2013). Over time, it will create enough jobs to reduce "necessity entrepreneurs". However, by then, it is necessary to create conditions in which people can more easily become self-entrepreneurs and increase their income. One of the main ways to meet these challenges involves relaxing the financial constraint entrepreneurs are confronted with.

### 1.2.2 Microfinance, a powerful tool with mixed results

Enterprises need funding to deal with regular charges (employee salaries, supplies, unexpected expenses such as machinery failures, etc.) or to invest in the long term by acquiring better production technologies. If self-financing (via equity partners or retained profits) is not sufficient, enterprises have to resort to external sources of funding.

Unfortunately, many MSEs in developing countries are credit rationed (Bigsten et al., 2003; Akoten et al., 2006; Stein et al., 2010), that is, they are unable to find a lender willing to lend the funds they need at the prevailing interest rate. Credit rationing mainly occurs because of asymmetric information between borrowers and lenders (Stiglitz and Weiss, 1981). The lender has imperfect information on the borrower's capacity and commitment to succeed in his project. Therefore, the lender has to implement monitoring systems and require collateral in order to mitigate the risk of default, which results in higher fixed costs for him. MSEs are particularly vulnerable to credit rationing because their profitability is

more uncertain than that of large firms and because they lack collateral. Moreover, they require small loans on which banks cannot amortize their fees.

Since the 1970's, microfinance has emerged as a powerful tool to overcome financing constraints of small firms. Along with the development of specific lending methods such as group lending and progressive lending aimed at addressing screening and monitoring challenges (Armendáriz and Morduch, 2010), microfinance has managed to reach borrowers excluded from the formal financial system and provide an alternative to moneylenders' usurious interest rates. As a result of its huge potential, microfinance has spread all over the planet. At the end of 2014, microfinance made up a loan portfolio of around \$87 billion, for 1,045 microfinance institutions serving 112 million borrowers.<sup>5</sup>

Today the microfinance sector is experiencing a significant shift. MFIs have gradually been moving away from offering group-based loans with weekly repayment schedules to providing loans tailored to better match the cash flow patterns of small growing businesses. This "upscaling process" (Vanroose and D'Espallier, 2013; Cull et al., 2014) has resulted in loans that are no longer "one-size-fits-all" but are rather more customized and vary according to their size, maturity and interest rate. In Madagascar, for instance, some MFIs offer loans with longer maturity (from one to three years) and larger amounts (up to a maximum of \$38,000) than in the past. However, while access to microfinance is commonly believed to lead to enterprise growth and development, empirical evidence shows rather weak or no effects on MSE profits or job creation (Karlan and Zinman, 2011; Mel et al., 2014; Banerjee et al., 2015b).

There are several possible explanations. One may be simultaneous constraints such as entrepreneurs' lack of skills, shortage of adequately educated labor or an uncondusive business environment (Demirgüç-Kunt et al., 2008). Second, there is evidence that microfinance does not address growth-oriented entrepreneurs but rather those who use credit to smooth their consumption (for food, health services and education etc.), and actually do not intend to expand their business (Berner et al., 2012). Third, evidence suggests that many growth-oriented small-scale entrepreneurs are inadequately served by the current finance options offered by MFIs (Banerjee and Duflo, 2012; McKenzie et al., 2010; Hampel-Milagrosa and Loewe, 2015). High interest rates and short term repayment cycles may not enable entrepreneurs to realize long-term investments in machinery or introduce new production and process standards (Dalla Pellegrina, 2011; Field et al., 2013; Banerjee et al., 2015a).

### 1.3 Contribution of this dissertation

In this dissertation, we attempt to shed new light on how microfinance can influence MSE development, both for self-entrepreneurs and potential "gazelles".

First, we explore the level to which small entrepreneurs are financially constrained when they launch their business and how much it can influence the sector they choose. We highlight the implication in terms of capital allocation and the importance of start-up financing.

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<sup>5</sup>Source: [www.themix.org/mixmarket](http://www.themix.org/mixmarket)

Secondly, we investigate how MFIs position themselves with regard to commercial bank offers. The common viewpoint is that MFIs and commercial banks operate in segmented markets and are mutually complementary. However, "up scaling" strategy could in fact result in competition with commercial banks and deeply influence how the most promising MSEs are financed.

Finally, recent upscaling strategy of MFIs raises questions about why MSEs with significant financing needs continue to resort to MFIs. We explore whether a lack of information on the difference between interest charged by banks and MFIs could be an important driver of potential borrowers' behavior.

We lead our research on small entrepreneurs, clients of one of the biggest MFIs in Madagascar.

### 1.3.1 Context and Data

#### 1.3.1.1 Madagascar, a quick overview

Madagascar is an African island populated by nearly 24 million people. Abundantly endowed with natural resources, it is a fragile state which has been embroiled in political and economic turmoil since 2009. Madagascar is one of the rare cases of a country that has been in a quasi-continuous economic slump since its independence in 1960. Its GDP per capita in constant USD decreased by 41% between 1967 and 2015 and is respectively 8 times lower than Indonesia's and 13 times lower than Thailand's, although all three countries' GDPs were approximately the same 50 years ago. As result, Malagasy people are fully confronted to the job and income creation challenges mentioned above, and MSEs play a central role at answering it.

There were around 2.2 million MSEs in Madagascar in 2012. The quasi-totality were informal, i.e., not registered and lacking in sound accounting practices. Mainly concentrated in the trade (34%) and manufacturing sectors (43%), MSEs in Madagascar make up 36% of the non-agricultural GDP and have an average of 1.4 employees (including the entrepreneur). The large majority of these MSEs are excluded from the formal financial sector and 95% of investments are self-financed ([Instat Madagascar, 2013](#)).

#### 1.3.1.2 Data

We use two original databases. For Chapters 1 and 2, we use the client database of ACEP Madagascar, one of the largest MFIs in the country. This database contains information on 50,480 micro and small enterprises (MSEs) who were clients of the MFI between 1995 and 2014. The data provides us with information on the business activity (sector, sales, profit, fixed assets, number of employees, starting date etc.) and financing information (amount of loan, duration, interest rate, collateral pledged etc.) for each loan granted. Having panel data for clients who obtained at least two credits was very useful. Clients have also been traced geographically since 2010, which enabled us to compute a set of distances we use in Chapter 2. This step required a major reprocessing of the database in order to harmonize GPS coordinates. For Chapter 2, we complemented this database by localizing all of the

commercial bank branches located in the 9 regions in which ACEP operates: a total of 154 bank branches operated by 12 commercial banks. We hand collected the postal address of each bank on their website and with the aid of Google-Maps, we obtained the precise location (latitude and longitude). It is worth noting that only half of the branches had a postal address accurate enough to be traced with the internet only. We complemented our database with in situ visits to get precise locations when necessary.

For Chapter 3, we undertook a survey designed to extend research on borrowing behaviors and financial literacy among small business clients of ACEP. We randomly selected 292 clients in Antananarivo. Sampling was done according to the loan amount and business sector of the clients. We interviewed 253 clients who had borrowed at least \$954, which corresponds to the highest quartile of clients according to the loan amounts granted by ACEP.

The survey consisted of a private interview with each identified client. Interviews took place at ACEP branches during the repayment period. ACEP required that the interviews last less than 50 minutes in order not to disturb their clients' schedules. The questionnaire was designed to yield a picture of the financial situation of each small enterprise, including their investments, financing needs and their accounting practices, as well as the entrepreneur's motivation, business prospects and administrative training.

These data enabled us to look further into the financial constraint effects on entrepreneurs' choices and how MFIs and commercial banks were interacting with each other.

### 1.3.2 Main results

#### *Chapitre 2: Financial Constraint, Entrepreneurship and Sectoral Migrations*

In Chapter 2, we document that around one third of entrepreneurs in our database changed business sectors in the first five years after starting their business. While the literature would explain this phenomenon by serial entrepreneurs driven by profit (Plehn-Dujowich, 2010) or by entry mistakes in a given sector (Cabral, 1997; Camerer and Lovo, 1999), we suggest that these migrations across sectors may be due to financial constraints experienced by entrepreneurs when they launched their business. We assume that lack of capital and high entry costs may prevent them from investing in their first-choice sector, but that they had no other choice left than to start a business anyway due to the lack of paid-job opportunities. As a result, they launched their business in a second-choice sector in order to make a living and changed activity sectors as soon as they can. Although the role of the financial constraint has been widely studied in industrialized countries (Evans and Jovanovic, 1989; Evans and Leighton, 1989; Blanchflower and Oswald, 1998; Holtz-Eakin et al., 1993; Hurst and Lusardi, 2004), empirical evidence on developing countries is scarcer (Paulson and Townsend, 2004). Moreover, as far as we know, we are the first to explore how much the financial constraint may influence sectoral migration among micro and small enterprises in developing countries.

We use the first loan amount obtained from ACEP as a proxy to assess the degree of individual access to finance. We find that less financially constrained firms i.e., entrepreneurs who obtained a large first loan, had fewer incentives to change business sectors. According to

our conceptual framework, these results suggest that among MSEs, there are entrepreneurs operating in an undesired sector. These results raise interesting questions about the allocation of entrepreneurial talent, which is crucial for growth and development (Bianchi, 2010; Gries and Naudé, 2010). Reducing this mismatch by enabling entrepreneurs to invest in their first-choice sector from the beginning is potentially an un-tapped source of economic growth. This suggests that start-up financing is a valuable field of work for development practitioners, especially those in the microfinance sector.

### *Chapitre 3: Do Banks and Microfinance Institutions Compete?*

In Chapter 3, we investigate if "upscaling" strategies implemented by MFIs resulted in competition with regular commercial banks. To test this hypothesis, we choose the distance (in kilometers) between each borrower of ACEP and the closest commercial bank branch as a measure of competition at the individual level. We find that the shorter the distance, the larger the loan obtained by the borrower and the lower the collateral required, all other things being equal. These results are significant only for banks who started a downscaling strategy and for the least opaque clients (i.e., larger and older enterprises). We interpret these results in terms of competition. Contrary to our initial beliefs, MFIs and commercial banks are no longer operating in a segmented market. In other words, the upscaling strategy launched by MFIs may be viewed as a substitution of bank financing and not as a direct attempt at decreasing credit rationing for people excluded from the formal financial sector, which is the MFI's *raison d'être*.

The net economic impact of the up-scaling process is hard to know. On the one hand, it may be detrimental for MSEs who could obtain more appropriate financing from banks. By granting large loan amounts with less requirements than banks (such as proof of sound accounting practices), MFIs may in fact discourage MSEs from becoming more formal. As the formalization of a business may be a push factor for the economy (McKenzie et al., 2010; Bruhn and McKenzie, 2013) and high interest rates can hinder investment, this trend may ultimately be damaging for economic development. On the other hand, the upscaling strategy may provide higher incomes that the MFI could use to improve financial inclusion for the poorest. Unfortunately, our data does not allow us to investigate these subjects. However, we believe that these questions are worth asking.

### *Chapitre 4: Financial Information Seeking Among Small Enterprises*

Finally, we wonder why entrepreneurs with significant and growing financing needs still resort to MFIs instead of turning to commercial banks that offer lower interest rates? The literature investigating why individuals choose between moneylenders and formal lenders highlights the inadequacy of financial products offered by banks and the high transaction costs potential borrowers have to bear to get financed (Kochar, 1997; Mushinski, 1999; Straub, 2005; Giné, 2011). In the Chapter 4 we suggest that a lack of information on the difference in interest rates between banks and MFIs is a strong predictor of a borrower's choice on where to seek financing. Indeed, contrary to the obvious difference between interest rates of moneylenders' and formal lenders', comparing MFIs and banks rates may be quite hard especially because MFIs and banks use different methods to calculate interest

rates and present them to clients<sup>6</sup>.

We randomly chose 253 borrowers in the highest quartile of clients according to the loan amounts granted by ACEP and observed that only 66% reported knowing the interest rate currently charged on their loan. Of these, 56% were in fact mistaken. Even more striking, we found that 86% of the respondents did not know that the creditor interest rates applied by commercial banks were actually lower than those charged by the MFI - 54% of the borrowers in our sample were actually convinced of the opposite - although the difference is at least ten percentage points. We then investigated the determinants of information-seeking about bank lending terms and conditions. Our results illustrate that both the financial literacy of a borrower's entourage and his level of education are strong predictors of whether or not he will seek out information from banks. In other words, borrowers with at least a minimum of financial literacy will inquire, while financially illiterate borrowers are likely to remain ignorant about alternative financing options.

There is no doubt that thanks to their upscaling strategy, MFIs are meeting the growing financing needs of MSEs excluded from the formal financial sector. However, there may also be entrepreneurs who continue to resort to MFIs rather than commercial banks largely because of a lack of information, which highlights the economic costs of financial illiteracy.

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<sup>6</sup>MFIs typically use a flat interest rate method with a single fixed fee for credit, regardless of capital repayment, while banks use a declining balance method, where the interest rate is charged only on the outstanding capital. While these methods may appear equal at first glance, interest rates can, in fact, vary dramatically.





# Financial Constraint, Entrepreneurship and Sectoral Migrations

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### Résumé<sup>1</sup>

Au sein de 3000 petites entreprises clientes d'une institution de microfinance (IMF), nous observons qu'un tiers des entrepreneurs ont changé de secteur au cours des cinq premières années après le démarrage de leur activité. Nous trouvons que la probabilité de changer de secteur d'activité est fortement et négativement corrélée avec le montant du premier crédit obtenu auprès de l'IMF. Nous interprétons ce résultat en termes de contrainte financière: le manque de moyens financiers peut empêcher un individu de démarrer une activité dans le secteur de son choix, tandis que le manque d'opportunité sur le marché du travail le contraint à investir dans un autre secteur par défaut. L'entrepreneur changera de secteur quand il en aura la possibilité, générant les "migrations sectorielles" que nous observons. Nos résultats remettent en cause la distinction faite entre "entrepreneurs par nécessité" et "entrepreneurs par défaut", et soulignent les conséquences potentielles en termes de développement économique que peut avoir une allocation sous-optimale des compétences entrepreneuriales.

### Abstract

Using an original database of over 3,000 micro and small enterprises (MSEs) that were microfinance institution (MFI) clients in Madagascar over the period of 2008-2014, we observe that around one third of these entrepreneurs switched business sectors in the first five years after starting their business. We find that the probability of an entrepreneur's changing sectors is highly correlated with the size of the first loan obtained from the MFI. This result survives multiple robustness checks, including treatment for endogeneity and attrition. We interpret this finding in terms of financial constraint: a lack of financing prevents an entrepreneur from initially investing in his first choice sector, causing him to change sectors only when he has become financially able to do so. This result challenges the classic distinction made between "necessity entrepreneurs" and "opportunity entrepreneurs" and raises important questions concerning entrepreneurial talent allocation.

*Keywords:* Entrepreneurship, Financial constraint, firm dynamics, Madagascar

*JEL classification:* L26, M13, O16, O55

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## 2.1 Introduction

In this paper, we attempt to look at entrepreneurship in relation to an important and rarely scrutinized aspect of firm dynamics in developing countries: that of migration across sectors. Contrary to common beliefs, entrepreneurs in developing countries often develop different activities sequentially (Newman et al., 2013). Our data indicate that five years after the creation of their firm, one third of entrepreneurs no longer operated in the same business sector. A large literature has investigated the determinants of entrepreneurship and firms' growth but very little is known about sectorial migrations. Many factors may explain such migration across sectors. For instance, one explanation is that economic conditions may make one sector suddenly more appealing than another. A second explanation is that the entrepreneur was not operating in their desired sector from the start. The first explanation involves "serial entrepreneurs" who are defined as highly skill entrepreneurs who launch businesses successively if the quality of the business they currently practice is below a certain threshold (Plehn-Dujowich, 2010). The second explanation involves entrepreneurs who may start their initial business in a sector which does not suit them due to "entry mistakes" (Cabral, 1997) or "overconfidence" in their capacity to perform (Camerer and Lovo, 1999).

In this article, we suggest that the extend of financial constraints faced by an entrepreneur can be an important determinant. Some financially constrained entrepreneurs may launch a business in a sector other than that of their first choice due to high entry costs in their preferred sector. As they earn more money and financial constraints relax, they may shut down their initial business to launch a new business in another sector better suited to their needs. We investigate whether financial constraints affect a given entrepreneur's probability of changing business sectors in Madagascar. Madagascar provides an excellent testing ground given that the functioning of capital market is limited by the existence of significant failures. We use an original database of small business clients of a microfinance institution (MFI). We gather information on 3,017 firms who created businesses between 2008 and 2010 and obtained loans from one MFI. Among these entrepreneurs, one third (921 out of 3,017) had changed business sectors by 2014. The first loan amount obtained from the MFI is used as a proxy to assess the degree of individual access to finance. Our results show that less financially constrained firms (that is entrepreneurs who obtain a larger first loan) had fewer incentives to change business sectors. Increasing the loan amount borrowed by one standard deviation decreases by two percentage points the probability of the entrepreneur changing sectors, all else being equal. Our results survive different robustness checks, including treatment for endogeneity, attrition and sample change.

This paper contributes to the literature dealing with the dynamics of small firms and entrepreneurship in developing countries. Some papers have investigated the determinants of firm creation, growth and death in developing countries (e.g. Mead and Liedholm, 1998; Sleuwaegen and Goedhuys, 2002; Harding et al., 2006; Nichter and Goldmark, 2009; Hsieh and Klenow, 2014, among others), however, as far as we know, only Newman et al. (2013) have investigated sectorial migrations in developing countries.<sup>2</sup> Using data from Vietnamese

<sup>2</sup>Bernard et al. (2006) scrutinize this phenomenon in the U.S. and they find that eight percent

manufacturing firms, they show that between 6 to 35 percent of firms switched industry between 2001 and 2008.

Our paper complements this previous work in two dimensions. First, we study sectoral migration for microenterprises, while [Newman et al. \(2013\)](#) concentrate on large, formal and manufacturing enterprises. In this work, we focus on small firms operating in agriculture, industry, trade and services. Our data confirm that this phenomenon is far from anecdotal among microenterprises and therefore deserves some attention. Second, our paper differs from [Newman et al. \(2013\)](#) in its objective. They investigate differences in terms of productivity or capital-labor ratio between switching firms and their counterparts. Our data do not allow us to do so. However, we focus on one possible explanation of migrations across sectors. Specifically, we study whether sectoral migrations are induced by initial financial constraints faced by an entrepreneur. We argue that financial constraint can have an entrepreneur may choose an activity sector by default rather than by mistake because of limited investment capacity.

This paper also adds elements to a burgeoning body of literature that investigates the relationships between business owner's entrepreneurial motivation and economic development. Researchers have mainly focused on the distinction between "opportunity entrepreneurs" who strive to grow wealth by developing new ventures in economically appealing sectors and "necessity entrepreneurs" who, by contrast, start a business because they have no better option for work ([Reynolds et al., 2002](#)). This distinction is quite interesting since it suggests that, depending on their initial motivation, entrepreneurs may not make the same contribution to economic growth. Opportunity entrepreneurs are Schumpeterian entrepreneurs who fuel structural transformation through the well-known destructive-creation process, while necessity entrepreneurs display much lower entrepreneurial talent and are likely to run into early failures and thus may contribute to precarious and temporary job creation ([Acs, 2006](#); [Santarelli and Vivarelli, 2007](#); [Quatraro and Vivarelli, 2015](#)). The difference between necessity and opportunity entrepreneurs may not be so distinct since we do not know precisely why necessity entrepreneurs start their businesses. Previous studies make the implicit assumption that necessity entrepreneurs become entrepreneurs by default (i.e., out of sheer necessity) and assume that these entrepreneurs do not have any particular entrepreneurial motivation or talent ([Reynolds et al., 2002](#); [Hessels et al., 2008](#)). In this article, we argue that the migrating entrepreneurs we observe can be considered both as necessity entrepreneurs and as opportunity-driven entrepreneurs. We believe that initially they choose to start a business (like an opportunity entrepreneur) but that a lack of capital prevents them from investing in their first-choice sector. A lack of paid-job opportunities actually induces them to start a business (like a necessity entrepreneur) in a second choice sector. However, these entrepreneurs are not necessarily reluctant to become entrepreneurs or devoid of entrepreneurial talent.

As far as we know, our article is the first to illustrate that because of credit market and labor market failures, certain "would-be" opportunity entrepreneurs may have no other choice than to invest in a sector which may not be the most appropriate for them. Insofar as a misallocation of entrepreneurial talent is detrimental for growth and development

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of manufacturing firms switched activities during five-years periods between 1977 and 1997.

(Bianchi, 2010; Gries and Naudé, 2010), and considering the important share of migrating entrepreneurs in our sample (more than one third) this is an important issue.

The rest of the article is structured as follows. Section 2.2 summarizes to what level financing constraint and sectorial entry costs may drive an entrepreneur's business decisions. Section 2.3 presents our data, variables and method while Section 2.4 displays our econometric results. The final section concludes.

## 2.2 Conceptual framework

This paper refers to the abundant literature on "self-employment", and especially to the relationship between financial constraint and entrepreneurship. According to this literature, individuals have basically two occupational choices : get a job or start a business. This decision depends on a tradeoff between the expected utility of the two situations which depends mainly on expected earnings.<sup>3</sup> Several authors have argued that low wage and widespread unemployment may be important push factors for an individual's switch from paid employment to entrepreneurship (Evans and Leighton, 1990; Storey, 1991; Foti and Vivarelli, 1994).

A large body of research has also highlighted the role of financial constraint to explain an individual's decision (or not) to start a business. In their seminal work, Evans and Jovanovic (1989) highlight that wealthier people in the United States were more inclined to become entrepreneurs since their personal wealth allowed them to borrow more capital on the credit market. These results are consistent with the stylized facts documented by Evans and Leighton (1989) who find that "men with greater assets are more likely to switch to self-employment, all else equal". Controlling for endogeneity, various works have confirmed the positive effect of personal wealth in developed countries on a person's decision to create a business (Blanchflower and Oswald, 1998; Holtz-Eakin et al., 1993). Concerning developing countries, works are fewer. Focusing on Thailand, Paulson and Townsend (2004) find that wealthier households are more likely to start businesses and to invest more starting capital.

Beyond the relationship between wealth and entrepreneurship, several studies have focused on understanding how an individual's wealth was likely to influence their investment choices. Using models of self-employment with liquidity constraint, Zazzaro (2001) and Bianchi (2010) suggest that potential entrepreneurs may be induced to choose traditional low return businesses instead of innovative ones because of credit constraint. Such choices have important consequences on entrepreneur's wealth. Using data from Cameroon, Nguimkeu (2014) documents that entrepreneur's investment choices and entrepreneurial earnings are positively related to initial wealth. Interestingly, simulations show that allowing an individual to borrow up to three times the value of their average wealth will increase their average earnings by more than 30%.

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<sup>3</sup>Beyond these financial aspects, particular attention has been given to how personal characteristics may influence the choice of entering into entrepreneurship, such as age (Blanchflower, 2000), the role of family background (Burke et al., 2008), the level of education (Blanchflower and Meyer, 1994) or even psychological attributes such as the need for autonomy (Brandstätter, 1997), the internal locus of control (Brandstätter, 1997) and the lack of risk aversion (Kihlstrom and Laffont, 1979).

Banerjee et al. (2015a) provide close results with a model of technology choice. They show that financially constrained entrepreneurs can only access diminishing-returns technology while less financially constrained entrepreneurs can access technologies with higher fixed costs but also with higher returns. Comparing the impact of different types of credit on households' investment in Bangladesh, Dalla Pellegrina (2011) find that tight repayment schedules may preclude borrowers from undertaking long-term investments. According to the author, it may push farmers, whose production cycle is longer than in other activities, toward more flexible but sometimes more expensive credit channels, such as the informal one. In the same vein, Field et al. (2013) find that microfinance loans with a two-month grace period encouraged small entrepreneurs (who were financially constrained by the terms of their standard microfinance loans) to acquire non liquid assets and enabled them to better optimize their investments.

In this article, we highlight that in addition to being unable to invest in high-return technologies, individuals face constraints both on the job market and the credit market to such an extent that they may not be able to create a business in their desired sector, ultimately leading to the choice of a business sector by default.

To study whether financial constraints affect sectoral migration, we merely extend the framework developed by Ahlin and Jiang (2008) that documents that some households may save enough capital to move from self-employment to "real entrepreneurship". We assume that individuals have two occupational choices, employment or business creation. Each individual compares the gain he or she would obtain from employment to the expected profit resulting from running a firm. More precisely, we assume that an entrepreneur can either invest in a business that requires a minimal amount of capital and entrepreneurial talent or he can invest in another activity requiring less capital but also less fitted to their entrepreneurial capacities and therefore generating a lower profit. We call the first activity a "first choice sector" and the second activity a "second choice sector".

Let us consider  $\tilde{I}_i$  as the expected investment for the entrepreneur  $i$  and  $A_i$  as the entrepreneur's investment capacity. We define  $\tilde{I}_i$  as the minimum investment required to make the business viable. We assume that entrepreneurs can rely only on their own wealth to create their first enterprise. Indeed, creating an enterprise is a very risky undertaking (Bartelsman et al., 2005) and because of high asymmetry information and poor institutional framework, banks<sup>4</sup> in developing countries are reluctant to finance individuals whose entrepreneurial talent has not yet been demonstrated.<sup>5</sup> Therefore, we assume that  $A_i$  is only composed of the entrepreneur's personal resources.

The financial constraint is defined as  $\tilde{I}_i - A_i$ , that is the difference between what the potential entrepreneur plans to invest and what he can really invest. The intensity of the financial constraint depends on  $A_i$  but also on  $\tilde{I}_i$ , the minimum capital required to launch a viable business in a given sector, i.e. entry costs.<sup>6</sup>

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<sup>4</sup>Commercial banks and microfinance institutions as well.

<sup>5</sup>In their survey among microenterprises in Sri Lanka, De Mel et al. (2008a) find that 89% of firms got no start-up financing from a bank or microfinance organization.

<sup>6</sup>For instance, Mead (1994) documented that in Southern and Eastern Africa initial capital requirements were inversely related to new business creation. In some sectors, a business has to

We assume that entry costs vary significantly depending on the activity sectors. For instance, considering the median total assets (fixed assets + working capital) of new firms in each sector as a measure of entry costs, we observe that new firms in the renting/fixing sector have 11 times more total assets than firms in the food processing sector (see Table 2.9 in the Appendix for more details). Therefore, depending on the sector targeted, a potential entrepreneur may be able to start his activity (or not) for the same amount of money.

Let us consider two sectors. Sector  $j$  is the sector initially chosen by the potential entrepreneur, and sector  $m$  is a sector which requires a lower initial investment. We have  $\underline{I}_m < \underline{I}_j$  where  $\underline{I}_m$  and  $\underline{I}_j$  are the minimum starting capital required to create a viable business respectively in sector  $m$  and  $j$ .

If  $A_i$  is inferior to  $\underline{I}_j$  but superior to  $\underline{I}_m$  the individual cannot start his business in the sector he wants. He may then choose to get a job. However, we assume that for some people with a minimum of entrepreneurial talent, or who have difficulty finding a decent job, due to a high unemployment rate or low wages in the informal sector, entrepreneurship expected earnings are always superior to employee's expected income. In this case, the individual may have no other choice than starting a business in sector  $m$ .

We argue that these "constrained entrepreneurs" will try to reach their first choice sector as soon as they are financially able to do so<sup>7</sup>, resulting in the "sectoral migrations" we observe.

To test our hypothesis, we expect that migration is more likely among entrepreneurs who were financially constrained when they started their enterprise. It is worth noting that as migration involves many costs (liquidation costs, building costs, etc.), we could observe an opposite effect since credit can also be interpreted as an increasing of financial resources and not only as a proxy of financial constraint.

## 2.3 Data and variables

### 2.3.1 Data

We benefited from a comprehensive client database of ACEP, a microfinance institution (MFI) in Madagascar. Madagascar provides an excellent testing ground given that the functioning of both labor and capital markets appears to be quite imperfect<sup>8</sup>. Our data

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reach a "minimum efficiency scale" to be viable and profitable, particularly because some sectors are more affected by scale economies. In these sectors, smaller firms face proportionally higher fixed costs and are more likely to be driven out of the market (Lotti and Santarelli, 2004). Finally, in some activities, the production process takes a long time and therefore requires long term financing.

<sup>7</sup>It is worth noting that we are not able to assess accurately this assertion due to the lack of information on entrepreneur's wealth, endogeneity issues between loan amount/wealth accumulation and the switching sector decision, as well as the lack of information on non-microfinance clients.

<sup>8</sup>According to the Malagasy National Statistical Institute (NSI), only 6.4% of the working population currently has a formal job, and the median wage in the informal sector is five times lower than in the formal sector, \$11.5 and \$51 per month, respectively. Moreover, only 6% of adults report that they have an account at a financial institution, compared to 29% on average in Sub-Saharan Africa (SSA), and only 15% of enterprises report having a bank loan/line of credit in 2013, compared to 23% for SSA (Global Financial Inclusion Database - September 2016)



are particularly conducive for our research question since they allow us to depict each client's sectoral evolution and simultaneously observe their economic situation. Since 2008, ACEP has been collecting business information (sector, sales, profit, fixed assets, number of employees, starting date, etc.) and basic information for each loan granted (amount of loan, duration, interest rate, collateral pledged etc.) for all of its customers. Data is collected by credit officers for each credit renewal (rather than retrospectively) which gives us some accuracy assurance<sup>9</sup>.

While the database includes exhaustive information about all of the entrepreneurs who received a loan from the MFI between 2008 and 2014, we focus our attention on the cohort of firms created between 2008 and 2010. Due to a lack of data, we cannot use firm and credit information before 2008. We choose to work with cohorts because we are interested by firms' characteristics, especially the financial constraint, when they are created. Making a pooling analysis would have lead us to compare all firms regardless of their starting year and therefore at different stage of their life cycle. Including time dummies would not have been relevant given that for firms created before 2008 we are not sure of the data accuracy, especially concerning the sector.<sup>10</sup>

We also needed to observe a sufficient number of firms over a sufficient amount of time to capture sectoral migrations. Considering only firms created in 2008 sharply reduced our sample. Using a cohort of firms created between 2008 and 2010 allows us to extend the number of firms. In addition, the lapse between 2010 and 2014 (which is the latest available year) is sufficient to observe whether entrepreneurs migrated (or not) across sectors.<sup>11</sup> Our final sample includes 3,017 firms, all created in 2008, 2009 or 2010.

Of course, there is no denying that our database has some limitations. First, MSEs we are studying are microfinance clients and therefore present particular characteristics compared to other MSEs. Second, even if credit officers have interest to be as accurate as possible when they collect economic and financial information from clients, this kind of data are always complicated to assess when concerning micro and small business without accurate accounting practices. Third, although a given entrepreneur started his business in 2008, he did not necessarily obtained his first loan from ACEP that same year, thus appearing in our database in 2008. As illustrated by Figure 2.1, we can broadly identify three steps in the entrepreneurial process. In step 1, the individual chooses to start a business instead of trying to get a paid-job (with respect to our assumption of very low opportunities on the job market in Madagascar). In step 2, he decides what sector he wants to invest in depending on his investment capacity and the starting capital required. In step 3, he runs his activity and obtains his first loan from ACEP. It is from this point that the entrepreneur appears in our database where we can observe whether or not he changes sectors afterwards. Thus, we

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<sup>9</sup>De Mel et al. (2009) shed an interesting light on the difficulty of accurately assessing the income of microenterprises with field surveys.

<sup>10</sup>Before 2008, the partner MFI did not have the same process to collect information concerning the borrowers

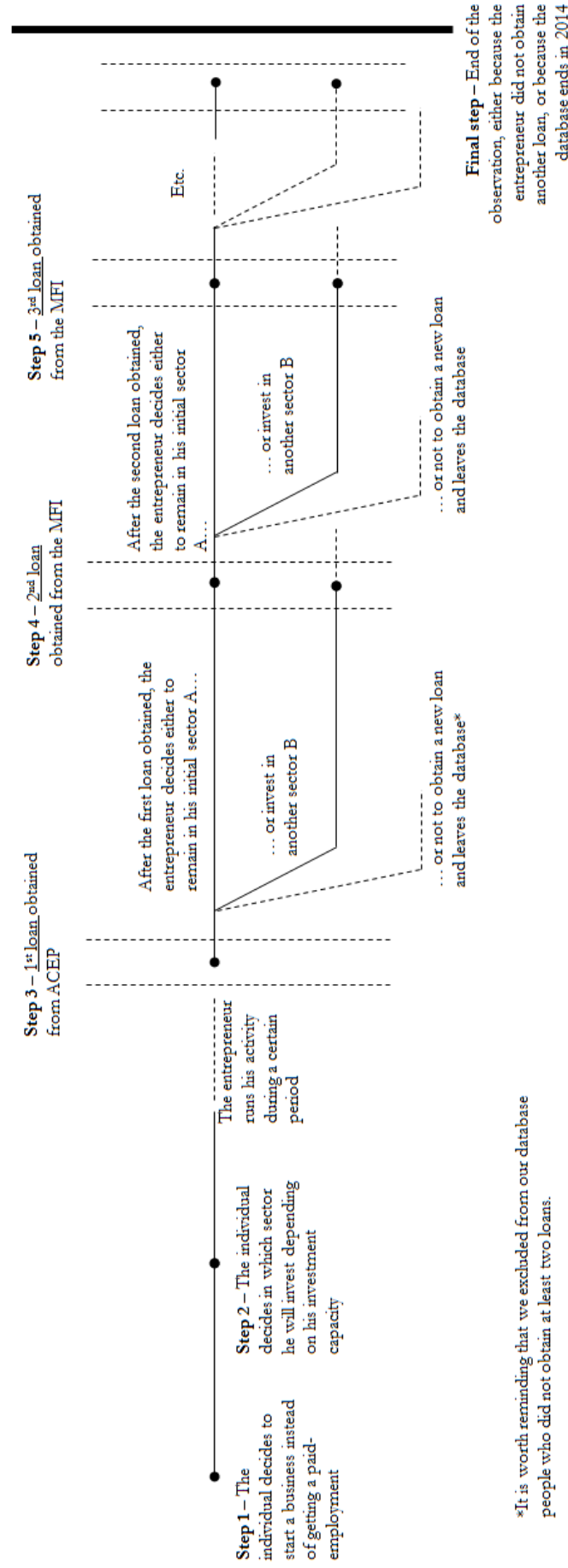
<sup>11</sup>Additional filter rules are applied in our study. First, we excluded firms that reported business in a sector entitled "diverse" because this sector includes unclassified activities. Second, among the remaining firms, we kept those with at least two observations available between 2008 and 2014 (since we aim at studying changes in sectors we need to have at least 2 observations). Finally, we dropped firms for which control variables were not available.

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do not know whether borrowers had previously changed business sectors before obtaining a loan from ACEP. We can only assume that this probability is positively correlated with the time between step two and step three. Moreover, if a borrower has not migrated by the last year of the study (2014), we have no way of knowing if they plan to do so in the future. Finally, we are exposed to an attrition problem given that some entrepreneurs stop securing new loans before the end of the study (2014) and therefore disappear from the database. Table 2.10 documents that among firms created in 2008, only 38% (431 to 1,125) obtained a loan in 2014.

We discuss these major drawbacks in the sensitivity analysis in Section 2.4.

Figure 2.1: Timeline illustrating the process of obtaining a loan and changing sectors



\*It is worth reminding that we excluded from our database people who did not obtain at least two loans.

### 2.3.2 Variables

#### 2.3.2.1 How to detect movers and stayers?

We aim at assessing the determinants of migration from one business sector to another. We therefore need to distinguish between entrepreneurs who stay in their initial sector (stayers) and entrepreneurs who shut down their initial business and launch a new one in a different sector (movers).

Our database is composed of entrepreneurs who have obtained at least two loans from ACEP. The great majority of loans granted by ACEP last one year. However, entrepreneurs can reimburse quicker, so that there is not necessarily one year between two loans. To obtain a loan, the entrepreneur has to report to ACEP in which sector he runs his business and how he plans to use the financing (mainly working capital or investment). It is worth noting that ACEP grants a new loan only to entrepreneurs who did not face difficulties to reimburse the previous one. ACEP considers 38 different business sectors (firms in our database operate in 27 of these sectors). After a discussion with ACEP staff, we regrouped these into 14 homogenous sectors as some activities are virtually indistinguishable to us.<sup>12</sup> Table 2.8 presents the different sectors and the number of firms in each sector. The majority of borrowers were operating in four sectors (specialized trade, market gardening, general trade and other services) on the date of the initial creation of their enterprise.

Based on this new classification of business sectors, we distinguish between "movers" and "stayers". As illustrated by Figure 2.1, the entrepreneur has the opportunity of changing activity sector between each loan he obtains. We define an entrepreneur as a "mover" if he reported to ACEP, when he obtained a subsequent loan, a different sector than the one reported for the first loan. It correspond to what happens after step 3 and before the final step on the Figure 2.1. The last loan we observe is either a loan obtained in 2014 (which is the end of our study period) or a loan obtained before but not renewed by the entrepreneur afterward (due to lower financing needs or refusal from ACEP). One of the difficulty in our study is to be sure that we observe a real sector change and not the simultaneous creation of another activity, with a diversification purpose for instance. To control for this aspect, we distinguish in our econometric analysis "portfolio entrepreneurs" who run simultaneously several activities and use additional restriction as robustness checks.

#### 2.3.2.2 How to measure financial constraint?

A critical step of our analysis consists in defining a good measure of financial constraint. Financial constraint can be defined as the gap (due to lack of financing) between the expected investment  $\tilde{I}_i$  and investment capacity  $A_i$  for individual  $i$ . Insofar as the expected level of investment cannot be observed, the literature employs proxies of financial constraints. The agent's level of wealth has been generally used to assess financial constraints (see: [Kerr and Nanda, 2011](#)). Wealth has the advantage of being correlated to assets invested in the busi-

<sup>12</sup>For instance, one business involves the transformation of rice and another involves the transformation of food products. Considering these two activities as different might involve false migrations.

ness as well as to one's borrowing capacity.<sup>13</sup> Unfortunately, we do not have information on the individuals' wealth level in our database.

However, we observe the first loan amount secured from ACEP. We assume this is a good proxy of the entrepreneur's wealth when he launched his enterprise and therefore a good proxy of his financial constraint for two reasons.

First, we believe that the relationship between the entrepreneur's wealth and his borrowing capacity is positive. Indeed, due to information asymmetry, a lender is particularly reluctant to provide an unknown borrower a large amount of funds for an initial loan (Petersen and Rajan, 1994). Consequently, a borrower has to provide reliable proof of their repayment capacity, particularly via easily seizable collateral such as frozen savings, to obtain a large loan. In other words, the larger the first loan obtained, the wealthier the entrepreneur

Second, we assume that entrepreneurs always ask for the maximum external financing they need and receive the maximum they can handle (from the lender's point of view). Indeed, we could imagine that because external financing is costly, wealthy individuals choose to resort to external lenders marginally in order to decrease their financing costs (Myers and Majluf, 1984). Nonetheless, we believe that because of transaction costs like application fees, time needed to complete application form, regular meetings at the MFI agency to make monthly payments etc., it is in the entrepreneur's interest to apply for a large loan in order to amortize these fixed costs. Moreover, given that the absolute size of the profit is positively proportional to the amount of sales, it is in the entrepreneur interest to start the largest enterprise he can and therefore to ask for the maximum loan they can handle. Due to the magnitude of the financial constraint in developing countries, particularly for MSEs (Beck et al., 2005), this assumption seems quite acceptable to us.

For all of these reasons, we believe that the proportionality coefficient between an entrepreneur's wealth and the first loan obtained is more or less the same for all the levels of wealth. In other words, the smaller the first loan obtained, the smaller the entrepreneur's wealth and therefore the higher probability for him of having been financially constrained when he started his business.

Nonetheless, the entrepreneur could have obtained financing from informal lenders, kin or moneylenders. In this case, we could imagine that a poor individual obtained a significant amount of money allowing him to launch his enterprise in the desired sector, and obtained a first small loan from the MFI one or two years later. In this case, the first credit secured from the MFI would be a good measure of the entrepreneur's initial wealth but not of his financial constraint. We believe that the possibility of a business owner obtaining significant financing from relatives is very unlikely because the wealth of the entrepreneur's kin is likely highly correlated with his own wealth. In other words, poor people tend to have poor relatives. Therefore, poor people have a limited borrowing capacity from their kin and still a higher probability of being financially constrained than wealthy people.

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<sup>13</sup>However, wealth may be subject to endogeneity (Hurst and Lusardi, 2004) and authors employing agent's wealth implicitly assume that the level of expected investment do not differ across individuals.

Concerning moneylenders, loans they offer have high fees and short terms, two characteristics which make these loans very unsuitable for launching a business. Moreover, we interviewed 250 clients of ACEP (see Chapter 4) and less than ten percent of clients used a loan from relatives or money lenders as an additional source of financing.

### 2.3.3 Methodology

To investigate whether financial constraint impact migration across sectors, we regress the decision of entrepreneurs to change sectors based on the level of their financial constraint and on additional control variables. Our baseline model is the following probit regression:

$$Pr(Y_i = 1) = \Phi(\alpha + \beta B_i + \Gamma \mathbf{X}_i) \quad (2.1)$$

where subscript  $i$  refers to firm,  $\Phi$  is the standard normal cumulative distribution,  $Y_i$  is a dummy equals to 1 if a firm created between 2008 and 2010 has changed sectors and 0 otherwise,  $B_i$  is first loan obtained by  $i$  (proxy of financial constraints) and  $\mathbf{X}_i$  is a set of control variables (discussed below). According to our framework, the initial level of financial constraint should affect the likelihood to migrate across business sectors. If the most financial constraint entrepreneurs are more willing to change sectors because they cannot invest the right level of capital, we expect that  $\beta < 0$ . In other words, entrepreneurs having larger loans have a lower probability to change sector. At the opposite, if migration costs are the main obstacle to migration, we expect that  $\beta > 0$ . Only the less constrained entrepreneurs are able to migrate to reach new opportunities.

A major pitfall concerns endogeneity. Unobserved individual's characteristics can influence both his will to change sector and credit access. To take into account this endogeneity issue, we run an instrumental model along with the simple probit model.

We employ two instruments. The first instrument is the average annual loan amount granted by the credit officer who accepts to finance the project. We expect that the average loan amount granted by the same credit officer in a given year is highly correlated with the amount of the individual's first loan (obtained the same year from the same officer).

Concerning instrument's relevance, by construction and because of credit officer's character (like his risk aversion or his years of experience for instance), individual's first loan and loans average granted by the same officer are correlated. Concerning the exclusion condition, this instrument is driven by supply-side factors and is therefore less subject to endogeneity issues that could arise from demand-side factors. Indeed, endogeneity sources due to clients localized in a same area, and who then could be affected by a shock inducing them to ask a small loan and to change sector, can be tempered given that credit officers' activity does not seem limited to a specific localization. As illustrated in Table 2.11, credit officers have a quite vast activity area. The median distance with their clients is 2 kilometers and the standard deviation is 6.2 kilometers. In Table 2.12 we can see that on average, credit officers seek out for clients on a 42.5 Km<sup>2</sup> area, that is half of the Antananarivo area (88 Km<sup>2</sup>). These two tables illustrate that credit officers are in relation with entrepreneurs who are quite dispersed and therefore are unlikely to have a similar propensity to change

sectors and ask for a small loan because of a common shock.<sup>14</sup>

The second instrument is the average loan amount granted to firms operating in the same sector during the same year. This variable is positively correlated with the individual's first loan amount because this instrument captures determinants of the loan size that are not related to the entrepreneur's characteristics. One might raise concerns about the exogeneity of this instrument if external shocks have impacted some sectors and not other sectors. However, Figure 2.4 in Appendix documents that we cannot clearly observe a trend from or to one sector. In addition, to ensure that our results are not driven by this instrument, we re-run instrumental variables method excluding the second instrument.

In all models, we add variables to control for individual characteristics such as the entrepreneur's gender and age. For instance, women or older borrowers may be more risk adverse while younger entrepreneurs may consider changing sectors more easily since they know they have a longer period to work. We also control for MSE characteristics by considering the firm size (number of employees) and the firm age when the first loan was obtained. Indeed, the size of the enterprise and the loan amount may be correlated: entrepreneurs who take out a small first loan may tend to migrate because the small size of their enterprise makes migration easier and not because they were financially constrained when they invested. Given that the longer the period between the firm creation and the first credit granting, the higher the likelihood that the entrepreneur changed sectors before he secured the credit from ACEP, and therefore the lower the probability of observing sectors change, it is necessary to control for the enterprise age.

We also try to control for unobservable characteristics such as entrepreneurial talent. Very talented entrepreneurs may have a better perception of profit opportunities and therefore a higher probability of changing sectors when an opportunity arises. At the same time, they may also be more productive and therefore need smaller external financing amounts, or they may more effectively convey their credit worthiness to lenders and thus obtain larger loan amounts. Thus, entrepreneurial talent and financial constraint appear to be correlated although the relationship between the two is unclear. We include three dummies to control for firms that outperform their counterparts who took out a loan and launched their business in the same year and in the same industry. We divide firms in each industry by quartile according to their level of profit in the year of creation and as controls we add dummies for firms in the second, third and fourth quartiles.<sup>15</sup> We believe that the initial performance of the firm gives us a good albeit imperfect proxy of entrepreneurial talent. Finally, one might expect that push factors (i.e., all exogenous shocks that can influence growth prospects in a sector, such as taxation, regulations, new competitors on the market, etc.) at the industry level can be important drivers of migration. We therefore include industry dummies to control for these aspects.

Finally, we add two additional variables to control for limits of our dependent variable. Detecting movers and stayers is not as simple as one might expect. On the one hand, some entrepreneurs launch activities simultaneously in different sectors, generally in order to diversify their sources of income. These are called "portfolio entrepreneurs". For instance,

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<sup>14</sup>These computations are based on 1,925 clients of the database localized by ACEP.

<sup>15</sup>Using dummies instead of values of profit allows us to control for outliers.

Paulson and Townsend (2004) document that 18% of households in Thailand have more than one business. Unfortunately, our dependent variable gives us no information on "portfolio entrepreneurs". To control for this issue, we create a dummy variable (portfolio) that takes the value of 1 if the firm operated in a third sector that is different from the initial and final sectors between its date of creation and 2014. Indeed, we might assume that persons who obtained loans for three different businesses in six years are in fact portfolio entrepreneurs who simultaneously created several businesses rather than entrepreneurs who subsequently "migrated" from one sector to another. The "portfolio" variable also takes the value of 1 if we observe that the entrepreneur started their business in sector A, invested in sector B, and then reinvested in sector A. We assume that this "back and forth" between two sectors indicates that the entrepreneur invested simultaneously, and not subsequently, in two sectors. It is important to distinguish these two types of entrepreneurs because we believe that they have different motivations (diversification for the "portfolio entrepreneur") and therefore different implications in terms of contribution to economic growth. On the other hand, we control for the number of years between the first observation (i.e. when the entrepreneurs obtained their first loan) and the final observation (i.e. when they obtained their last loan). This aspect is also very important because the shorter the period of observation, the lesser the probability of observing a migration. For instance, if a firm was created in 2008 and obtained its first loan in 2013, we have only two years of observation. If the entrepreneur did not change sectors, this may be due to the fact that they plan to do so later (therefore we would not be able to observe it) or because they did so before 2013 (again, we would not be able to observe this).

## 2.4 Results

### 2.4.1 Descriptive statistics

Before investigating in detail the determinants of migration, we provide some simple statistics. Descriptive statistics are presented in Table 2.1. We observe that 30.5% of firms created in 2008, 2009 or 2010 did not operate in the same sectors in 2014 (921 to 3,017) as they had initially. Regarding our variable of interest, the average loan is around \$600 but dispersion is wide.

We implement different t-tests to study whether movers and stayers differ. Results are reported in Table 2.2. Movers and stayers are broadly similar in their characteristics. When they obtain their first loan, their enterprises are the same size, in terms of number of employees, sales and in fixed assets. They also show similarities in terms of profitability and capital intensity. However, movers and stayers differ in terms of credit conditions. Movers have on average smaller loans that required smaller interest rates.

In the following section, we look at the dynamics of migration. To provide comprehensive statistics, we focus on the total number of migrations. Only four of our fourteen sectors (specialized trade, other services, construction and transport) ended up with a positive "net migration" as documented in Figure 2.3 in the Appendix.



Table 2.1: Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Migration	3,017	0.31	0.47	0	1
Initial Amount <sup>a,b</sup>	3,017	603.44	1,389	22.9	22,900
Period	3,017	1.87	1.22	0	6
Portfolio	3,017	0.07	0.26	0	1
Initial age (firm) <sup>b</sup>	3,017	2.33	1.40	0	6
Initial age (Ind) <sup>b</sup>	3,017	36.68	8.87	19	68
Gender	3,017	0.6	0.49	0	1
Initial size (# of employees) <sup>b</sup>	3,017	1.88	2.12	0	48
Benefice (quartile 2)	3,017	0.3 <sup>c</sup>	0.46	0	1
Benefice (quartile 3)	3,017	0.22 <sup>c</sup>	0.41	0	1
Benefice (quartile 4)	3,017	0.12 <sup>c</sup>	0.32	0	1

<sup>a</sup> Monetary values are in constant USD, where 1 USD = 3,144 Ariary.

<sup>b</sup> By "initial", we mean "at the time of the first loan".

<sup>c</sup> These variables are dummy equal to one if firm belongs to the quartile mentioned. Their are not equal to 0.25 because we computed these variables on the total sample and not only on the sample we used for regressions.

Table 2.2: T-test of individual variables

	Stayers	Movers	t-test
<b>Individual characteristics at the time of the first loan</b>			
Age (enterprise)	2.49	1.96	9.54***
Age (entrepreneur)	35.67	35.94	0.77
Gender	0.6	0.62	-0.88
<b>Firms characteristics at the time of the first loan</b>			
Employees	1.85	1.91	-0.72
Sales	1,333	1,208	0.89
Fixed assets	1,738	1,618	0.38
Net income	198.5	194	0.38
Profitability (net income/sales)	0.43	0.53	-0.72
Capital intensity (assets/employees)	917.5	1033	-0.84
Capital intensity (sales/assets)	21.8	21.4	0.72
<b>Information concerning the first loan obtained</b>			
Amount of first loan	643	513	2.36***
Maturity	385.03	382.15	1.98**
Interest rate	19.98	19.57	7.17***
Collateral (amount)	2.036	1.688	1.55*
Collateral (% of loan amount)	3.11	3.17	-0.92

Monetary values are in constant USD, where 1 USD=3,144 Ariary. Absolute value of t-tests are reported.  
\*, \*\*, \*\*\* indicate significance at 10, 5 and 1% respectively.

One might have expected that these "sectorial migrations" resulted from a structural transformation where entrepreneurs would leave low-productive and low capital-intensive sectors for more "modern sectors". However, this is not the case. We are unable to distinguish clearly "push sectors" (that is, sectors entrepreneurs would tend to leave) and "pull sectors" (that is, sectors entrepreneurs would tend to migrate towards) and therefore unable to identify specific "migration patterns". On the contrary, it appears that every sector experiences both departures and arrivals. For instance, the general trade and specialized trade sectors account for a large share of "emigrants" and "immigrants" as illustrated by Figure 2.3.<sup>16</sup> Therefore, sectorial migration appears to be a very complex phenomenon, with no particular pattern, as illustrated by the Figure 2.4 in the Appendix: all sectors gain/lose enterprises and "emigrant/immigrant" enterprises can represent a very large share of firms in any given sector.

### 2.4.2 Baseline model

The econometric results, of our baseline model are presented in Table 2.3. The first two columns show the results with and without the measure of financial constraint (total amount borrowed). In the last four columns we show results using instrumental variable methods to control for endogeneity. We report both the linear (two-stage least square) and non-linear model (IV-Probit) results.

When we do not control for endogeneity, the coefficient associated to the amount borrowed is negative and statistically significant. This result indicates that the higher the financial constraint, the higher the incentives to change business sectors. Increasing the level of the amount borrowed by one-standard deviation decreases by two percentage points the probability of migrating.<sup>17</sup> This level seems relatively high insofar as one third of firms created between 2008 and 2010 had migrated by 2014. Concerning other individual control variables, we find a positive effect of number of periods. Quite logically, the longer the observation period, the higher the likelihood of observing sector change for a MSE. The age of the firm is also strongly significant. The older the enterprise when the first loan is obtained, the lower the probability of changing sectors. This result may suggest that entrepreneurs changed sectors before obtaining their first loan. Another explanation is that the longer the period between the firm creation and the first loan, the smaller the observation period. Finally, owners of large firms (in terms of employees) seem more reluctant to migrate. However, this result is not always robust, especially when we control for the total amount borrowed.

These baseline results illustrate to what degree financial constraint may influence the decision for an entrepreneur to change business sectors. According to the theoretical framework (see Section 2.2), they would indicate that there are "constrained entrepreneurs", i.e., people who did not secure enough financing to invest in the sector they initially targeted.

<sup>16</sup>The same conclusions can be drawn if we consider these sector changes in relative number of firms by sector.

<sup>17</sup>Marginal effects in the Table 2.3 are reported for financial figures in 1,000 USD. The economic effect of a one-standard deviation is obtained as follows:  $\hat{\beta} \times \text{Std Dev.} = -0.014 \times 1.396 = 0.0194$

Table 2.3: Probit estimations: Baseline results

	Probit		Instrumentation			
	[1]	[2]	[3]	[4]	[5]	[6]
	Probit	Probit	2SLS	IV-Probit	2SLS	IV-Probit
First credit Amount		-0.014*** (-2.94)	-0.016** (-2.24)	-0.061** (-2.19)	-0.016** (2.15)	-0.061** (-2.10)
Period	0.0334*** (4.37)	0.0333*** (4.31)	0.0362*** (3.92)	0.1045*** (4.34)	0.0362*** (3.92)	0.1045*** (4.34)
Portfolio	0.0822* (1.80)	0.0839* (1.77)	0.0985* (1.93)	0.2675* (1.79)	0.0985* (1.93)	0.2673* (1.79)
Age (firm) <sup>a</sup>	-0.0334*** (-4.28)	-0.0329*** (-4.15)	-0.0327*** (-3.99)	-0.1028*** (-4.04)	-0.0327*** (-3.99)	-0.1029*** (-4.05)
Age (ind.) <sup>a</sup>	0.0002 (0.23)	0.0002 (0.24)	0.0003 (0.32)	0.0007 (0.23)	0.0003 (0.32)	0.0007 (0.23)
Gender	0.0030 (0.20)	0.0038 (0.26)	0.0047 (0.32)	0.0131 (0.28)	0.0046 (0.32)	0.0132 (0.28)
Size (# of employees) <sup>a</sup>	-0.0083*** (-2.13)	-0.0058 (-1.42)	-0.0047 (-1.25)	-0.0151 (-1.24)	-0.0047 (-1.26)	-0.0151 (-1.25)
Benefice (quartile 2)	0.0074 (0.36)	0.0087 (0.43)	0.0095 (0.48)	0.0289 (0.46)	0.0095 (0.48)	0.0289 (0.46)
Benefice (quartile 3)	0.0017 (0.09)	0.0062 (0.34)	0.0069 (0.37)	0.0250 (0.43)	0.0068 (0.37)	0.0249 (0.43)
Benefice (quartile 4)	0.0018 (-0.06)	0.0191 (0.55)	0.0256 (0.71)	0.0858 (0.75)	0.0255 (0.71)	0.0852 (0.75)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
# Obs	3,017	3,017	3,017		3,017	
Pseudo $R^2$	0.0855	0.0863	0.1053		0.1055	
Test for IV						
- Exogeneity			0.2452	0.3133	0.2517	0.3561
- Overidentification			0.8607			
F value of excluded instruments			4912.5		9747.46	

The dependent variable is a dummy equal to one if a firm has changed sector between its year of creation (2008, 2009 or 2010) and 2014. Probit specification is used in column [1] and [2], 2SLS in columns [3] and [5] and IV-probit in columns [4] and [6]. The set of instruments is the average loan amount granted by a same MFI's credit officer during the same year and the average loan offered for firms operated in the same sector in the same year (the second instrument is excluded in columns [5] and [6]). Marginal effects are reported (marginal effects for loan amount are reported for 1,000 USD). Standard errors are clustered at the industry-level and industry-dummies are included. \*, \*\*, \*\*\* indicate significance at 10, 5 and 1% respectively.

<sup>a</sup> Measured when the entrepreneur obtains his first credit from the MFI

As discussed in Section 2.3, a major pitfall in our approach concerns endogeneity issues. We employ two instruments. First, the average annual loan amount granted by the credit officer who serves the entrepreneur. We believe that the average loan amount granted by the credit officer in a given year is highly correlated with the size of the entrepreneur's first loan, due to officer characteristics (for instance, strong risk aversion). The second instrument is the average loan amount granted to firms operating in the same sector during the same year. This variable is positively correlated with the amount of the individual's first loan and not correlated with the decision of changing sector because this instrument captures determinants of the loan size that are not related to the entrepreneur's characteristics.

We report the results of the linear two-stage least squares and instrumental probit, in columns [3] to [6]. We run different specifications. Columns [3] and [4] include the two instruments discussed above. According to the usual tests, the instruments are both strong (F-value) and exogenous (overidentification test). The coefficients associated to the interest variable remain statistically and economically significant in both linear (column 3) and non-linear specifications (column 4). The fifth and sixth column include exclusively the first instrument. Indeed, one might expect that the second instrument (average loan offered to firms operating in the same sector during the same year) could be endogeneous. A shock in a sector in 2008 (such as an increase in input price or a new regulation) might affect the future profits of firms operating in this sector. In this case, the microfinance institution may be reluctant to provide a large loan and the entrepreneur may have an incentive to leave this sector. We do not believe that this issue is a real problem insofar as we control for industry shocks (dummies). Nonetheless, to be sure, we rerun our instrumentation excluding this instrument. As presented in columns [5] and [6], our results are not affected by excluding this instrument. Finally, the different instrumental specifications tend to reject the presence of endogeneity according to Wu-Hausman tests (linear models) and Wald tests of exogeneity (IV-probit models). In different specifications, we cannot reject the null hypothesis posing that instrumented and non-instrumented regressions provide statistically the same results. We, therefore, run additional robustness checks without taking into consideration the endogeneity issue.

### 2.4.3 Robustness checks

Our baseline results document that the smaller the financial constraint at the time entrepreneurs created their business, the smaller the likelihood of them changing sectors thereafter. We run a battery of sensitivity tests to gauge the validity of our baseline results. Results are reported in Table 2.4.

First, results can be driven by the model specification. We therefore employ a linear model (column [1]) and a logit model (column [2]), which does not alter our results. In addition, we withdraw all control variables (column [3]). Again, the results are quite similar.

We consider the initial amount borrowed as a good proxy for the degree of the entrepreneur's financial constraint based on the assumption that his personal income level and ability to secure external financing are positively correlated. In other words, the larger the entrepreneur's first loan, the wealthier we can assume that the entrepreneur was, and

therefore the lower his level of financial constraint when he launched his business. This assumption seems quite straightforward given that a potential borrower has to pledge a significant amount of collateral in order to secure a loan, even from an MFI. However, our hypothesis becomes more questionable as the time between the firm's starting year and the first credit year increases (see Table 2.10 in the Appendix). First, the entrepreneur may be unable to afford a substantial loan at the time they start their business and therefore not try and take out an initial small loan, but rather wait a few years to accumulate savings in order to obtain a bigger loan once their finances have become more stable. In this case, the borrower's first loan would not reflect financial constraints the entrepreneur faced when he launched his business. Secondly, the entrepreneur may not need external financing to launch his business. However, the business may subsequently decline and the entrepreneur may ultimately need to obtain a small loan. In this case, the business owners obtaining a first small loan would not necessarily indicate that they were financially constrained when their business was created. We face similar endogeneity issues if an entrepreneur started their business by resorting to a lender other than our partner MFI. To control for this aspect, in addition to employing instrumental variables, we created a sub-sample composed of entrepreneurs who obtained their first loan the same year they launched their business. Results, reported in column [4], are not affected by this change. We can even notice that the economic effect is stronger.

In addition, the impact of financial constraints should be higher for opaque firms with limited access to finance. We provide a test based on the age of the owner to confirm our hypothesis. An older business owner may have already developed a firm in the past or may have already contacted a microfinance institution to get a loan. By contrast, a younger business owner may face more financial constraints since he has had less time to accumulate his own capital. We distinguish between firms whose owner is "young" (below the median age of 35) and firms with older owners (above the median age). Empirical results tend to support our hypothesis (columns [5] and [6]). The effect of financial constraints matters only for the sub-sample of young entrepreneurs.<sup>18</sup>

One might argue that what we observe is the creation of a second enterprise by the same entrepreneur (or by someone else, with whom the entrepreneur is simply obtaining the loan) rather than a real move across sectors of a given enterprise. If this were the case, the interpretation of our results would be completely different. It is possible that financial constraints could increase a business owner's likelihood of developing activities in multiple sectors. In our baseline model, we try to provide a simple control for this possibility by including the portfolio variable (see above). Below, we present an additional test to be sure that we observe real moves across sectors rather than business diversification. Disentangling "real movers" to "portfolio entrepreneurs" is not simple with our data as for each loan request the borrower declares only one business sector, even if he exercises multiple businesses. Nonetheless, we expect that a real mover would report the new sector as his business in all future loan requests, whereas we expect a "portfolio entrepreneur" would report both his previous and new sectors sequentially.

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<sup>18</sup>Our results are unchanged if we use the first quartile age of 29 as threshold.

Table 2.4: Robustness checks

	Specification			1 <sup>st</sup> year
	[1]	[2]	[3]	[4]
First credit Amount	-0.058** (-2.40)	-0.035** (-2.27)	-0.046*** (-2.80)	-0.094*** (-2.73)
Controls	Yes	Yes	No	Yes
Industry dummies	Yes	Yes	Yes	Yes
Obs.	3,017	3,017	3,017	337
Pseudo $R^2$	0.100	0.135	0.110	0.090

	Age of the individual		Portfolio	Cohort 2008
	[5]	[6]	[7]	[8]
First credit Amount	-0.017*** (-3.49)	-0.009 (-1.23)	-0.013* (-1.74)	-0.058** (-2.32)
Controls	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes
# Obs.	1,504	1,513	2,278	1125
Pseudo $R^2$	0.0896	0.0959	0.238	0.086

Column [1] illustrates results with a linear model, column [2] with a logit model, column [3] without control variables, column [4] only for firms who obtained their first credit the year they have been created, column [5] for individuals below the median age of 35 and column [6] for individuals above this age, column [7] for a sample without portfolio entrepreneurs and people likely to be it, column [8] for firms created in 2008 only.

The dependent variable is a dummy equal to one if a firm has migrated between its year of creation (2008, 2009 or 2010) and 2014 for columns [1] to [8]. All models are estimated using a probit specification with the exception of columns [1] (OLS) and [2] (logit). Marginal effects for loan amount are reported for 1,000 USD. Standard errors are clustered at the industry-level and industry-dummies are included. Control variables include the following list of variables: period, previous change, portfolio, entrepreneur's age at the time of the first credit, gender, firm's age at the time of the first credit, size and profit (Q2, Q3 and Q4). \*, \*\*, \*\*\* indicate significance at 10, 5 and 1% respectively.

Based on this assumption, we drop firms that have a final sector that differs from the second-to-last sector. We therefore focus our attention on firms that applied for a loan for a business in a new sector for at least two consecutive years.<sup>19</sup> Our sample is thus reduced (2,278 observations instead of 3,017). While this is an imperfect test, we do exclude a large share of portfolio entrepreneurs. Our results, reported in column [7], point out that our conclusions are not altered.

Furthermore, to be sure that our findings are not driven by a specific sector, we exclude each sector of origin and run the baseline model. Results, unreported but available upon request, remain statistically and economically similar.

An additional potential weakness of our econometric strategy concerns the choice of a cohort of firms created between 2008 and 2010. We believe that using these firms allows us to compare a sufficient number of firms which face the same business environment. However, our results may be driven by the specific year of the cohort. To test the sensitivity of our results, we consider firms created in 2008.<sup>20</sup> For the subsample of firms created in 2008, we rerun our baseline model as well as instrumentation and the battery of sensitivity tests presented above. Our results are strongly robust insofar as the coefficient associated to financial constraint is always negative and statistically significant at the usual threshold (columns [8]).

A final concern of our econometric strategy is the risk of attrition bias given that certain firms disappear from the database and we are not able to know if they subsequently changed sectors or not. Indeed, for 52% of the firms (1,599 out of 3,017) we have no information for 2014, which means that these entrepreneurs stopped securing loans from our partner MFI, either because they did not seek additional financing or because the MFI refused to grant them another loan. Attrition bias may arise if the borrowers' non-renewal is caused by their level of financial constraint. For instance, highly financially constrained entrepreneurs may want to change sectors but face more difficulty repaying their loan and thus may be unable to afford or obtain a new loan. Conversely, non-financially constrained individuals may no longer need external financing and may seize an opportunity in another sector. We propose several tests to control for the possibility that the financial constraint influences the probability that an entrepreneur does not obtain a new loan. We create a dummy equal to one if data about a firm is available for 2014 and 0 otherwise. We regress the likelihood of observing information in 2014 to the borrower's financial constraint and all control variables. Results are reported in Table 2.5. The coefficient associated with the initial loan amount is not statistically different from 0 (column [1]), suggesting that a borrower's exit from the database does not depend upon the magnitude of their financial constraint. However, we face two different types of attrition from the database, i.e. failure

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<sup>19</sup>For instance, suppose that we have four observations for a firm operating in sector A. This firm is declared as a stayer if its sequence of sectors is as follows: (A, A, A, A); the firm is declared as a mover if its sequence is (A, A, B, B) or (A, B, B, B); finally the firm is excluded if the sequence is (A, A, A, B) because we cannot be sure that it is a real mover or a portfolio entrepreneur and if the sequence is (A, B, A, B) because this clearly indicates a portfolio entrepreneur.

<sup>20</sup>Due to the limited period of time, we cannot consider firms created after 2011 as an additional robustness test.

Table 2.5: Robustness checks - Attrition

	Attrition			
	[1]	[2]	[3]	[4]
First credit Amount	-0.007 (-0.75)	0.003 (0.07)	0.096 (0.53)	-0.009 (-0.98)
First credit Amount <sup>2</sup>		-0.0009 (-1.08)		
Period	0.1486*** (33.06)	1.1036*** (41.65)	0.2633*** (38.96)	0.2584*** (34.07)
Portfolio	-0.0472 (-1.61)	-0.2298 (-1.55)	-0.0686** (-2.39)	-0.0374 (-0.74)
Age (firm) <sup>a</sup>	0.2397*** (108.95)	1.0446*** (65.51)	0.2397*** (61.96)	0.2519*** (64.89)
Age (ind) <sup>a</sup>	0.0002 (0.27)	0.0011 (0.43)	0.0008 (0.55)	-0.0002 (-0.33)
Gender	-0.0151 (-0.85)	-0.0631 (-0.81)	-0.0170 (-0.96)	-0.0163 (-0.72)
Size (# of employees) <sup>a</sup>	-0.0482** (-2.11)	-0.0281** (-1.98)	-0.0278*** (-3.06)	-0.0088 (-1.39)
Benefice (quartile 2)	0.0503 (0.93)	0.0250 (0.85)	0.0276** (2.31)	-0.0067 (-0.17)
Benefice (quartile 3)	0.1977*** (3.14)	0.0630** (2.56)	0.0606* (1.96)	0.0301 (0.84)
Benefice (quartile 4)	0.1698** (2.02)	-0.0341 (1.46)	-0.0280 (-0.46)	0.0322 (0.67)
Industry-dummies	Yes	Yes	Yes	Yes
Obs.	3,017	3,226	1,454	1,563
Pseudo $R^2$	0.3838	0.4044	0.4085	0.368
F-test (joint test)		0.07		

Column [1] represents the likelihood of observing information in 2014 regressed on the borrower's financial constraint and all control variables, column [2] represents a quadratic specification to capture a U-shaped relationship between financial constraint and likelihood to exit the database, column [3] illustrates results on a sub-sample of firms whose the financial constraint is below the median value, and column [4] above the median value.

The dependent variable is a dummy equals to one if data for firms is available in 2014 and 0 otherwise for columns. All models are estimated using a probit specification with the exception of column [2] (OLS). Marginal effects for loan amount are reported for 1,000 USD. F-test in column [2] is a test of joint significance of amount and amounts squared. Standard errors are clustered at the industry-level and industry-dummies are included. \*, \*\*, \*\*\* indicate significance at 10, 5 and 1% respectively.

<sup>a</sup> Measured when the entrepreneur obtains his first credit from the MFI



and growth of the enterprise. In this case, we expect that the probability of exiting the database is positively related to financial constraint for the most constrained firms and negatively for the least constrained firms. We therefore use a quadratic specification to capture a U-shaped relationship between financial constraint and likelihood to exit the database (column [2]).<sup>21</sup> We also divide our sample in two sub-samples according to the median value of financial constraint (columns [3] and [4]). Our main results are unchanged in these different models. The level of financial constraint never explain a firm's withdrawal from the database.

#### 2.4.4 "Low-High" and "High-Low" movers

We argue that some entrepreneurs may prefer to invest in a sector requiring a higher initial investment but cannot do so due to their inability to obtain a sufficient amount of capital. Rather than fail or merely survive in their preferred sector, they may launch a business in a different sector with the intent of earning enough money to change sectors later. According to our hypothesis, as soon as they have accumulated enough money to invest the minimum amount required, these entrepreneurs migrate towards sectors requiring higher levels of entry costs.

To provide additional evidence, we classify sectors according to entry costs. It is worth noting that entry costs are complex and difficult for us to calculate. We therefore provide only an approximation of entry costs by reporting the level of median total assets<sup>22</sup> of MSEs that obtained their credit the year they were created (during 2008-2014, nb. obs. 732), which gives us an initial idea of how much financing an entrepreneur must invest to run a business in a given sector. We can observe a significant level of heterogeneity across business sectors. For instance, as illustrated in Figure 2.2 and Table 2.9 in the Appendix, renting, collection and transport sectors require nine times more assets than the catering, hairdressing and food processing sectors.

After ranking sectors according to the median amount of fixed assets, we study the pattern of migration across sectors. On the 921 movers, we observe that 456 (49.5%) migrated toward a higher entry cost sector (Low-High movers) while 465 (50.5%) did the opposite and migrated toward a lower entry cost sector (High-Low movers).

However, our conceptual framework explains only Low-High mover behaviors. Indeed, given that High-Low movers invest in a second sector with lower entry costs than the first one, we cannot assume that they were financially prevented from doing so since the beginning given that the second sector requires a lower first investment.

There are other reasons that can explain sector changes from a lower to a higher entry cost sector.<sup>23</sup> Of course, all of these reasons are important for explaining sector changes.

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<sup>21</sup>We use a linear model because we cannot directly infer the results by scrutinizing the signs of coefficients in a non-linear model (Greene, 2010). However, we also employ a probit model which does not alter our results.

<sup>22</sup>Total assets are defined as the sum of fixed assets and working capital

<sup>23</sup>For instance, entrepreneurs may be serial-entrepreneurs who are constantly looking for new profit opportunities and launch businesses successively if the profit of the business they currently practice is below a certain threshold (Plehn-Dujowich, 2010). The decision to change sectors can

For instance, if financially constrained entrepreneurs initially decide to reach their "first choice sector" ultimately, it is with the expectation of generating higher profits. However, we believe that their current profit is lower than expected because of the financial constraint, and not because of any type of "entry mistakes". As only Low-High movers are likely to have been financially constrained when they started their business, we expect that the initial amount of credit can explain only their decisions, and not those of the High-Low movers.

Firstly, we can compare the average first loan between Low-High movers and stayers. According to our conceptual framework, Low-High movers wanted to invest in a sector whose entry costs exceeded their initial investment capacity. Logically, we expect that their initial loan amount will be smaller than the initial average loan amount in the sector they initially wanted to invest in (that is, the sector where they launched their second business). Column [1] of Table 2.6 shows the average initial loan amount by sector (for all the sample) and column [3] for "stayers" only (i.e. entrepreneurs who did not change sectors). Column [2] indicates the average initial loan amount for Low-High movers. For instance, we can see that Low-High movers who create their second business in the collection sector obtained a loan on average 2.3 times smaller than "native entrepreneurs" (i.e. people who directly invested in the collection sector) and 3 times smaller if we compare to "stayers" only in column [4]. We can make a similar analysis for 11 out of 12 sectors.

As an additional test, we expect that financial constraint should be significant only for the Low-High movers and not for High-Low movers. In Table 2.7, we regress the probability for an entrepreneur to be a Low-High mover (column [1]), or to be a or a High-Low mover (column [2]), on the level of financial constraint and usual control variables. As expected, the first credit amount is significant only for Low-High movers<sup>24</sup>. These results tend to support our hypothesis that some of the sectoral changes we observe, especially those from lower to higher entry cost sectors, may be due to entrepreneurs initially prevented from investing in their first choice sector because of financial constraints.

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also result from "entry mistakes" because the entrepreneur underestimates competition (Cabral, 1997), overestimates the average profit in the sector (Bennett, 2010) or was simply "overconfident" in his capacity to perform (Camerer and Lovo, 1999). Finally, sectoral changes can also be driven by individual characteristics, such as boredom.

<sup>24</sup>Our result are not altered if we consider as entry costs measures the first quartile or the fifth centile of total assets by sector.

Table 2.6: "Low-High" and "High-Low" entrepreneurs, by sectors

	Average first loan of Low-High compared to average first loan of the total sample, by sector		Average first loan of Low-High compared to average first loan of "stayers", by sector	
	Total sample [1]	Low-High [2]	Stayers [3]	Low-High [4]
Hairdressing	294	NA <sup>a</sup>	281	NA <sup>a</sup>
Collection	1 023	440* (1,95)	1 325	440** (2,44)
Specialized trade	468	288 (1,43)	493	288 (1,50)
Construction	420	393 (0,33)	339	393 (-0,70)
General trade	507	333* (1,71)	522	333 (1,56)
Other services	616	374** (2,34)	547	374** (2,26)
Farming	291	268 (0,35)	289	268 (0,31)
Medium size manufacturing	372	198 (0,37)	293	198 (0,82)
Catering	366	221 (0,96)	525	221 (1,49)
Renting	416	539* (-1,90)	436 (-1,25)	539
Small size manufacturing	262	227 (0,53)	293 (0,82)	227
Liberal professions	2 701	926 (0,98)	8 001 (2,41)	926**
Food processing	465	NA <sup>a</sup>	633	NA <sup>a</sup>
Transport	1 600	1 064 (1,41)	1 658	1 064 (1,44)

t-student are in brackets. \*, \*\*, \*\*\* indicate significance at 10, 5 and 1% respectively. Figures are expressed in US dollars.

<sup>a</sup> Because the hairdressing and food processing sectors have very low entry costs, they have not "received" Low-High entrepreneurs, i.e. people who left sectors with lower entry costs.

Table 2.7: Probability of changing sectors among "Low-High" and "High-Low" entrepreneurs

	Low-High entrepreneurs [1]	High-Low entrepreneurs [2]
First credit Amount	-0.027*** (-2.92)	-0.002 (-0.38)
Period	0.0134** (2.13)	0.0188*** (2.97)
Portfolio	0.0384 (1.58)	0.0606* (2.56)
Age (firm) <sup>a</sup>	-0.0171*** (-3.08)	-0.0165*** (-2.92)
Age (ind.) <sup>a</sup>	0.0005 (0.72)	0.0007 (1.00)
Gender	0.0106 (0.79)	-0.008 (-0.60)
Size (# of employees) <sup>a</sup>	0.0053 (1.64)	0.0017 (0.50)
Profit (quartile 2)	0.0204 (1.29)	-0.0175 (-1.09)
Profit (quartile 3)	0.0205 (1.14)	-0.0088 (-0.49)
Profit (quartile 4)	0.0388 (1.57)	-0.0172 (-0.70)
# Obs	3017	3017
Pseudo $R^2$	0.0217	0.0245

The dependent variable is a dummy equal to one if an entrepreneur has invested in a sector with higher entry costs than his first one (for the column "Low-High entrepreneurs") or in in a sector with higher entry costs than his first one (for the column "High-Low entrepreneurs"). Marginal effects are reported (marginal effects for loan amount are reported for 1,000 USD). \*, \*\*, \*\*\* indicate significance at 10, 5 and 1% respectively.

<sup>a</sup> Measured when the entrepreneur obtains his first credit from the MFI.

## 2.5 Conclusion and policy implications

Using an original database of over 3,000 micro and small enterprises (MSEs) that were microfinance institution (MFI) clients in Madagascar over the period of 2008-2014, we observe that around one third of these entrepreneurs changed business sectors in the first five years after starting their business. While the literature would explain this phenomenon by serial entrepreneurs driven by profit or by entry mistakes in a given sector, we suggest another explanation. We find a significant negative relationship between the size of the first loan secured from the MFI and the probability of a borrower changing business sectors. This result survives multiple robustness checks, including treatment for endogeneity and attrition. We interpret this result in terms of financial constraints that prevent small entrepreneurs from investing in the sector they want. Because of limited opportunities in the job market, these individuals are "forced" to start their own businesses even in a second choice sector, and therefore change sectors as soon as they can. Literature on the relationship between entrepreneurship and financial constraints is abundant, but to our knowledge, we are the first to document these "sectorial migrations" and to suggest that they may be due to financial constraints.

Our results shed light on the composition of entrepreneurship and challenge the classic distinction made between "necessity entrepreneurs" and "opportunity entrepreneurs". Indeed, we believe that the financially constrained entrepreneurs we are studying can be considered both as opportunity driven entrepreneurs, as they want to start an enterprise, and as necessity entrepreneurs because they are "forced" to invest in a second-choice sector (due to financial constraint and a lack of job opportunities) while they may have preferred employment. Accordingly, necessity entrepreneurs may simply be reluctant to work in a sector by default rather than reluctant to run a business *per se*. As already suggested by [Block and Sandner \(2009\)](#), necessity entrepreneurs cannot be defined as simply lacking in business talent and could have as much growth potential as "opportunity driven" entrepreneurs if they were able to run the activity for which they are the most motivated and therefore the most suited.

This observation raises interesting questions about the allocation of entrepreneurial talent. One third of entrepreneurs in our sample (921 out of 3,017) changed sectors and at least half of them may have done so because they were financially constrained initially. Ensuring a good match between an individual's aspirations and his activity endeavors is a cornerstone of economic development. According to our theoretical framework, the "sectorial migrations" we observe illustrate both an initial mismatch and a "re-matching" given that "migrating entrepreneurs" ultimately reach the "promised sector". However, it does not mean that every constrained entrepreneur ultimately manages to change sectors or that this initial mismatch did not result in a loss of growth and happiness for the entrepreneur. Therefore, reducing this mismatch is a valuable field of work for development practitioner, especially those of the microfinance sector.

Rapidly and accurately identifying constrained entrepreneurs in order to reduce the time they take to reach their first choice sector is an important goal. Credit officers could screen their clients in order to identify potential "migrating entrepreneurs" and adapt their

financing to their specific needs. For instance, [Field et al. \(2013\)](#) have documented that granting loans with longer maturity terms, and even a grace period, could allow people to make longer-term investments.

However, helping entrepreneurs to invest in the right sector from the beginning could be better than allowing them to change sectors. It raises the question of start-up financing which is one of the riskiest parts in business, but also when financial constraints may have the most critical incidence given that it may induce people to invest in sector that is inappropriate or unsuited to them. MFIs may want to develop specific methodology in order to avoid mismatching. For instance, they could implement an in-depth screening-phase during which credit officers help the would-be entrepreneurs to make his business plan and assess his ability to run a business. In a recent study, [McKenzie \(2015\)](#) finds that business plan competition is an effective tool for identifying the most talented entrepreneurs, and that winning firms (which received financial award) experience larger growth rates in sales, profits and employment.

Of course, a complete answer to questions raised by these observations would require more detailed information on entrepreneurs (especially their education, family background and social aspirations) in order to tell with certainty what their first choice sector may have been. Much more work is also needed to understand more precisely how credit influences the choice of the first activity and sector changes. Indeed, we consider the amount borrowed as a proxy of financial constraint but are not able to identify its role in the migration given that we have information only on entrepreneurs who obtained a loan. Finally, observing whether sectorial migrations occur in other contexts (with different constraints on the credit and job markets) is also a very interesting avenue for future works.

## 2.6 Appendix

Table 2.8: Classification by sectors, subsectors and activities

Sectors, subsectors and activities				
Sector	Subsectors	activities	Nb. Obs.	Share
Agricultural	Farming	Small farming	14	0.5%
		Market gardening	297	9.9%
		Cattle farming	82	2.7%
Services	Hairdressing	Hairdressing	50	1.7%
	Collection*	Collection	52	1.7%
	Construction	Construction	48	1.6%
	Catering	Catering	73	2.4%
	Renting and fixing**	Renting and fixing	136	4.5%
	Liberal professions	Liberal professions	28	0.9%
	Transport	Transport	284	9.4%
	Other services	Other	245	8.1%
		Cleaning	2	0.1
Trade	General Trade	General Trade	308	10.2%
	Specialized Trade	Specialized Trade	1,091	36.2%
Manufacturing	Small manufacturing	Craft (art, painting, sculpture)	30	1.0%
		Jewelery	12	0.4%
	Medium manufacturing***	Equipment manufacturing	49	1.6%
		Textile manufacturing	119	4.0%
		Woodworking	30	1.0%
	Food processing	meal, milk, rice, grains, oil	67	2.2%

\*"Collection" is a sector that consists of gathering the production of farmers in rural areas and bringing it to the markets in cities.

\*\*"Renting and repairs" is an activity consisting in fixing, and occasionally renting, vehicles, machinery and devices, like electrical household appliances and small electronic devices.

\*\*\*By specifying "medium manufacturing", we mean to make the distinction from small manufacturing without implying that MSEs do "heavy manufacturing" such as mining, industrial machinery or metal refining.

Table 2.9: Entry costs across sectors

Sectors	5th centile of total assets <sup>a</sup>	25th centile of total assets <sup>a</sup>	50th centile of total assets <sup>a</sup>
Renting/fixing	1,064	1,825	3,041
Collection	942	999	2,602
Transport	196	1,090	2,166
Liberal professions	366	634	2,056
Other services	229	811	1,457
Construction	253	901	1,053
Small manufacturing	108	214	867
General trade	147	426	797
Farming	236	439	693
Specialized trade	166	292	630
Medium manufacturing	118	229	448
Catering	65	193	304
Hairdressing	54	166	295
Food processing	85	196	287

<sup>a</sup> Total assets is the sum of fixed assets and working capital, in USD. We consider as a measure of entry costs the average total assets of MSEs that obtained their credit the year they have been created (2008-2014), by sector, nb. obs. 732.

Figure 2.2: Total assets (fixed assets + working capital) median of MSEs that obtained their credit the year they have been created (2008-2014), in USD

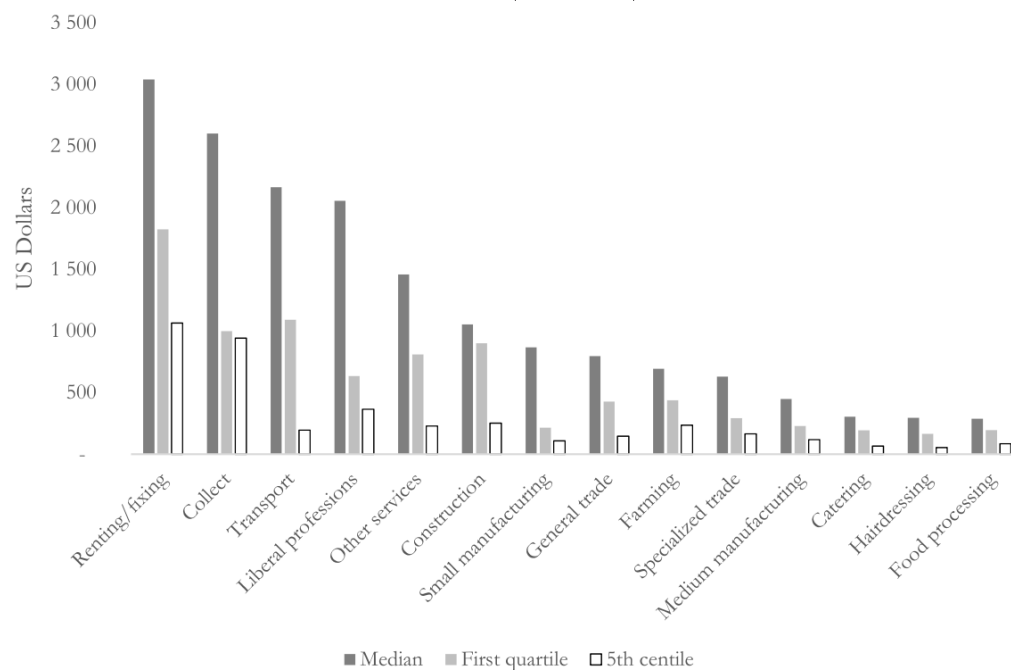




Table 2.10: Sample breakdown according to the first and last credit year

MSE starting year	MSEs breakdown according to the year of the first credit obtained from the MFI							Total
	2008	2009	2010	2011	2012	2013	2014	
2008	161	155	152	252	243	155	7	1125
2009		103	132	328	274	228	20	1085
2010			91	243	282	180	11	807

MSE starting year	MSE breakdown according to the year of the last loan obtained from the MFI							Total
	2008	2009	2010	2011	2012	2013	2014	
2008		30	65	64	193	342	431	1125
2009		1	11	70	184	247	572	1085
2010				20	119	253	415	807

Table 2.11: Distance between MFI clients and their credit officer, by city

	Mean <sup>a</sup>	Median <sup>a</sup>	Std. Dev. <sup>a</sup>	Minimum <sup>a</sup>	# of entrepreneurs
Mahajanga	2.1	2	1.5	0.2	132
Tsaramandroso	1.8	1.1	2.1	0.11	108
Antananarivo (1st arrondissement)	3.7	2.2	10.4	0.03	122
Antananarivo (2th arrondissement)	5	2.1	21.6	0.19	96
Antananarivo (4th arrondissement)	4.8	2.5	15.3	0.05	69
Antananarivo (6th arrondissement)	1.5	1.1	1.4	0.06	64
Ambohitrimanjaka	6.2	6.6	2.6	0.82	12
Ivato Ambohibao	5.8	3.6	10.5	0.14	73
Ambohimangakely	3.3	2.9	4.2	0.2	105
Ankadikely Ilafy	2.9	2.5	1.8	0.49	109
Tanjombato	5.5	2	13.3	0.15	74
Ambatolampy	3	0.9	13.1	0.01	86
Ambohimandroso	12.3	15.2	6.2	0.18	27
Soamalaza Mahatsinjo	6.7	2.1	17.7	0.13	408
Ambositra I	1.5	0.7	3	0.1	60
Tanana Ambany	6.6	1.7	20.9	0.12	191
Moramanga	1.9	1.9	0.6	1.47	2
<b>All sample</b>	<b>3.7</b>	<b>2.1</b>	<b>6.2</b>	<b>0.14</b>	<b>1738</b>

<sup>a</sup> Distances are in kilometers.

Table 2.12: Average and median surface of activity for credit officers, by city

	Average surface (in Km <sup>2</sup> )	Mediane surface (in Km <sup>2</sup> )
Antananarivo (1st arrondissement)	37.9	34.7
Antananarivo (2th arrondissement)	33.3	27.5
Antananarivo (4th arrondissement)	58.3	32.1
Antananarivo (6th arrondissement)	18.8	18.9
Mahajanga	14.1	13.8
Tsaramandroso	22.7	14.6
Ambohitrimanjaka	42.2	42.2
Ivato Ambohibao	131.9	131.9
Ambohimangakely	31.2	14.6
Ankadikely Ilafy	48.7	51.9
Tanjombato	25.8	32.3
Ambatolampy	12.9	12.9
Ambohimandroso	75.4	75.4
Soamalaza Mahatsinjo	65.4	53.8
Ambositra I	12.2	12.2
Tanana Ambany	41.8	21.3
<b>All sample</b>	<b>42.5</b>	<b>31.3</b>

Figure 2.3: Proportion of "emigrants MSEs" and "immigrants MSEs" by sector\*

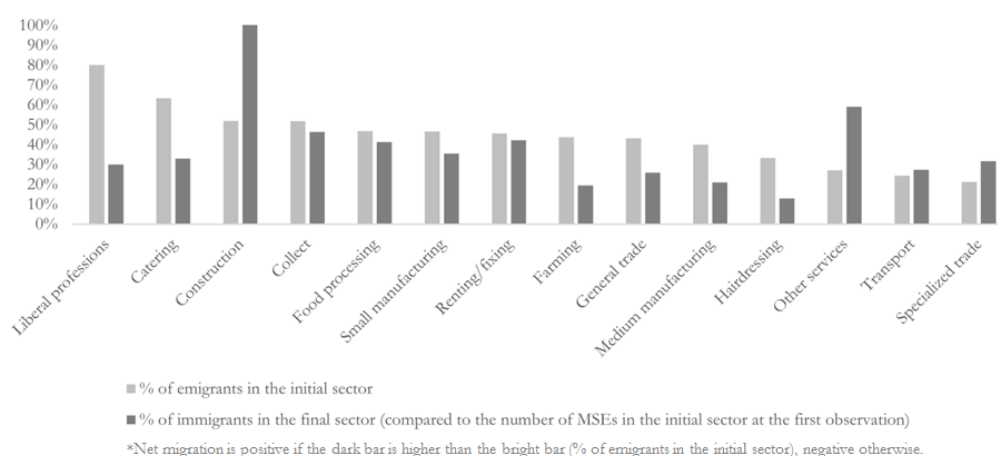


Figure 2.4: Sectorial migrations between 2008 and 2014



# Do Banks and Microfinance Institutions Compete?

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**Résumé<sup>1</sup>**

Dans cet essai, nous nous intéressons à la concurrence qu'il peut avoir entre institutions de microfinance (IMF) et banques commerciales. Plus précisément, nous étudions si la qualité d'un crédit obtenu par le client d'une IMF est influencée par la distance entre celui-ci et une agence bancaire. Nous utilisons la base de données clients d'une IMF malgache regroupant 28 760 crédits accordés sur la période 2008-2014. Nous trouvons que plus un client est situé à proximité d'une agence bancaire, plus les caractéristiques des crédits obtenus seront avantageuses (montants plus élevés, plus faible collatéral demandé), toutes choses égales par ailleurs. Nos résultats sont significatifs uniquement pour les banques ayant développé des produits à destination des petites entreprises et pour les clients dont l'activité est la plus formalisée. Nous interprétons ces résultats comme des signes de concurrence entre IMF et banques commerciales, et en discutons les implications en termes de réduction de la contrainte financière.

**Abstract**

Using an original panel dataset of 28,760 loans granted by a microfinance institution (MFI) in Madagascar over the period 2008-2014, we investigate whether MFIs and commercial banks compete. We study whether bank proximity influences loan conditions obtained by MFI clients. We find that the shorter the distance of a bank to a given MFI borrower, the larger the loan obtained and the less collateral required. These results are significant only for banks who have adopted a downscaling strategy and for the least opaque clients (i.e., larger and older enterprises). We interpret these effects in terms of competition.

*Keywords:* Microfinance, Banks, Competition, Loan conditions, Mission drift

*JEL classification:* G21, O16

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<sup>1</sup>Cet essai est issu d'un travail collaboratif avec Florian Léon.

*Nous remercions Mialy Ranaivoson et Nathanielle Razaniajatovo pour leur aide dans la localisation des agences bancaires, et Olivier Santoni pour son aide dans l'utilisation du logiciel de Système d'Information Géographique (QGIS). Enfin, nous remercions la Banque Centrale de Madagascar pour les données partagées.*

### 3.1 Introduction

Limited access to formal credit is a major growth constraint for developing economies, especially for small firms (Beck et al., 2006b) and microenterprises (De Mel et al., 2008a; McKenzie and Woodruff, 2008; Banerjee and Duflo, 2014). Since the 1970s, microfinance has emerged as a powerful tool to reach borrowers excluded from the formal financial system (Armendáriz and Morduch, 2010). Microfinance can be conceived as a response to market failures in capital markets, filling the gap between moneylenders who charge usurious interest rates and commercial banks<sup>2</sup> who are unwilling to provide financing to people in poverty.

A common viewpoint states that MFIs and commercial banks operate in segmented markets. MFIs target low-income people excluded from bank financing due to the lack of collateral or insufficiently size financing needs. However this view, often called the "market failure" hypothesis, has recently been challenged by new competitive strategies developed by both MFIs and commercial banks. On the one side, a number of MFIs have adopted a "scaling-up" process and developed their range of services to match the growing financial needs of small businesses. This "upscaling" strategy has resulted in MFIs targeting more affluent borrowers and, in certain extreme cases, MFIs have changed their legal structure to become commercial banks as in the case of Prodem in Bolivia, Bandhan in India or Microcred (and Sipem more recently) in Madagascar. On the other side, some commercial banks have begun to target smaller firms by developing special products or by acquiring microfinance institutions. This "downscaling" process seems to have begun in Latin America in the 1990's and has since experienced significant growth in other area of the world (Valenzuela, 2002; Bell et al., 2002; Ferrari and Jaffrin, 2006).<sup>3</sup> We can, however, assume that there is no competition between MFIs and commercial banks in spite of these trends if MFIs still focus on opaque clients that banks are not able to screen and monitor (mainly because of high opacity among clients and unadapted lending technologies on the part of banks).

Which of these views (the market-failure or the competition hypothesis) best describe what is really going on remains an open question. Only a handful of papers have analyzed the relationship between MFIs and banks, and how it may be affected by upscaling and downscaling strategies. Hermes et al. (2011) document that MFIs perform better in countries where the formal financial system is more highly developed. Vanroose and D'Espallier (2013) show that MFIs reach more clients and are more profitable in countries where the formal banking sector is less developed, in line with the *market-failure hypothesis*. However, they also point out that MFIs grant smaller loans in well-developed financial systems, more in line with the *competition hypothesis*. Cull et al. (2014) extend the previous research

<sup>2</sup>For the reminder of this article, the terms "commercial bank" and "bank" are used interchangeably to refer to formal lenders (i.e., registered financial entities) which do not offer financial products or use lending techniques designed specifically to target poor populations.

<sup>3</sup>It is worth noting that in both cases, MFIs and commercial banks can theoretically benefit from each other. On one side, banks provide financial services useful for MFIs, such as financing or lending technology transfer. On the other side, MFIs support financial inclusion which ultimately benefits banks. This mutual benefit helps to explain the development of closer ties between banks and MFIs observed in different countries.

and provide support for the competition view. They show that the development of commercial banks gives MFIs, especially commercially-oriented ones, incentives to explore new market niches (e.g. smaller loans, lending to women). [Brown et al. \(2016\)](#) adopt a complementary strategy by investigating the impact of MFI expansion on financial inclusion in South-Eastern Europe. They document that the openness of an MFI branch increases the share of banked households even in areas which are well served by ordinary retail banks.

In this paper we complement existing literature by investigating if and how competitive pressure induced by a bank's presence affects loans offered by an MFI. We use a rich data set containing 28,760 loans from 2008 to 2014 provided by ACEP, a major MFI operating in Madagascar. Madagascar is a perfect testing ground for our subject for several reasons. First, the partner MFI initiated its upscaling strategy a few years ago by offering loans with an upper-limit of \$38,000. Second, there is a very diverse landscape of commercial banks where some banks have adopted "downscaling" strategies (Bank of Africa), while others have focused only on microfinance products (Access Banque) or are former MFIs that have become commercial banks but still target small borrowers (Microcred in 2010 and SIPEM in 2014). Finally, a large number of Madagascar's commercial banks (seven out of twelve) have not initiated any particular downscaling strategies.

We study whether bank proximity impacts credit conditions faced by clients of ACEP. We consider four measures of loan conditions (total loan amount, maturity, interest rate, and collateral requirements). We assume that the distance between each MFI client and the closest commercial bank branch is a good measure of competitive pressure induced by the bank's presence. Indeed, due to transportation and informational costs, the probability of a MFI client being wooed by a commercial bank increases as the distance between the client and commercial bank decreases. Inclusion of individual fixed-effects allows us to control for unobserved characteristics that could impact distance and credit conditions. We find that bank presence improves loan conditions. All things being equal, firms in the vicinity of a bank can secure larger loans with less collateral from a MFI. Competitive pressure is harsher if we consider the less opaque clients (the largest and the oldest) and only banks who engage in a downscaling strategy.

Our work contributes to three strands of the literature. First we complement existing papers ([Hermes et al., 2011](#); [Vanroose and D'Espallier, 2013](#); [Cull et al., 2014](#)) regarding how bank development affects the business of MFIs. Competition induced by bank presence could result in two effects. First, the competitive pressure induced by the expansion of commercial banks could motivate MFIs to attract new clients, especially those who are not wooed by banks (i.e., the most *opaque*). This effect is called the *extensive margin* effect. Second, competition may also induce MFIs to offer better loan conditions in order to retain clients and attract new ones. This is referred to as the *intensive margin* effect. In this paper, we concentrate our analysis on the *intensive margin* effect, while existing literature focuses on the extensive margin effect.<sup>4</sup> Our work indicates that bank competition impacts

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<sup>4</sup>One exception is [Cull et al. \(2014\)](#) that consider how bank presence impact average interest rates. Ideally, we would complement our study by an analysis of extensive margin. Unfortunately, a consistent investigation would require that we have access to a survey of borrowers and non-borrowers as in [Brown et al. \(2016\)](#). These data are not available in Madagascar, and we also face a problem of identification.

not only the pools of clients but also conditions faced by incumbent clients.

Second, we focus on one country. Cross-country investigations done previously provide some insights but also raise concerns about identification. For instance, unobserved factors, such as improvement in the transportation and communication infrastructure or new financial regulations, may affect both bank development and MFI outreach. Using data from one country enables us to control for all of these factors. It is also hard to disentangle the competitive effect and the spillover effect in cross-country studies. Indeed, expansion of a bank network can induce spillovers for MFIs. For example, it is easier for MFIs to transfer funds from a central agency to remote regions if banks open branches in remote areas. Bank expansion may reduce management costs for MFIs and explain why they are able to serve less affluent clients. Focusing on one institution permits us to concentrate on the competitive effect insofar as spillover effects occur at the institution-level.

Our paper also adds to a scant body of literature that investigates the determinants of loan terms in microfinance. Some papers have addressed this issue in the context of banking (Brick and Palia, 2007; Degryse et al., 2009). To our knowledge, only Behr et al. (2011) have seriously investigated it in microfinance. They study the implications of the lending relationship on collateral requirements and interest rates and document that the lending relationship alleviates collateral requirements. We confirm this finding. We also show that larger loans are also longer-term and less collateralized. In addition, the age of the firm has an unexpected impact: older firms tend to have access to smaller loans at higher costs (higher interest rate and higher level of collateral requirements). This may reflect the fact that older firms invest in riskier endeavors.

Finally, our article also sheds light on the potential "mission drift" induced by upscaling strategies among MFIs. Evidence of mission drift in the microfinance industry as a whole is limited (Cull et al., 2007; Mersland and Strøm, 2010) and previous works cannot really tell if offering larger loans resulted in crowding out the poorest borrowers (Armendáriz and Szafarz, 2011).<sup>5</sup> Our results illustrate a more concrete aspect of mission drift. They show that harsher competition induced by bank proximity motivates MFIs to offer better loan conditions to less opaque clients (i.e., the largest and oldest). Therefore, we can legitimately assume that these clients could be eligible for a loan from a commercial bank and that MFIs are targeting "bankable" clients. In other words, the upscaling strategy launched by MFIs could be viewed as a substitution for bank financing and not as a direct decrease in credit rationing for "unbankable" people. Obviously, knowing whether an MFI's upscaling strategy, and more generally competition between MFIs and banks are good for economic growth is far beyond the scope of our article. However, we aim to bring some additional insight to bear on the question.

The remainder of the paper is organized as follows. Section 3.2 exposes the conceptual framework. Section 3.3 presents the data and variables and Section 3.4 the econometric methodology. Section 3.5 displays the results. The final section concludes.

<sup>5</sup>Average loan size used as a proxy of poverty outreach does not allow for distinction between inherent microfinance characteristics, such as progressive lending and cross-subsidization, and mission drift.



## 3.2 Conceptual framework

### 3.2.1 The *intensive margin* hypothesis

As we have highlighted, MFIs and banks in Madagascar have begun to offer comparable loans and are both converging towards the financing of a new target group: small enterprises with high financing needs. Our aim in this paper is to investigate whether both intermediaries compete. We are particularly interested to know if competition induced by bank presence influences loan terms offered by MFIs. A body of literature has documented that competition between banks impacts loan rates (Degryse et al., 2009) or other loan components such as collateral requirements (Hainz et al., 2013) or loan amount (Chong et al., 2013). Baquero et al. (2012) has investigated this question in the case of competition among MFIs indicating that loan rates are sensitive to competition for commercial MFIs. However, to our knowledge no paper has investigated how competition from banks affects MFIs. According to the *intensive margin* effect, we assume that in case of competition, the MFI will improve its offers in order to retain its current clients as well as to attract new ones.

A critical step consists in defining a good measure of competition pressure induced by banks for MFI clients.<sup>6</sup> Recent papers (Degryse and Ongena, 2005; Bellucci et al., 2013) have employed distance between a borrower and the closest alternative lender to proxy competition. In this article, we follow the same vein and argue that the distance between each client of ACEP and the closest commercial bank branch is a good proxy of bank competition pressure.

The distance between an MFI client and the closest commercial bank branch influences both transportation costs, as in location differentiation models (Hotelling, 1990; Salop, 1979), and information asymmetry. For the lender, higher distance results in higher monitoring costs (Sussman and Zeira, 1995) and more difficulty in assessing the borrower's trustworthiness (Hauswald and Marquez, 2006). For the borrower, higher distance results in higher prospecting costs as it decreases their awareness of the availability and conditions of the loans offered (especially in the absence of advertising as may be the case in developing countries) and increases the cost of information (as it takes more time to reach the nearest branch). Therefore, we consider that the probability of MFI clients being wooed by a commercial bank increases as the distance between MFI clients and commercial bank decreases.<sup>7</sup> We therefore make the following hypothesis:

#### Hypothesis 1

*All else equal, the closer bank branches are located to MFI clients, the higher the competition generated and therefore the more favorable the loan conditions obtained by the MFI clients.*

<sup>6</sup>Banking literature employs different measures of competition using market structure or inferred behaviors (Leon, 2015).

<sup>7</sup>These statements are especially true considering that regular banks do not use wandering credit officers to prospect clients in a large area but are rather directly solicited by customers.

We can identify four loan characteristics on which competition may have an influence and that we are able to measure: loan amount, interest rate, duration and collateral required.<sup>8</sup>

First, we can focus on credit amount. Due to high information asymmetry and a poor institutional framework in Madagascar, we can assume that MFI clients do not obtain as much financing as they would like, even if they are willing to pay a higher interest rate. To assess whether borrowers are liquidity rationed, ideally we would know if they desired more credit at the current market rate and did not obtain it despite willingness to pay a higher interest rate and/or put up more collateral (Angelini et al., 1998). Unfortunately, we do not have this information. However, we believe that, all else equal, competition induced by commercial banks may in fact give MFI clients greater bargaining power and enable them to better negotiate their loan terms and obtain larger loan amounts.

Second, competition induced by a commercial bank could also force an MFI to lower their interest rates. For instance, Degryse and Ongena (2005) and Bellucci et al. (2013) document that interest rates decrease with the distance between the borrower and other competing banks. The same thing could be true for MFI clients.

Third, duration of the loan could also be influenced by the competitive pressure induced by banks. As illustrated by Field et al. (2013), micro and small entrepreneurs are also constrained both by the maturity of their loan and by the lack of grace period. Therefore, we could imagine that MFI clients wooed by commercial banks try to secure longer-term loans from the MFI.

Finally, competition could also influence the collateral pledged by the borrower. Collateral is used by banks to handle information asymmetry, either as a screening device or as an incentive for the borrower to behave properly.<sup>9</sup> As documented by Behr et al. (2011), collateral is widely used by MFIs to overcome information asymmetry. They find that collateral requirements drop significantly over time in the lender-borrower relationship, i.e., after a reduction of the information asymmetry. We believe that lenders may choose to lower the collateral-to-loan ratio in order to retain current borrowers or attract new ones, because this allows clients either to obtain a larger loan or to decrease the consequences in case of default.

MFIs can also change the collateral composition. We can broadly identify two types of collateral, i) personal guarantees which involve a third-party who agrees to pay back the loan in case of default, ii) material securities which are the assets that lenders will seize in order to recover their losses in case of default. Because pledging collateral in the form of material securities poses a direct risk to the borrower, they may prefer avoiding this.<sup>10</sup>

<sup>8</sup>There may be other ways for the MFI to compete, such as with the quality of its services, commercial advice dispensed by credit officers, application costs and time etc. Unfortunately, our database does not allow us to consider these aspects.

<sup>9</sup>See (see Coco, 2000; Steijvers and Voordeckers, 2009), respectively for a survey on the theoretical and empirical literature about the use of collateral.

<sup>10</sup>For instance, studying small farm producers determinants of applying for a bank loan, Boucher et al. (2008) document that an individual may be "risk rationed", that is, denied credit because he considers the eventual loss of his property too detrimental, especially in the context of the absence of an insurance market.

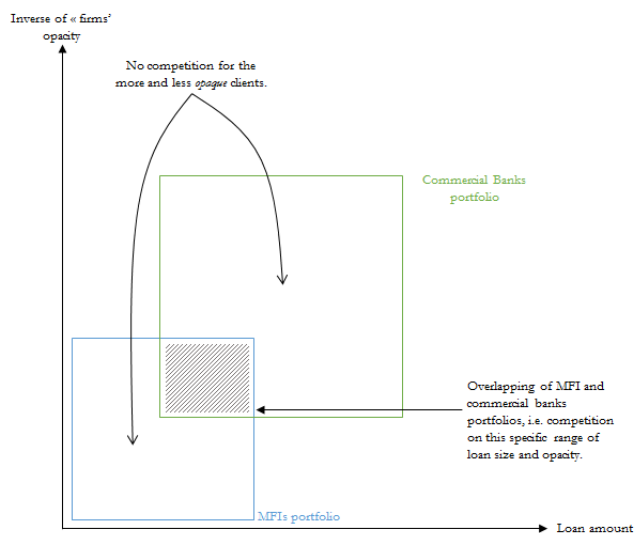
Therefore, we could expect that harsher competition induced by the proximity of a bank branch would lower the share of material security in the collateral pledged by the borrower.

### 3.2.2 The borrower's level of opacity

To summarize, we hypothesize that if MFIs and banks compete, it will result in better loan conditions for MFI clients. However, upscaling and downscaling strategies, respectively initiated by MFIs and banks, state that these two intermediaries are converging toward the financing of the least opaque micro and small enterprises (MSEs), or more precisely largest and oldest MSEs. Smaller and younger firms have more difficulty signaling their credit worthiness and are therefore more creditrationed (Beck et al., 2006b; De Mel et al., 2008a; McKenzie and Woodruff, 2008; Banerjee and Duflo, 2014). We can thus imagine that even if regular banks have begun to target small enterprises in addition to medium and large ones, they still do not utilize the most appropriate lending technologies to target the most opaque firms. Moreover, as lending is a "fixed costs activity", it is highly unlikely that a bank would continue the downscaling process by granting smaller and smaller loans that entail increased screening and monitoring costs and thus less profit. On the other hand, by the same token, if MFIs began to target larger enterprises, their financing limit (regulatory or not) and higher interest compared to those of banks, would prevent them from targeting larger enterprises.

Therefore, as illustrated by Figure 3.1, pools of MFI and bank clients overlap only on a small area (the hatched area) and competition should not be observable for the most and least opaque firms which are only targeted by MFIs and commercial banks, respectively.

Figure 3.1: Portfolio overlap depending on borrowers opacity



As a result, we make the following hypothesis.

#### Hypothesis 2

*The larger and older the enterprise (i.e., the less opaque), the harsher the effects of competition induced by bank proximity.*

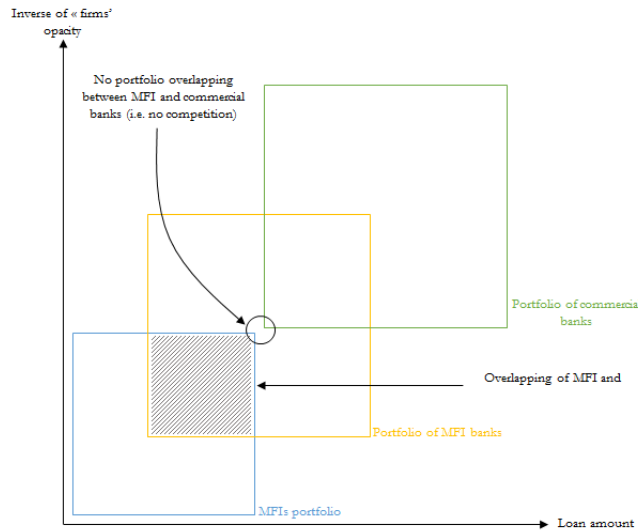
### 3.2.3 Bank types

Hypothesis 2 states that the level of a borrower's opacity determines his credit worthiness and therefore the extent to which he can be wooed by banks. However, this effect also depends on the magnitude of the bank's downscaling strategy.

We can identify two types of commercial banks in our study. A first group of banks are traditional *commercial banks* that have never really implemented a downscaling strategy. They grant small loans but still ask formal requirements that result in a cumbersome application process, especially for small and more informal businesses. A second group, called here *downscaling banks*, is composed of commercial banks that have specifically developed offers targeting small firms, with a dedicated microfinance unit.

We illustrate these bank types in Figure 3.2, along with the different sizes and positioning of bank portfolios according to bank types. *Downscaling banks* have a very similar lending strategy to MFIs and therefore quite a bit of overlap in their portfolios. Inversely, *Commercial banks* portfolios have less overlap. As a result, we should observe strong competition effects only for *downscaling banks* and no competition for *Commercial banks*.

Figure 3.2: Portfolio overlap depending on the type of banks



We make the following hypothesis

#### Hypothesis 3

*We will observe that bank proximity induces competition only for downscaling banks.*

## 3.3 Data and variables

### 3.3.1 Data

The unique dataset we analyze consists of all loans granted over the period from January 1, 2008 to December 31, 2014 by ACEP, one of the largest microfinance institution (MFI) in

Madagascar. ACEP has operated since 1995 and offers a large range of financial services.<sup>11</sup> It targets MSEs only in urban and semi-urban areas throughout the country, and is active in various industries including agriculture, manufacturing, transport and trade.

We complement our client database by identifying the location of every bank branch operating in Madagascar. As of December 31, 2014, we identified 154 bank branches operated by 12 commercial banks. We refer to the register of the Malagasy National Bank<sup>12</sup> to identify all of the commercial banks operating. We hand collect the postal address of each branch on their website. Using addresses and Google-Maps<sup>©</sup>, we obtain the precise location of all branches (latitude and longitude). It is worth noting that only half of the branches had a postal address accurate enough to be geolocated thanks only to the internet. We complement our database with *in situ* visits to get the precise location of unlocated branches.

The initial database comprised about 74,599 loans made to 35,472 borrowers. However, before selecting the final data set used in the regressions, we applied filters. For each outcome and independent variable, we trimmed the top and bottom 1% to avoid the presence of outliers.<sup>13</sup> We then removed double-counting and observations for those loans where at least one variable is lacking. The sample then numbered 55,412 observations and 29,764 borrowers. Finally, we excluded observations with missing information on geographical location (about half of the data). The final sample includes 13,757 borrowers representing 28,760 observations.<sup>14</sup>

### 3.3.2 Variables

#### 3.3.2.1 Loan contracts

For each loan granted, our partner gives us data on the loan terms as well as information on the borrower's business and the lender-borrower relationship. Data on credit loan terms are used to compute our outcome variables. We consider four different loan conditions: loan amount, interest rate, maturity, and collateral requirements. Loan amount and interest rate are deflated using the consumer price index. Loan maturity is given in days. For collateral requirements, we use two alternative proxies. First, we compute the ratio of collateral pledged to total loans. Our partner provides us with the value of the collateral. Second, we focus on the composition of collateral. Different forms of collateral are required to obtain a loan. To simplify, we can distinguish between personal guarantees and material guarantees. Personal guarantees involve a third-party who agrees to reimburse the loan in case of default. Material guarantees (security) are all assets that the lender can seize in the event of default. Because material guarantees directly affect them, borrowers may prefer to limit amount of material assets that they guarantee for the total loan amount. Better

<sup>11</sup>MFIs in Madagascar are classified in three categories (1, 2, and 3). Category 3 is made up of the largest MFIs in Madagascar, including ACEP.

<sup>12</sup>[http://www.banque-centrale.mg/index.php?id=m8\\_5\\_1](http://www.banque-centrale.mg/index.php?id=m8_5_1)

<sup>13</sup>Some exceptions are made for the age of the firm and the number of employees where the bottom 1% is zero and concerns a large number of observations (and is not an outlier).

<sup>14</sup>Clients geolocalization has not been done randomly. We discuss selection bias issues further in the article.

loan conditions therefore imply not only a limited ratio of collateral to loan but also a limited percentage of material guarantee to collateral. We compute this ratio as our second measure of collateral requirements.

The descriptive statistics, reported in Table 3.1, document that loan amount represents \$826 on average. The real interest rate is 11% on average and the average loan has a maturity of one year. Guaranteed collateral represents 2.5 times the total value of the loans and more than 50% of the collateral is composed of securities. Loans differ greatly in terms of amount and collateral requirements, while interest rate and maturity have low variations. The majority of the loans have a maturity of one year (90% of the loans have a maturity between 365 days and 395 days), and interest rates vary between two values in nominal terms (18% or 21%).

### 3.3.2.2 Distance

A crucial step consists in building a measure of competition intensity. As expressed above, we employ the distance between a borrower and the closest bank (as the crow flies). The intuition is based on the idea that a client in the vicinity of a bank is more likely to be captured by a bank than is a remote client due to transportation costs and information asymmetry. In 2010, our ACEP began to collect the precise location (latitude and longitude) of its clients. By the end of 2014, 46% of clients were geolocated.<sup>15</sup> To compute our interest variable, namely the distance between a given borrower and the closest bank, we used the precise location of borrowers provided by ACEP and the location of banks that we had hand-collected. Using QGIS<sup>®</sup>, an open source geographic information system, we computed the euclidian distance between a given borrower and the closest bank.

Our measure differs from the literature (Degryse and Ongena, 2005; Agarwal and Hauswald, 2010) in two aspects. First, for the sake of simplicity and accuracy, we assessed the shortest distance in kilometers and did not use the shortest traveling time.<sup>16</sup> Second, we compute a time-variant measure of distance. It is common in the literature on developed countries to use time-invariant distance because bank networks do not significantly change over time. However, the network of bank branches in Madagascar has dramatically expanded from 2008 to 2014 in Madagascar. More than 40% of branches in 2014 were not active in 2008 (63 to 154). As a result, using distance in 2014 to proxy distance in 2008 can be misleading. To obtain a time-varying measure, we complement data on branch locations by collecting the list of active branches by year from 2008 to 2014. To do so, we employ the annual list of branches provided by the Malagasy Central Bank. We collect the list of branches operating in 2008 and identify new branches in each subsequent year. We compute the distance from the borrower (whose location is time-invariant) and the closest bank (which can change over if a new bank opens in the vicinity) for each year. Obtaining a time-variant distance variable has the additional advantage of allowing us to provide better identification as explained below.

<sup>15</sup>16,636 clients out of 35,472 clients are geolocated when we consider the whole sample (46.9%). For the sample of clients employed here, we have geographical location for 13,737 to 29,764 (46.2%).

<sup>16</sup>Due to the lack of information on the road network in Madagascar, computing the shortest distance for each borrower would have been very difficult and surely inaccurate.

The average distance is around 2.5 km and differs greatly over time as documented in Table 3.12 in Appendix. We observe a decrease in the average distance between 2008 and 2012. The subsequent increase is explained by loans obtained by new clients in remote areas (which increases the average distance).

### 3.3.2.3 Control variables

The list of control variables includes information on business characteristics and on borrower-lender relationship intensity. The literature shows that business characteristics are important determinants of loan amount, maturity, interest rate, and collateral requirements in banking (Degryse et al., 2009) and in microfinance (Behr et al., 2011). In particular, opaque firms obtain less advantageous credit conditions. Opacity is often assessed by the size (Berger et al., 2001) and age of the firm (Hyytinen and Pajarinen, 2008). We therefore add several measures of size including total sales, total assets, number of employees and the age of the firm. In addition, we control for business activity by using dummies for the business sector.

The banking literature underlines the importance of controlling for the lending relationship (Degryse et al., 2009). This aspect is particularly important in microfinance due to the fact that its lending technologies are based on dynamic incentives (Armendáriz and Morduch, 2010). We therefore expect loan amount and maturity to increase with the length of the lending relationship. Regarding other credit terms, Behr et al. (2011) document that collateral requirements are relaxed over the course of the lending relationship. The effect of the lending relationship on interest rates is ambiguous. Evidence from banking literature is mixed (Degryse et al., 2009) and Behr et al. (2011) fail to provide evidence for a robust impact of the lending relationship on interest rates in microfinance. Following Behr et al. (2011), we proxy the lending relationship using the number of loans obtained by the borrowers.<sup>17</sup> As shown in Table 3.1, the average firm financed by our partner is eight years old, has two employees and total monthly sales of approximately \$1,556. On average, borrowers have had a relationship with ACEP for two years.

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<sup>17</sup> An alternative measure is the duration of the relationship (Petersen and Rajan, 1994; Berger and Udell, 1995) in years, which we utilize without altering our conclusions. The two measures of the lender-borrower relationship are closely related with a correlation coefficient exceeding 0.9

Table 3.1: Descriptive Statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max	CV <sup>†</sup>
Loan contract						
Amount <sup>‡</sup>	28,767	827.8	1,015	22.9	24,809	1.23
Real interest rate	28,767	0.126	0.027	0.061	0.220	0.21
Maturity	28,767	384.3	29.4	93	934	0.08
Collateral/Amount	28,767	2.819	1.247	0.088	10.835	0.44
Securities/Collateral	28,767	0.545	0.162	0	1	0.30
Individual characteristics						
Sales <sup>‡</sup>	28,767	1,556	2,400	0.4	24,523	1.54
Immobilization <sup>‡</sup>	28,767	1,847	3,435	0.1	26,590	1.86
Employees	28,767	2.12	2.26	0	32	1.06
Firm age (in years)	28,767	8.5	6.32	0	44	0.74
Borrower-lender relationship						
Number	28,767	2.890	2.504	1	20	0.87
Year	28,767	2.249	3.075	0	19	1.37
Distance (in meters)						
- all banks	28,767	2,450	5,612	5.53	88,604	2.29
- Commercial banks	28,767	5,165	11,717	11.40	109,929	2.27
- Microfinance banks <sup>‡</sup>	28,767	2,546	5,530	5.53	88,604	2.17
- to partner MFI's branch	28,767	3,743	7,682	4.26	101,980	2.05

<sup>†</sup> CV=Std. Dev/Mean; <sup>‡</sup> Data are deflated and in USD; <sup>‡</sup> BoA, Microcred, AccessBanque

## 3.4 Empirical strategy

### 3.4.1 Econometric model

We study whether the presence of a bank affects credit conditions faced by borrowers of our partner MFI. We follow the literature (Degryse et al., 2009; Behr et al., 2011) and employ a linear specification as follows:

$$y_{it} = \beta d_{it} + \Delta \mathbf{X}_{it} + \mu_i + \nu_t + \varepsilon_{it} \quad (3.1)$$

where  $y_{it}$  is one of four loan characteristics (amount, interest rate, maturity, or collateral requirements) for borrower  $i$  in period  $t$ ;  $d_{it}$  is the distance between the borrower  $i$  and the closest bank in period  $t$ ; and  $\mu_i$  and  $\nu_t$  are individual fixed effects and time dummies, respectively.  $\mathbf{X}_{it}$  is a matrix of control variables (see above).

We further employ two extensions of Eq. 3.1. First, we add other characteristics of loan terms as control variables. The rationale for this inclusion is that loan terms are jointly determined (Brick and Palia, 2007). However, including other loan terms might induce an endogeneity problem due to reverse causation and unobserved third factors. As a result, our baseline model is run without other loan terms and their inclusion is viewed as a robustness check. Second, our baseline model does not allow us to control for supply-side factors. To do so, we include credit officer dummies that correct for all unobserved time-invariant characteristics of the lender. We present models with and without credit officer dummies because our model controlling for sample selection (see below) fail to converge when dummies are considered as controls. In all specifications, we cluster standard errors



at the borrower level.

Hypothesis 1 is valid if firms close to banks obtain better loan conditions. As a result, distance should be negatively correlated with loan amount and maturity ( $\beta < 0$ ) and positively with the real interest rate and collateral requirements ( $\beta > 0$ ).

In a second step of analysis, we test the relevance of hypothesis 2 stating that competition pressure is more important for opaque borrowers. To do so, we divide the sample according to the level of opacity of firms. Opacity is captured by size (number of employees and total sales) and age. A firm is declared as opaque if its size or age is below the median. Finally, we test hypothesis 3 which asserts that competition is mainly due to downscaling banks. To do so, we run Eq. 3.1 but we consider only downscaling banks to compute distance.

### 3.4.2 Identification and sample selection issues

Before presenting the results, we discuss two technical issues, namely identification and sample selection.

#### 3.4.2.1 Identification issue

A crucial issue concerns the identification of the impact of distance. One might raise concerns about the fact that credit conditions as well as location (distance) can be affected by unobserved characteristics. On the one hand, a dynamic entrepreneur may be able to obtain favorable credit conditions and be more likely to be located in a dynamic area (close to bank). On the other hand, one might worry about our measure of distance between the borrower and the closest bank may capture the distance between the borrower and the credit officer if bank branches and MFIs branches are close to one another. Recent papers (Pedrosa and Do, 2011; Presbitero and Rabelotti, 2014) have investigated the direct effect of lender-borrower distance in microfinance. These studies indicate that distance affects information asymmetry between the lender and the borrower.<sup>18</sup> As a result, we expect remote borrowers obtain less favorable loans due to screening and monitoring costs. If the distance between borrowers and the closest bank and that between borrowers and the credit officer are correlated, our estimates are misleading due to omitted variables.

Our identification strategy is based on the inclusion of individual fixed effects. Inclusion of fixed effects allows us to focus on within variation and to avoid all bias induced by time-invariant unobserved characteristics<sup>19</sup>. We expect that, after controlling for borrower characteristics and the intensity of the lender-borrower relationship, we are able to capture an unbiased impact of bank presence on intensive margin.

<sup>18</sup>Pedrosa and Do (2011) show that the intensity of screening increases with distance and Presbitero and Rabelotti (2014) show that distance increases information asymmetry and moral hazard.

<sup>19</sup>It is worth noting that the distance between MFI clients and their credit officer is time-invariant given that, none of the borrowers in our database changed residence or credit officer, and no credit officer changed offices. As a result, we prefer to remove the borrower-credit officer distance and include individual fixed effects that capture more variables.

### 3.4.2.2 Sample selection correction

From an empirical perspective, our estimates are subject to a sample selection bias. As explained above, our partner only provided GPS information for half of the clients in our study. There is no explicit rule to determine which clients are chosen and which are not. However, the choice to select some clients and exclude others is certainly a non-random decision as shown in Table 3.11 in Appendix. For instance, we observe that older clients and borrowers with larger loans are more likely to be geolocated than others. In econometric terms, we suspect a sample selection issue that could induce bias results. Heckman (1979) provides a simple way to test and control for sample selection in cross-sectional data. However, this issue is more complex for panel data with fixed effects.<sup>20</sup> Different parametrical and non-parametrical methods have been developed (Baltagi, 2008). In this paper, we follow the three-step methodology proposed by Wooldridge (1995).

In a first step, for each period we estimate a selection equation using a standard probit as follows:

$$Pr(s_{it} = 1) = \Phi(\Delta \mathbf{X}_{it} + \gamma Z_{it}) \quad (3.2)$$

where  $s_{it}$  is a dummy equals 1 if a borrower is geolocated and 0 otherwise, and  $Z_{it}$  is a selection variable. The selection variable must be strongly correlated with the likelihood to be geolocated but not with credit conditions faced by agent  $i$ . As selection variable ( $Z_{it}$ ), we use the share of geolocated clients by credit officer (we exclude individual  $i$ ).<sup>21</sup>

In a second step, we compute the inverse of the Mills ratio for each borrower  $i$  in each semester  $t$  as follows:  $\hat{\lambda}_{it} = \phi(\hat{A}_{it})/\Phi(\hat{A}_{it})$  where  $\hat{A}_{it} = \hat{\Delta} \mathbf{X}_{it} + \hat{\gamma} Z_{it}$ .

In a third step, we re-estimate the baseline model (Eq.3.1) by adding the estimated inverse Mills ratio as covariates:

$$y_{it} = \beta d_{it} + \Delta \mathbf{X}_{it} + \rho \hat{\lambda}_{it} + \mu_i + \nu_t + \varepsilon_{it} \quad (3.3)$$

According to Wooldridge (1995), a simple test to detect sample selection consists of the t-statistics for  $\rho$ . Under the null hypothesis (absence of bias)  $\rho$  is statistically equal to 0. If  $\rho \neq 0$ , we need to correct for sample selection bias. In this case, we cannot use standard errors because  $\hat{\lambda}_{it}$  is a generated variable. A simple way to get robust standard errors is by applying the bootstrapping method (Semykina and Wooldridge, 2010).

## 3.5 Results

### 3.5.1 Baseline results

We analyze the effect of the proximity of banks to MFI borrowers on loan terms by regressing five different loan characteristics on the distance between the borrower and the closest bank

<sup>20</sup>Because our identification strategy is based on the inclusion of fixed effects, we cannot remove them.

<sup>21</sup>Concretely,  $Z_{it}$  = number of geolocated clients in the pool of credit officer  $i$ /total of clients in the pool of credit officer  $i$ .

and a list of control variables. Baseline results are displayed in Tables 3.2-3.6. We consider the following dependent variables: loan amount, interest rate, maturity, collateral amount and type of collateral. For each variable, we present econometric results using OLS and Wooldridge's correction for sample selection.

### 3.5.1.1 Loan amount

We first study whether bank presence affects loan amount. The hypothesis here is that in the proximity of a bank, microfinance institution is less reluctant to limit the loan amount out of fear of potentially losing clients. In other words, we expect that the coefficient associated with distance to be negative.

Table 3.2 displays the results of the model explaining the loan amount. The first four columns report results using OLS. The results in column [1] show that the competitive pressure induced by the proximity of a bank gives credit officers an incentive to provide larger loans. The variable of distance, capturing competitive pressure, has a highly significant and negative influence on loan amount. Distance is also economically significant: a one standard deviation increase in distance induces a reduction of the loan amount by almost \$150.<sup>22</sup> Neither the statistical power of the distance variable nor the economic size of the effect is altered by the inclusion of other credit conditions and/or credit officer dummies (columns [2]-[4]). These findings are in line with the hypothesis of competitive pressure induced by banks that encourages MFIs to provide better services.

Our model is subject to sample selection because we are able to geocode only a half of the borrowers. To correct for sample selection, we employ the three-step procedure proposed by Wooldridge (1995). Results are presented in columns [5] to [8].<sup>23</sup> Coefficients associated with  $\hat{\lambda}$  are positive and statistically significant, indicating the presence of a sample selection bias. After controlling for this issue, our baseline results are not altered. The distance between the borrower and the closest bank has a negative and significant impact on loan amount.

Regarding control variables, we note that larger firms get access to larger loans, while older firms do not. In addition, borrowers benefit from longer and more intense relationships with the lender through larger loans. Dynamic incentives are used in microfinance to reduce moral hazard (Armendáriz and Morduch, 2010) and it is therefore normal to observe a positive correlation between the number of loans and the loan amount. In column [2], we include other aspects of loan terms (interest rate, maturity and collateral requirements). We also note that the interest rate tends to be uncorrelated with the size of the loan, contrary to maturity (positive correlation) and collateral requirements (negative correlation).

<sup>22</sup>Table 3.2 reports standardized coefficients. The standardized coefficients are interpreted as the standard deviation change in the dependent variable when the independent variable is changed by one standard deviation (Bring, 1994). Put differently, the impact of one standard deviation of variable X is computed as:  $\sigma_y * \hat{\beta}_x$  where  $\sigma_y$  is the standard deviation of Y and  $\hat{\beta}_x$  the estimated standardized coefficient of X. Here the impact of distance is obtained as  $\sigma_y * \hat{\beta}_d = 1015 * 0.145 = 147.2$

<sup>23</sup>Results including credit officer dummies should be treated with caution because the first step (probit) fails to converge.

Table 3.2: Determinants of loan amount

	Without controlling for sample selection				Controlling for sample selection			
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Distance	-0.145*** (-4.46)	-0.140*** (-4.35)	-0.144*** (-4.46)	-0.138*** (-4.32)	-0.146*** (-4.50)	-0.146*** (-4.20)	-0.145*** (-4.49)	-0.145*** (-4.19)
Sales	0.153*** (12.09)	0.153*** (12.08)	0.155*** (12.32)	0.154*** (12.27)	0.153*** (12.10)	0.153*** (11.46)	0.155*** (12.34)	0.155*** (11.76)
Immobilization	0.046*** (5.18)	0.045*** (5.10)	0.041*** (4.84)	0.040*** (4.75)	0.046*** (5.15)	0.046*** (5.25)	0.040*** (4.81)	0.040*** (4.93)
Employees	0.045*** (6.16)	0.043*** (6.04)	0.043*** (5.84)	0.042*** (5.78)	0.045*** (6.20)	0.045*** (5.88)	0.043*** (5.88)	0.043*** (5.54)
Firm age	-0.648*** (-5.50)	-0.645*** (-5.50)	-0.667*** (-5.77)	-0.674*** (-5.87)	-0.654*** (-5.55)	-0.654*** (-5.52)	-0.675*** (-5.83)	-0.675*** (-5.82)
Loan number	0.663*** (22.00)	0.656*** (22.35)	0.618*** (21.08)	0.612*** (21.27)	0.662*** (22.01)	0.662*** (22.03)	0.618*** (21.10)	0.618*** (21.34)
Interest rate			0.040 (0.49)	0.094 (1.45)			0.041 (0.50)	0.041 (0.50)
Maturity			0.117*** (14.03)	0.113*** (14.43)			0.117*** (14.01)	0.117*** (13.97)
Collateral/Loan			-0.027*** (-4.17)	-0.028*** (-4.36)			-0.027*** (-4.04)	-0.027*** (-4.29)
$\hat{\lambda}$					-226278.5** (-2.99)	-226278.5** (-3.02)	-203442.5** (-2.75)	-203442.5** (-2.75)
Dummies								
- Period	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Credit officer		Yes		Yes		Yes		Yes
Obs.	28,767	28,767	28,767	28,767	28,754	28,754	28,754	28,754
$R^2$ (within)	0.269	0.282	0.319	0.328	0.270	0.270	0.319	0.319

The dependent variable is the total loan amount (in deflated USD). The table shows estimations without controlling for sample selection (columns [1]-[4]) and those controlling for sample selection using Wooldridge's procedure (columns [5]-[8]). Within estimator is used and period and industry dummies are included in all specifications. Standard errors are clustered at the borrower level in columns [1] to [4] and bootstrapped in columns [5] to [8]. t-statistics are reported in parentheses. Standardized coefficients are reported (with the exception of  $\lambda$ ). \*, \*\*, and \*\*\* indicate significance at the 10%, 5% and 1% respectively

### 3.5.1.2 Loan maturity

In a second step, we study the determinants of the loan maturity. We expect  $\beta$  to be negative, indicating that borrowers located in the vicinity of a bank obtain longer-term loans. Results are presented in Table 3.3. As previously, we first present OLS estimates and then employ Wooldridge (1995)'s procedure to control for sample selection.

The baseline model indicates (column [1]) that distance has no impact on maturity. This result is not altered by the inclusion of credit officer dummies (column [2]) but changes when other loan terms (amount, rate and collateral) are added in columns [3] and [4]. Coefficients associated with distance are positive and statistically significant, indicating that firms located farther from a bank branch get longer-term loans. These findings contradict our hypothesis stating that duration should be negatively correlated with distance. Correcting for sample selection does not alter our results ( $\hat{\lambda}$  equals zero). However, the positive impact of distance should be treated with caution for two main reasons. First, as explained above, including other loan terms might induce an endogeneity problem and bias estimates. Second, variation of outcome variable is very low (90% of loan maturity is comprised between 365 and 395 days).

Regarding control variables, we confirm that larger loans also have longer terms. In addition, interest rates are negatively correlated with maturity. One possible explanation is based on the risk profile of borrowers. Lender are less reluctant to provide longer loans to low-risk clients and these clients also obtain cheaper loans. The intensity of the relationship with the lender is positively correlated with loan maturity. Specific lending technology in microlending, such as dynamic incentives, explains this result. However, the positive impact of the lending relationship disappears when we control for other loan characteristics.

Table 3.3: Determinants of maturity

	Without controlling for sample selection				Controlling for sample selection			
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Distance	0.009 (0.51)	0.009 (0.49)	0.086** (3.10)	0.081** (2.95)	0.009 (0.48)	0.009 (0.45)	0.087** (3.12)	0.087** (2.88)
Sales	-0.015 (-1.12)	-0.013 (-1.00)	-0.096*** (-6.11)	-0.092*** (-6.01)	-0.015 (-1.12)	-0.015 (-1.14)	-0.096*** (-6.12)	-0.096*** (-6.23)
Immobalization	0.041* (2.40)	0.041* (2.42)	0.016 (1.00)	0.018 (1.10)	0.041* (2.40)	0.041* (2.48)	0.016 (1.02)	0.016 (1.07)
Employees	0.019 (1.30)	0.016 (1.10)	-0.008 (-0.69)	-0.009 (-0.73)	0.020 (1.36)	0.020 (1.40)	-0.007 (-0.63)	-0.007 (-0.66)
Firm age	0.246 (1.02)	0.277 (1.14)	0.818*** (3.40)	0.809*** (3.36)	0.241 (1.00)	0.241 (1.00)	0.817*** (3.39)	0.817*** (3.40)
Loan number	0.253*** (4.94)	0.238*** (4.75)	-0.088* (-1.68)	-0.085 (-1.58)	0.252*** (4.93)	0.252*** (4.69)	-0.089* (-1.69)	-0.089* (-1.65)
Loan Amount			0.541*** (10.53)	0.525*** (10.47)			0.541*** (10.51)	0.541*** (10.80)
Interest rate			-1.337*** (-4.83)	-1.227*** (-4.46)			-1.337*** (-4.83)	-1.337*** (-4.86)
Collateral/Loan			0.003 (0.27)	0.005 (0.43)			0.003 (0.27)	0.003 (0.27)
$\hat{\lambda}$					-1.071 (-0.84)	-1.071 (-0.87)	0.306 (0.24)	0.306 (0.25)
Dummies								
- Period	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Credit officer		Yes		Yes		Yes		Yes
Obs.	28,767	28,767	28,767	28,767	28,754	28,754	28,754	28,754
$R^2$ (within)	0.0192	0.0427	0.109	0.121	0.0196	0.0196	0.109	0.109

The dependent variable is the maturity (in days). The table shows estimations without controlling for sample selection (columns [1]-[4]) and those controlling for sample selection using Wooldridge's procedure (columns [5]-[8]). Within estimator is used and period and industry dummies are included in all specifications. Standard errors are clustered at the borrower level in columns [1] to [4] and bootstrapped in columns [5] to [8]. t-statistics are reported in parentheses. Standardized coefficients are reported (with the exception of  $\hat{\lambda}$ ). \*, \*\*, and \*\*\* indicate significance at the 10%, 5% and 1% respectively.

### 3.5.1.3 Interest rate

The third outcome variable we study is the (real) interest rate. Our hypothesis implies that the interest rate decreases as distance between a borrower and the closest bank decreases. In other words, coefficients associated with distance should be positive. Econometric results are displayed in Table 3.4. As previously, we first present OLS estimates (columns [1] to [4]) and then control for sample selection (columns [5] to [8]).

Results from OLS estimations (columns [1]-[4]) point out that the coefficients associated with distance are not statistically significant. In the subsequent columns, we correct for sample selection. Results indicate that the model does not suffer from any sample selection issues and results regarding distance are not altered. These findings do not give support to our baseline hypothesis. However, econometric results explaining the level of real interest rates should be treated with caution. The predictive power of our model seems too great to be wholly reliable ( $R^2 = 0.99$ ). One explanation may be the lack of variation of the interest rate. Indeed, the nominal interest rates are two values only (18% and 21%). We present baseline results for the sake of transparency but we ignore them in the rest of the paper.

Turning to the control variables, we show that loan maturity is negatively correlated with interest rates. It may be due to the fact that borrowers paying higher rates are higher risky borrowers, they also obtain lower maturity loans. Finally, older firms and firms that have more intense relationships with the MFI tend to pay higher rates. These findings are surprising but it is possible that these firms may finance riskier activities that entail higher interest rates.

Table 3.4: Determinants of interest rate

	Without controlling for sample selection				Controlling for sample selection			
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Distance	-0.001 (-0.71)	-0.001 (-0.61)	-0.001 (-0.30)	0.000 (0.05)	-0.001 (-0.64)	-0.001 (-0.62)	-0.000 (-0.26)	-0.000 (-0.26)
Sales	0.001 (0.73)	0.001 (0.47)	0.000 (0.22)	-0.001 (-0.40)	0.001 (0.72)	0.001 (0.75)	0.000 (0.21)	0.000 (0.22)
Immobilization	-0.000 (-0.03)	0.000 (0.10)	0.001 (0.55)	0.001 (0.46)	-0.000 (-0.02)	-0.000 (-0.02)	0.001 (0.55)	0.001 (0.54)
Employees	-0.002 (-0.55)	-0.002 (-0.38)	-0.002 (-0.51)	-0.002 (-0.40)	-0.002 (-0.56)	-0.002 (-0.53)	-0.002 (-0.51)	-0.002 (-0.49)
Firm age	0.167*** (3.70)	0.160*** (3.51)	0.174*** (3.93)	0.169*** (3.79)	0.167*** (3.71)	0.167*** (3.81)	0.174*** (4.09)	0.174*** (4.09)
Loan number	0.012* (1.82)	0.016*** (2.68)	0.016*** (2.77)	0.016*** (2.79)	0.012* (1.82)	0.012* (1.71)	0.016*** (2.66)	0.016*** (2.66)
Loan Amount			0.003 (0.49)	0.007 (1.43)			0.003 (0.49)	0.003 (0.49)
Maturity			-0.022*** (-3.51)	-0.020*** (-3.31)			-0.022*** (-3.51)	-0.022*** (-3.52)
Collateral/Loan			0.001 (0.73)	0.001 (0.93)			0.001 (0.71)	0.001 (0.70)
$\hat{\lambda}$					0.000112 (0.76)	0.000112 (0.74)	0.0000591 (0.39)	0.0000591 (0.38)
Dummies								
- Period	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Credit officer	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	28,767	28,767	28,767	28,767	28,754	28,754	28,754	28,754
$R^2$ (within)	0.991	0.991	0.991	0.992	0.991	0.991	0.991	0.991

The dependent variable is the real interest rate. The table shows estimations without controlling for sample selection (columns [1]-[4]) and those controlling for sample selection using Wooldridge's procedure (columns [5]-[8]). Within estimator is used and period and industry dummies are included in all specifications. Standard errors are clustered at the borrower level in columns [1] to [4] and bootstrapped in columns [5] to [8]. t-statistics are reported in parentheses. Standardized coefficients are reported (with the exception of  $\hat{\lambda}$ ). \*, \*\*, and \*\*\* indicate significance at the 10%, 5% and 1% respectively.



### 3.5.1.4 Collateral requirements

Finally, we study the determinants of collateral requirements and consider two different proxies of collateral requirements. The first measure is the ratio of collateral value to total loan value. We expect the coefficient associated with distance to be positive. Table 3.5 displays results using the ratio of collateral to total loans. Results from simple OLS estimates (columns [1]-[4]) indicate that distance is not related to the amount of collateral. In a second step we correct for sample selection using a procedure proposed by Wooldridge (1995). The inverse of the Mills ratio ( $\hat{\lambda}$ ) is significant, indicating that the model is subject to sample selection bias. However, results regarding our interest variable do not change. Distance continues to have an insignificant coefficient.

Regarding control variables, our model provides interesting results. First, we point out that collateral requirements and loan amount are negatively correlated. In addition, we show that coefficients associated with the number of loans granted by ACEP is negative and statistically significant at the 1% level. This finding indicates that the lending relationship relaxes collateral requirements. Behr et al. (2011) provide similar results using data from Mozambique and the chattel guarantee ratio as outcome variable.

We use an alternative measure of collateral using the composition of collateral. We employ the ratio of material guarantees to total guarantees. Material guarantees are more costly for borrowers than personal guarantees (i.e., third-party). According to our hypothesis, we expect that the ratio of costlier (material) guarantees is positively related with distance, indicating that firms close to banks obtain better credit conditions. Econometric results using the composition of collateral are reported in Table 3.6. Findings are very similar to those obtained using the amount of collateral and can be summarized as follows. First, distance is not related to the level of material collateral in all specifications. Second, loan amount is negatively correlated with collateral requirements. Third, the lending relationship allows borrowers to pledge less assets as collateral.

Table 3.5: Determinants of collateral ratio

	Without controlling for sample selection				Controlling for sample selection			
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Distance	0.089 (1.20)	0.097 (1.32)	0.071 (0.98)	0.079 (1.10)	0.092 (1.26)	0.074 (1.03)	0.074 (1.03)	0.004 (0.09)
Sales	-0.004 (-0.32)	-0.004 (-0.32)	0.015 (1.15)	0.016 (1.23)	-0.005 (-0.38)	-0.005 (-0.38)	0.014 (1.07)	0.014 (1.05)
Immobilization	-0.018 (-1.23)	-0.018 (-1.20)	-0.012 (-0.85)	-0.012 (-0.82)	-0.018 (-1.27)	-0.018 (-1.21)	-0.013 (-0.91)	-0.013 (-0.87)
Employees	0.012 (0.96)	0.010 (0.80)	0.017 (1.42)	0.015 (1.26)	0.011 (0.91)	0.011 (0.92)	0.016 (1.35)	0.016 (1.37)
Firm age	0.605*** (2.76)	0.593*** (2.68)	0.517** (2.35)	0.498** (2.25)	0.619*** (2.83)	0.619*** (2.86)	0.539** (2.46)	0.539** (2.52)
Loan number	-0.544*** (-10.21)	-0.548*** (-10.15)	-0.465*** (-8.43)	-0.467*** (-8.31)	-0.543*** (-10.20)	-0.543*** (-10.58)	-0.465*** (-8.44)	-0.465*** (-8.73)
Loan Amount			-0.121*** (-4.32)	-0.128*** (-4.53)			-0.119*** (-4.23)	-0.119*** (-4.47)
Maturity			0.003 (0.27)	0.004 (0.43)			0.003 (0.29)	0.003 (0.30)
Interest rate			0.054 (0.73)	0.072 (0.93)			0.051 (0.68)	0.051 (0.68)
$\hat{\lambda}$					0.188*** (3.31)	0.188*** (3.39)	0.165** (2.88)	0.165** (2.92)
Dummies								
- Period	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Credit officer		Yes		Yes		Yes		Yes
Obs.	28,767	28,767	28,767	28,767	28,754	28,754	28,754	28,754
$R^2$ (within)	0.0272	0.0343	0.0307	0.0380	0.0281	0.0281	0.0314	0.0314

The dependent variable is the ratio of collateral value to loan value. The table shows estimations without controlling for sample selection (columns [1]-[4]) and those controlling for sample selection using Wooldridge's procedure (columns [5]-[8]). Within estimator is used and period and industry dummies are included in all specifications. Standard errors are clustered at the borrower level in columns [1] to [4] and bootstrapped in columns [5] to [8]. t-statistics are reported in parentheses. Standardized coefficients are reported (with the exception of  $\hat{\lambda}$ ). \*, \*\*, and \*\*\* indicate significance at the 10%, 5% and 1% respectively.

Table 3.6: Determinants of the share of material guarantee in the total collateral

	Without controlling for sample selection				Controlling for sample selection			
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Distance	0.000 (0.01)	-0.001 (-0.02)	-0.040 (-0.86)	-0.040 (-0.85)	0.004 (0.09)	0.004 (0.09)	-0.036 (-0.80)	-0.036 (-0.75)
Sales	-0.057*** (-3.96)	-0.055*** (-3.80)	-0.015 (-1.00)	-0.012 (-0.85)	-0.057*** (-4.01)	-0.057*** (-3.91)	-0.016 (-1.08)	-0.016 (-1.06)
Immobilization	-0.017 (-1.39)	-0.018 (-1.41)	-0.005 (-0.38)	-0.005 (-0.43)	-0.016 (-1.29)	-0.016 (-1.28)	-0.004 (-0.31)	-0.004 (-0.31)
Employees	0.012 (1.02)	0.011 (0.94)	0.025** (2.05)	0.023* (1.94)	0.011 (0.91)	0.011 (0.89)	0.023* (1.94)	0.023* (1.91)
Firm age	0.556** (2.56)	0.519** (2.38)	0.351* (1.64)	0.318 (1.48)	0.574*** (2.65)	0.574*** (2.60)	0.379* (1.77)	0.379* (1.71)
Loan number	-0.812*** (-16.49)	-0.814*** (-16.43)	-0.631*** (-12.35)	-0.635*** (-12.34)	-0.811*** (-16.51)	-0.811*** (-17.33)	-0.631*** (-12.38)	-0.631*** (-13.04)
Loan Amount			-0.277*** (-8.69)	-0.277*** (-8.63)			-0.274*** (-8.63)	-0.274*** (-8.68)
Maturity			0.147** (1.97)	0.135* (1.76)			0.002 (0.21)	0.002 (0.21)
Interest rate			0.002 (0.19)	0.004 (0.37)			0.143* (1.92)	0.143* (1.89)
$\hat{\lambda}$					0.0299*** (4.04)	0.0299*** (4.06)	0.0253*** (3.46)	0.0253*** (3.43)
Dummies								
- Period	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Credit officer		Yes		Yes		Yes		Yes
Obs.	28,767	28,767	28,767	28,767	28,754	28,754	28,754	28,754
$R^2$ (within)	0.0685	0.0774	0.0869	0.0952	0.0701	0.0701	0.0881	0.0881

The dependent variable is the ratio of material guarantee to total guarantee (physical and collateral). The table shows estimations without controlling for sample selection (columns [1]-[4]) and those controlling for sample selection using Wooldridge's procedure (columns [5]-[8]). Within estimator is used and period and industry dummies are included in all specifications. Standard errors are clustered at the borrower level in columns [1] to [4] and bootstrapped in columns [5] to [8]. t-statistics are reported in parentheses. Standardized coefficients are reported (with the exception of  $\hat{\lambda}$ ). \*, \*\*, and \*\*\* indicate significance at the 10%, 5% and 1% respectively.

### 3.5.2 Beyond average effect

#### 3.5.2.1 Borrowers characteristics

In the previous section, we document that distance is related to loan conditions only when we consider the loan amount as the dependent variable. However, previous findings provide the average effect of distance and mask more complex relationships between competitive pressure induced by bank proximity and loan terms. Indeed, competitive pressures differ according to clients characteristics. As stated by Hypothesis 2, larger and older firms are more likely to be captured by commercial banks than *opaque* firms. "Transparent" firms can produce sufficient reliable information to secure a loan from commercial banks. In addition, these firms are more likely to need larger financing amounts to finance their growth.

To investigate whether bank influence differs according to the size and age of the firm, we divide our sample between old/young and large/small firms. Old firms are defined as firms whose age is above the median and large firms are defined as those whose total sales and number of employees are above the median. We then regress Equation 3.1 on different sub-samples. We expect our findings to be amplified for older and larger firms but not for other firms. In this section, we focus on loan amount and collateral requirements (percentage of collateral to loan). Models that explain the interest rate and maturity are open to criticism due to the lack of variation of outcome variables.

Table 3.7 displays results regarding loan amount determinants on different sub-samples of old/young firms and large/small firms. Samples are divided according to the median age (Panel A), total sales (Panel B), and the number of employees (Panel C). The first four columns present estimations for the sub-sample of "transparent" firms (value of age, sales and employees above the median) and the last four columns present those for "opaque" firms.

As expected, the coefficient associated with distance is negative and statistically significant for "transparent" firms (columns [1]-[4]). "Opaque" firms are not affected by the presence of a bank in the vicinity: coefficients associated with distance are null in Panel A and B. When we consider "opaque" firms as firms with a number of employees below the median (panel C), distance has a negative impact. However, the levels of statistical significance and economic impact are reduced relative to transparent firms. Findings from Table 3.7 confirm our prediction that distance matters only for the most transparent firms.

We extend our analysis by scrutinizing the ratio of collateral to total loan amount employing the same method. Results are displayed in Table 3.8. The baseline results presented above indicate the lack of the effect of distance on collateral requirements. These results are partially challenged when we consider transparent firms defined as those having more employees than the median firm (Panel C). Results point out that distance is positively correlated with collateral-to-loan ratio for large firms but not for small firms, in line with our hypothesis. The economic effect is far from anecdotal: a one standard deviation increase of the distance increases the ratio of collateral-to-loan by 47.8 percentage points (for an average ratio of 2.93). Credit officers provide better credit conditions in the form of lower capital requirements for large firms located in the vicinity of a bank. Interestingly, distance has a negative impact for firms below the median age (Panel A). Young firms are asked

to pledge more collateral if they are in the vicinity of bank branches. These results may be consistent with our competition hypothesis given that the younger the firms the shorter the lender-borrower relationship, and therefore the easier for clients to change lenders; or simply stem from the inherent additional risk associated with younger firms.

Table 3.7: Determinants of loan amount, sub-sample analysis

Panel A: Age of the firm								
	Old firms (Age>Median)				Young firms (Age<Median)			
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Distance	-0.136*** (-4.72)	-0.130*** (-4.81)	-0.132*** (-4.36)	-0.125*** (-4.33)	-0.002 (-0.06)	0.001 (0.04)	-0.013 (-0.38)	-0.010 (-0.28)
Control								
- Borrowers	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Loan contract	No	No	Yes	Yes	No	No	Yes	Yes
Dummies								
- Period	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Credit officer	No	Yes	No	Yes	No	Yes	No	Yes
Obs.	13,611	13,611	13,611	13,611	15,156	15,156	15,156	15,156
R <sup>2</sup> (within)	0.239	0.262	0.290	0.307	0.300	0.308	0.352	0.359

Panel B: Total sales								
	Large firms (Sales>Median)				Small firms (Sales<Median)			
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Distance	-0.149*** (-5.34)	-0.142*** (-5.05)	-0.146*** (-5.22)	-0.138*** (-4.91)	-0.002 (-0.06)	-0.013 (-0.39)	-0.009 (-0.25)	-0.019 (-0.53)
Control								
- Borrowers	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Loan contract	No	No	Yes	Yes	No	No	Yes	Yes
Dummies								
- Period	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Credit officer	No	Yes	No	Yes	No	Yes	No	Yes
Obs.	13,676	13,676	13,676	13,676	15,091	15,091	15,091	15,091
R <sup>2</sup> (within)	0.343	0.363	0.378	0.391	0.181	0.192	0.292	0.302

Panel C: Number of employees								
	Large firms (# Employees>Median)				Small firms (# Employees<Median)			
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Distance	-0.174*** (-7.31)	-0.167*** (-8.54)	-0.164*** (-6.98)	-0.157*** (-7.93)	-0.107** (-2.11)	-0.103** (-2.07)	-0.111** (-2.17)	-0.108** (-2.13)
Control								
- Borrowers	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Loan contract	No	No	Yes	Yes	No	No	Yes	Yes
Dummies								
- Period	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Credit officer	No	Yes	No	Yes	No	Yes	No	Yes
Obs.	7,376	7,376	7,376	7,376	21,391	21,391	21,391	21,391
R <sup>2</sup> (within)	0.332	0.362	0.392	0.410	0.245	0.253	0.294	0.302

The dependent variables is total amount of loan. The sample is divided according to the age of the firm (panel A), total sales (panel B) and the number of employees (panel C). Within estimator is used and period- and industry-dummies as well as control variables (sales, immobilization, number of employees, and firm age) are included in all specifications. Other loan terms (maturity, rate and collateral ratio) are included as controls in columns [3], [4], [7] and [8]. Standard errors are clustered at the borrower level. t-statistics are reported in parentheses. Standardized coefficients are reported.

Table 3.8: Determinants of collateral ratio, sub-sample analysis

Panel A: Age of the firm								
	Old firms (Age>Median)				Young firms (Age<Median)			
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Distance	0.104 (1.29)	0.118 (1.43)	0.088 (1.08)	0.102 (1.22)	-0.212** (-2.19)	-0.206** (-2.11)	-0.212** (-2.15)	-0.205** (-2.07)
Control								
- Borrowers	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Loan contract	No	No	Yes	Yes	No	No	Yes	Yes
Dummies								
- Period	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Credit officer	No	Yes	No	Yes	No	Yes	No	Yes
Obs.	13,614	13,614	13,614	13,614	15,159	15,159	15,159	15,159
R <sup>2</sup> (within)	0.02	0.03	0.03	0.04	0.05	0.06	0.06	0.07

Panel B: Total sales								
	Large firms (Sales>Median)				Small firms (Sales<Median)			
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Distance	0.132 (1.34)	0.140 (1.41)	0.116 (1.18)	0.123 (1.25)	-0.010 (-0.08)	-0.005 (-0.04)	-0.010 (-0.08)	-0.008 (-0.06)
Control								
- Borrowers	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Loan contract	No	No	Yes	Yes	No	No	Yes	Yes
Dummies								
- Period	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Credit officer	No	Yes	No	Yes	No	Yes	No	Yes
Obs.	13,676	13,676	13,676	13,676	15,091	15,091	15,091	15,091
R <sup>2</sup> (within)	0.0216	0.0281	0.0245	0.0315	0.0469	0.0662	0.0539	0.0733

Panel C: Number of employees								
	Large firms (# Employees>Median)				Small firms (# Employees<Median)			
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Distance	0.382*** (7.57)	0.383*** (7.80)	0.358*** (6.89)	0.357*** (7.02)	-0.022 (-0.35)	-0.016 (-0.26)	-0.033 (-0.52)	-0.028 (-0.44)
Control								
- Borrowers	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Loan contract	No	No	Yes	Yes	No	No	Yes	Yes
Dummies								
- Period	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Credit officer	No	Yes	No	Yes	No	Yes	No	Yes
Obs.	7,376	7,376	7,376	7,376	21,391	21,391	21,391	21,391
R <sup>2</sup> (within)	0.0419	0.0569	0.0473	0.0633	0.0392	0.0523	0.0417	0.0551

The dependent variables is the ratio of collateral value to loan value. The sample is divided according to the age of the firm (panel A), total sales (panel B) and the number of employees (panel C). Within estimator is used and period- and industry-dummies as well as control variables (sales, immobilization, number of employees, and firm age) are included in all specifications. Other loan terms (amount, maturity and interest rate) are included as controls in columns [3], [4], [7] and [8]. Standard errors are clustered at the borrower level. t-statistics are reported in parentheses. Standardized coefficients are reported.

### 3.5.2.2 Bank types

In the previous sub-section, we concentrate on borrower characteristics, indicating that competitive pressure occurs only for large and old firms. In this section, we complement our analysis by focusing on bank types. Indeed, only banks with specific products dedicated to small firms with experience in microlending technologies induce competitive pressure for MFIs. Other banks do not target micro-enterprises and prefer to finance medium and large enterprises. Therefore, our results should be conditional to the type of banks in the vicinity of MFI clients.

Among 12 banks operating in Madagascar, we can distinguish between two broad categories of banks: traditional commercial banks (called *commercial banks*) that do not target micro-enterprises and banks that have developed microfinance products. We identify three downscaling banks in Madagascar: Bank of Africa (BoA) which is the bank with the largest branches network in Madagascar, AccessBanque which is a bank specialized in microfinance products, and Microcred, a former MFI which became a bank in 2010.<sup>24</sup> We call these banks *downscaling banks* and we expect that competitive pressure on our partner MFI is higher from them than from *commercial banks*.

To investigate the role of each category of bank, we construct a measure of distance for each one.  $Distance(commercial)$  is the distance between the borrower and the closest commercial bank branch;  $Distance(microfinance)$  is the distance between the borrower and the closest downscaling banks branch (BOA, AccessBanque or Microcred).

In Table 3.9, we display results for three different loan characteristics. In Panel A, we focus on loan amount. As expected, only the distance between a borrower and the closest downscaling banks has a negative and significant impact. In Panel B and C we concentrate on the share of collateral (collateral-to-loan ratio) and the ratio of security (security-to-collateral ratio). Neither *downscaling banks* nor *commercial banks* have an impact.

In the previous sub-section, we highlight the importance of distinguishing between transparent (large and old) and opaque firms to capture the effect of competition. Therefore, in the Appendix, we display the effect of distance to a *downscaling banks* branch for large and old firms only. First, we show that results (see table 3.13) regarding the loan amount is confirmed, whatever the variable used as the threshold of opacity (firm age, total monthly sales, number of employees).<sup>25</sup> Second, we highlight that distance to a *downscaling banks* branch has a significant effect on collateral requirements when we consider the difference in the number of employees between large and small firms (see Table 3.14). The distance has a significant negative effect when we consider the firm age as a threshold for opacity. In other words, the MFI requires more collateral for young firms in the vicinity of *downscaling banks* branch. This may be due to the fact that young firms entail particularly high risk. Finally, we focus on the percentage of material securities but we do not find any impact.

These results illustrate that competition is induced only by *downscaling banks*. However, these three banks are themselves very different from one another. We can particularly distinguish BoA which is a commercial bank that offers a wide range of financial products, including microfinance products, from Access Banque and Microcred, which are truly microfinance banks, i.e., financial intermediaries dedicated to microfinance business with the legal status of territorial bank. Although Access Banque has launched a marketing campaign in order to rebrand itself as a bank<sup>26</sup> and Microcred is developing a new range of products, their core business remains microfinance. Therefore, observing competition between our partner MFIs and these two commercial banks would not be unusual while it would be more surprising to observe competition from BoA.

<sup>24</sup>It is worth noting that SIPEM changed its legal status from MFI to commercial bank in 2014. Given that our study ended in 2014, we do not consider this financial intermediary in our analysis.

<sup>25</sup>Effects are significant for small firms as well, but the statistic and economic significance sharply decreased.

<sup>26</sup><http://mastergroup-communication.com/?p=13165>

Table 3.9: Determinants of loan amount, collateral ratio and security ratio by types of banks

Panel A: Loan amount								
	Commercial banks				Microfinance banks			
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Distance	-0.023 (-0.08)	-0.039 (-0.14)	0.089 (0.34)	0.057 (0.22)	-0.143*** (-4.42)	-0.138*** (-4.34)	-0.141*** (-4.41)	-0.136*** (-4.30)
Control								
- Borrowers	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Loan contract	No	No	Yes	Yes	No	No	Yes	Yes
Dummies								
- Period	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Credit officer	No	Yes	No	Yes	No	Yes	No	Yes
Obs.	28765	28765	28765	28765	28765	28765	28765	28765
R <sup>2</sup> (within)	0.265	0.278	0.314	0.324	0.0268	0.0338	0.0304	0.0377

Panel B: Collateral/Loan								
	Commercial banks				Microfinance banks			
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Distance	0.615 (1.31)	0.571 (1.22)	0.611 (1.31)	0.564 (1.22)	0.074 (1.02)	0.082 (1.13)	0.056 (0.79)	0.065 (0.91)
Control								
- Borrowers	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Loan contract	No	No	Yes	Yes	No	No	Yes	Yes
Dummies								
- Period	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Credit officer	No	Yes	No	Yes	No	Yes	No	Yes
Obs.	28 767	28 767	28 767	28 767	28 767	28 767	28 767	28 767
R <sup>2</sup> (within)	0.267	0.281	0.316	0.326	0.0274	0.0344	0.0309	0.0382

Panel C: Security/collateral								
	Commercial banks				Microfinance banks			
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Distance	0.271 (0.58)	0.259 (0.56)	0.262 (0.57)	0.246 (0.54)	-0.009 (-0.21)	-0.009 (-0.21)	-0.048 (-1.08)	-0.047 (-1.05)
Control								
- Borrowers	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Loan contract	No	No	Yes	Yes	No	No	Yes	Yes
Dummies								
- Period	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Credit officer	No	Yes	No	Yes	No	Yes	No	Yes
Obs.	28765	28765	28765	28765	28765	28765	28765	28765
R <sup>2</sup> (within)	0.0686	0.0775	0.0865	0.0950	0.0686	0.0774	0.0866	0.0951

The dependent variables are the total amount of loan (panel A), the collateral-to-loan ratio (panel B) and the security-to-collateral ratio (panel C). The sample is divided according to the type of banks: usual commercial banks in columns [1] to [4] and banks offering microfinance products (i.e., Bank of Africa, Access Banque and Microcred) in columns [5] to [8]. Within estimator is used and period- and industry-dummies as well as control variables (sales, immobilization, number of employees, and firm age) are included in all specifications. Other loan terms are included as controls in columns [3], [4], [7] and [8]. Standard errors are clustered at the borrower level. t-statistics are reported in parentheses. Standardized coefficients are reported.

To investigate the role of these different financial intermediaries, we construct a measure of distance for each group.  $Distance(ABM)$  is the distance between the borrower and the closest branch of Access Banque or Microcred;  $Distance(BoA)$  is the distance between the borrower and the closest Bank of Africa branch.

In Table 3.10 we display results using different measures of distance by bank group. In Panel A, we focus on distance between a given borrower and the closest BoA branch. Results show that the distance between the borrower and the BoA branch affects loan amount but



not collateral requirements. In the previous sub-section, we highlight the importance of distinguishing between transparent (large and old) firms and opaque firms to capture the effect of competition. Therefore, in the Appendix, we display the effect of distance to a BoA branch for large and old firms only. As expected, the distance to BoA has a significant effect on the loan amount and collateral requirements only for the less opaque firms (see Table 3.16 and Table 3.17).

Table 3.10: Determinants of the loan amount and the collateral-to-loan ratio by types of banks (BoA, Access Banque and Microcred)

Panel A: Bank of Africa								
	Outcome variable: Loan amount				Outcome variable: Collateral/Loan			
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Distance	-0.124** (-2.90)	-0.124** (-2.88)	-0.118** (-2.69)	-0.118** (-2.67)	0.128 (1.49)	0.131 (1.51)	0.113 (1.33)	0.116 (1.35)
Control								
- Borrowers	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Loan contract	No	No	Yes	Yes	No	No	Yes	Yes
Dummies								
- Period	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Credit officer	No	Yes	No	Yes	No	Yes	No	Yes
Obs.	28,767	28,767	28,767	28,767	28,767	28,767	28,767	28,767
R <sup>2</sup> (within)	0.267	0.281	0.316	0.326	0.0274	0.0344	0.0309	0.0382

Panel B: Former MFIs (Access Banque and Microcred)								
	Outcome variable: Loan amount				Outcome variable: Collateral/Loan			
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Distance	-0.011** (-2.25)	-0.012** (-2.39)	-0.013*** (-2.70)	-0.014*** (-2.81)	-0.053*** (-6.53)	-0.057*** (-7.02)	-0.055*** (-6.64)	-0.058*** (-7.15)
Control								
- Borrowers	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Loan contract	No	No	Yes	Yes	No	No	Yes	Yes
Dummies								
- Period	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Credit officer	No	Yes	No	Yes	No	Yes	No	Yes
Obs.	25,405	25,405	25,405	25,405	25,405	25,405	25,405	25,405
R <sup>2</sup> (within)	0.265	0.278	0.314	0.324	0.0286	0.0355	0.0322	0.0394

The dependent variables is the total loan amount in columns [1] to [4] and the ratio of collateral value to total value in columns [5] to [8]. The sample is divided according to the types of banks: Bank of Africa (panel A) and commercial banks dedicated to microfinance business (panel B). Within estimator is used and period- and industry-dummies as well as control variables (sales, assets, number of employees, and firm age) are included in all specifications. Other loan terms are included as controls in columns [3], [4], [7] and [8]. Standard errors are clustered at the borrower level. t-statistics are reported in parentheses. Standardized coefficients are reported.

In panel B, we focus on commercial banks that specialize in microfinance (either because they are former MFIs such as Microcred or have always targeted this market such as Access Banque).<sup>27</sup>

Our results are quite interesting. The distance to the nearest former microfinance institution has a significant negative effect on the loan amount. As for BoA, the MFI

<sup>27</sup>We consider only the period 2010-2014. Indeed, Microcred became a bank in 2010 and therefore we do not have information on the geolocalization of its branches before this date. In 2010, the Central Bank of Madagascar reported nine branches. However, it is highly likely that some of these branches were already open and were not launched this year. Using the 2008-2014 period, as for our baseline, requires considering that Microcred branches did not induce competition between 2008 and 2010, while we know that some of them were already open. For more accuracy, we choose to focus on the 2010-2014 period. It is worth noting that none of our baseline results are affected by this sample change.

seems to react to the competition induced by former MFIs by increasing the loan size offered to clients in the vicinity of their branches. However, the economical effect is ten times smaller. This may be due to the fact that clients in the vicinity of banks operating formerly as MFIs (Microcred), or dedicated to microfinance business (Access Banque), are smaller and therefore ask for smaller loan amounts. It can also indicate that the partner MFI is reluctant to increase their loan amount too much. As we said, in spite of a status change for Microcred, and a rebranding strategy for Access Banque, both actors continue behaving as microlenders. Therefore, clients may still perceive them as microfinance institutions rather than commercial banks. Borrowers located in the vicinity of a Microcred and Access Banque branch, may be "good" borrowers (with a low probability of default) but also "bad" borrowers (with a high probability of default) who have previously been rejected by competitors. As a result, these clients, located in the proximity of Microcred or Access Banque, may be riskier and the MFI may choose to grant them smaller loans. This may also explain why we find that collateral requirement increases for clients close to Microcred and Access Banque branches. Another explanation may be that ACEP is more afraid of BoA's competition because its financial products are more similar to other commercial banks' (i.e. lower interest rates, longer maturity), than Access Banque's and Microcred's.

### 3.6 Conclusion and policy implications

We investigate whether the respective strategies of upscaling and downscaling, initiated by MFIs and commercial banks, have resulted in competition between them.

Using an original panel data set of over 30,000 loans granted by an MFI in Madagascar over the period 2008-2014, we find that the proximity of a bank to an MFI client increased the size of the loan obtained and decreased collateral requirements. These results are statistically and economically significant only for banks offering microfinance products and for the less opaque MSEs (i.e., the largest and oldest). We interpret these effects in terms of competition. Our results suggest that, contrary to the *market failure hypothesis* which states that MFIs and commercial banks are operating in segmented markets, these two financial intermediaries actually do compete. Although previous works have studied the impact of bank downscaling on the composition of MFI portfolios, to our knowledge we are the first to focus on an MFI's reaction in terms of lending conditions.

Our article sheds new light on the consequences of MFI upscaling strategies in terms of mission drift. Concerns have been raised about the fact that expanding average loan size could ultimately induce MFIs to neglect the poorest clients and therefore deviate from their initial mission of poverty reduction (Hermes et al., 2011; Cull et al., 2014). Whether or not this is the case is worth asking but is very difficult to answer, as highlighted by Armendáriz and Szafarz (2011), especially because the proxy for poverty reach used in these studies, i.e., the average loan size, does not allow us to distinguish between intrinsic MFI behaviors (such as progressive lending and cross-subsidization) and mission drift. For instance, increasing the loan size may enable MFIs to generate larger profits which can be used later to grant more loans to the poorest borrowers.

Our results allow us to overcome this problem by focusing on a specific aspect of the

poverty-reduction mission of MFIs : financing people excluded from the formal financial sector, i.e., the "unbankable", not the "unbanked". Indeed, it is well known that because of a lack of collateral and insufficient financing needs, poor people cannot secure a loan from a bank, especially in countries with a weak institutional framework. The MFIs mission is then to fight against poverty by granting financing to unbankable people, that is, by *bringing to life* the large amounts of "dead capital" if we want to use De Soto (2005)'s terminology. However, our results suggest that MFIs may offer financial services to people who are in fact bankable, given that the competition induced by the proximity of a bank positively influences their loan conditions. This may be another way to look at mission drift in the microfinance industry: the upscaling strategy launched by MFIs can be viewed as a substitution for bank financing and not as a complementary approach to decrease credit rationing among unbankable people.

Why does this matter? We can see at least two reasons. First, interest rates charged by MFIs on loans are significantly higher than those charged by banks. Although it may be complicated to accurately compare interest rates between MFIs and commercial banks, we estimate that commercial banks' creditor interest rates are at least 13 percentage points lower than those of MFIs in Madagascar. Given that 10% of the largest MFI clients obtained at least \$ 5,500 and up to \$ 23,000, the corresponding interest rate spread may result in sizeable financial consequences for MSEs.<sup>28</sup> Second, it may unintentionally discourage MSEs from formalizing. Even if we do not have accurate information concerning application costs faced by MSEs when securing a loan from a commercial bank, we can assume that these firms have less difficulty signaling their creditworthiness, and therefore that application costs are lower than for more "opaque" firms (small and young firms).<sup>29</sup> Considering that these costs mainly entail being formally registered and having sound, even basic, accounting practices, granting larger loans to bankable entrepreneurs may in fact discourage these entrepreneurs from formalizing their business. As the formalization of a given business may be a push factor for the economy (McKenzie et al., 2010; Bruhn and McKenzie, 2013), MSEs which continue resorting to MFIs instead of banks on purpose and not by default, may be quite damaging for economic development.

Of course, determining whether MFI upscaling strategies, or competition between MFIs and banks, is good for economic growth is far beyond the scope of our article. A lot of work would be necessary to test whether the least opaque clients are effectively "diverted" from bank financing (i.e., if they are bankable and if they would try to secure a loan from banks if MFIs did not offer such large loan amounts), and if so, to accurately assess the impacts on their development. On one hand, upscaling strategies may in fact represent higher incomes the MFI could use to improve financial inclusion for the poorest borrowers, especially if the downscaling strategy initiated by some banks acts as a safeguard for preventing MFIs from targeting larger MSEs. On the other hand, granting sizeable loans to bankable enterprises may ultimately be detrimental for economic growth as MFI lending conditions are less favorable than those of banks and may discourage borrowers from formalizing their business.

<sup>28</sup>We look further into this question in the next chapter.

<sup>29</sup>Moreover, we can assume that downscaling strategies practiced by banks resulted in lower application costs.

More work is also needed to determine if our results are generalizable to other contexts.

### 3.7 Appendix

Table 3.11: Difference between geolocated and non-geolocated clients

	Geolocated			t-test
	All	Yes	No	(p-value)
Loan characteristics				
Amount <sup>†</sup>	804.4	831.2	775.5	<0.01
Real interest rate	11.46	12.61	10.21	<0.01
Maturity	384.3	384.4	384.2	0.35
Collateral/Amount	277	282	272	<0.01
Security/Collateral	54.2	54.5	53.9	<0.01
Business characteristics				
Sales <sup>†</sup>	1553.3	1557.0	1549.2	0.71
Immobilization <sup>†</sup>	1814.8	1854.1	1772.3	<0.01
Employees	2.11	2.12	2.09	0.07
Age (firm)	8.11	8.54	7.65	<0.01
Lending relationship				
Number	2.76	2.89	2.62	<0.01
Duration (years)	2.10	2.25	1.94	<0.01
# Obs.	55412	26618	28794	
<sup>†</sup> Data in deflated USD				

<sup>†</sup> Data in deflated USD

Table 3.12: Evolution of distance, by year

Year	All Banks	Bank of Africa	Commercial Banks	Access Banque and Microcred	Number of obs.
2008	2900.3	3329.0	5529.4	103343.4	1588
2009	2495.6	2936.4	5270.2	98785.7	1772
2010	2372.5	2942.3	5000.7	27532.5	1925
2011	2285.7	3037.6	4801.9	21178.9	3161
2012	2166.4	2769.7	4566.3	5209.5	5170
2013	2234.9	2854.8	4694.5	5350.1	7658
2014	2856.1	3497.6	6152.1	6934.2	7482

Table 3.13: Impact of the distance to "downscaling banks" on the loan amount

Panel A: Age of the firm								
	Old firms (Age>Median)				Young firms (Age<Median)			
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Distance	-0.137*** (-4.79)	-0.131*** (-4.88)	-0.132*** (-4.42)	-0.125*** (-4.36)	-0.010 (-0.27)	-0.004 (-0.13)	-0.021 (-0.59)	-0.015 (-0.46)
Control								
- Borrowers	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Loan contract	No	No	Yes	Yes	No	No	Yes	Yes
Dummies								
- Period	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Credit officer	No	Yes	No	Yes	No	Yes	No	Yes
Obs.	13611	13611	13611	13611	15156	15156	15156	15156
R <sup>2</sup> (within)	0.240	0.258	0.28	0.303	0.298	0.308	0.352	0.359

Panel B: Total sales								
	Large firms (Sales>Median)				Small firms (Sales<Median)			
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Distance	-0.148*** (-5.25)	-0.140*** (-4.99)	-0.144*** (-5.11)	-0.136*** (-4.82)	-0.022 (-0.57)	-0.037 (-0.89)	-0.030 (-0.75)	-0.042 (-1.01)
Control								
- Borrowers	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Loan contract	No	No	Yes	Yes	No	No	Yes	Yes
Dummies								
- Period	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Credit officer	No	Yes	No	Yes	No	Yes	No	Yes
Obs.	13676	13676	13676	13676	15091	15091	15091	15091
R <sup>2</sup> (within)	0.341	0.361	0.376	0.389	0.181	0.192	0.292	0.302

Panel C: Number of employees								
	Large firms (# Employees>Median)				Small firms (# Employees<Median)			
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Distance	-0.172*** (-7.36)	-0.166*** (-8.44)	-0.159*** (-6.96)	-0.153*** (-7.74)	-0.108* (-2.19)	-0.106* (-2.17)	-0.113* (-2.24)	-0.109* (-2.24)
Control								
- Borrowers	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Loan contract	No	No	Yes	Yes	No	No	Yes	Yes
Dummies								
- Period	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Credit officer	No	Yes	No	Yes	No	Yes	No	Yes
Obs.	7376	7376	7376	7376	21391	21391	21391	21391
R <sup>2</sup> (within)	0.326	0.357	0.387	0.406	0.245	0.253	0.293	0.301

The dependent variable is the total loan amount. The sample is divided according to the criterium used to detect transparent firms: Age of the firm (panel A), total sales (panel B) and number of employees (panel C). Distance refers to the distance between a borrower and the closest commercial bank branch offering microfinance products (Boa, Access Banque and Microcred). Within estimator is used and period- and industry-dummies as well as control variables (sales, immobilization, number of employees, and firm age) are included in all specifications. Other loan terms are included as controls in columns [3], [4], [7] and [8]. Standard errors are clustered at the borrower level. t-statistics are reported in parentheses. Standardized coefficients are reported.

Table 3.14: Impact of the distance to "downscaling banks" on the collateral-to-loan ratio

Panel A: Age of the firm								
	Old firms (Age>Median)				Young firms (Age<Median)			
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Distance	0.092 (1.19)	0.105 (1.33)	0.076 (0.98)	0.089 (1.12)	-0.229** (-2.44)	-0.222** (-2.35)	-0.229** (-2.40)	-0.222** (-2.31)
Control								
- Borrowers	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Loan contract Dummies	No	No	Yes	Yes	No	No	Yes	Yes
- Period	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Credit officer	No	Yes	No	Yes	No	Yes	No	Yes
Obs.	13611	13611	13611	13611	15156	15156	15156	15156
R <sup>2</sup> (within)	0.0219	0.0315	0.0250	0.0348	0.0563	0.0659	0.0611	0.0710

Panel B: Total sales								
	Large firms (Sales>Median)				Small firms (Sales<Median)			
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Distance	0.114 (1.17)	0.122 (1.25)	0.097 (1.01)	0.105 (1.09)	-0.035 (-0.30)	-0.028 (-0.24)	-0.039 (-0.32)	-0.034 (-0.28)
Control								
- Borrowers	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Loan contract Dummies	No	No	Yes	Yes	No	No	Yes	Yes
- Period	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Credit officer	No	Yes	No	Yes	No	Yes	No	Yes
Obs.	13676	13676	13676	13676	15091	15091	15091	15091
R <sup>2</sup> (within)	0.0213	0.0279	0.0243	0.0314	0.0472	0.0664	0.0544	0.0737

Panel C: Number of employees								
	Large firms (# Employees>Median)				Small firms (# Employees<Median)			
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Distance	0.350*** (7.19)	0.350*** (7.49)	0.327*** (6.51)	0.327*** (6.70)	-0.024 (-0.40)	-0.020 (-0.32)	-0.035 (-0.57)	-0.031 (-0.51)
Control								
- Borrowers	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Loan contract Dummies	No	No	Yes	Yes	No	No	Yes	Yes
- Period	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Credit officer	No	Yes	No	Yes	No	Yes	No	Yes
Obs.	7376	7376	7376	7376	21391	21391	21391	21391
R <sup>2</sup> (within)	0.0395	0.0546	0.0448	0.0605	0.0391	0.0521	0.0417	0.0551

The dependent variables is the total loan amount. The sample is divided according to the criterium used to detect transparent firms: Age of the firm (panel A), total sales (panel B) and number of employees (panel C). Distance refers to the distance between a borrower and the closest commercial bank branch offering microfinance products (Boa, Access Banque and Microcred). Within estimator is used and period- and industry-dummies as well as control variables (sales, immobilization, number of employees, and firm age) are included in all specifications. Other loan terms are included as controls in columns [3], [4], [7] and [8]. Standard errors are clustered at the borrower level. t-statistics are reported in parentheses. Standardized coefficients are reported.

Table 3.15: Impact of the distance to microfinance banks on the security-to-collateral ratio

Panel A: Age of the firm								
	Old firms (Age>Median)				Young firms (Age<Median)			
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Distance	0.033 (0.51)	0.023 (0.37)	-0.005 (-0.09)	-0.012 (-0.19)	-0.137* (-1.69)	-0.123 (-1.51)	-0.136* (-1.66)	-0.121 (-1.47)
Control								
- Borrowers	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Loan contract	No	No	Yes	Yes	No	No	Yes	Yes
Dummies								
- Period	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Credit officer	No	Yes	No	Yes	No	Yes	No	Yes
Obs.	13611	13611	13611	13611	15156	15156	15156	15156
R <sup>2</sup> (within)	0.0552	0.0721	0.0734	0.0883	0.108	0.117	0.120	0.130

Panel B: Total sales								
	Large firms (Sales>Median)				Small firms (Sales<Median)			
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Distance	-0.038 (-0.67)	-0.045 (-0.80)	-0.087 (-1.57)	-0.091* (-1.66)	0.061 (1.13)	0.066 (1.20)	0.053 (1.02)	0.054 (1.01)
Control								
- Borrowers	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Loan contract	No	No	Yes	Yes	No	No	Yes	Yes
Dummies								
- Period	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Credit officer	No	Yes	No	Yes	No	Yes	No	Yes
Obs.	13676	13676	13676	13676	15091	15091	15091	15091
R <sup>2</sup> (within)	0.0683	0.0783	0.0919	0.101	0.0738	0.0909	0.0994	0.117

Panel C: Number of employees								
	Large firms (# Employees>Median)				Small firms (# Employees<Median)			
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Distance	0.110 (1.57)	0.097 (1.57)	0.043 (0.63)	0.032 (0.52)	-0.066 (-1.28)	-0.063 (-1.20)	-0.097* (-1.70)	-0.093 (-1.62)
Control								
- Borrowers	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Loan contract	No	No	Yes	Yes	No	No	Yes	Yes
Dummies								
- Period	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Credit officer	No	Yes	No	Yes	No	Yes	No	Yes
Obs.	7376	7376	7376	7376	21391	21391	21391	21391
R <sup>2</sup> (within)	0.0834	0.104	0.113	0.131	0.0826	0.0949	0.105	0.118

The dependent variables is the total loan amount. The sample is divided according to the criterium used to detect transparent firms: Age of the firm (panel A), total sales (panel B) and number of employees (panel C). Distance refers to the distance between a borrower and the closest commercial bank branch offering microfinance products (Boa, Access Banque and Microcred). Within estimator is used and period- and industry-dummies as well as control variables (sales, immobilization, number of employees, and firm age) are included in all specifications. Other loan terms are included as controls in columns [3], [4], [7] and [8]. Standard errors are clustered at the borrower level. t-statistics are reported in parentheses. Standardized coefficients are reported.



Table 3.16: Impact of the distance to BoA on the loan amount

Panel A: Age of the firm								
	Old firms (Age>Median)				Young firms (Age<Median)			
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Distance	-0.101** (-2.75)	-0.099** (-2.69)	-0.094* (-2.32)	-0.093* (-2.29)	-0.006 (-0.16)	-0.006 (-0.17)	-0.005 (-0.16)	-0.006 (-0.17)
Control								
- Borrowers	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Loan contract	No	No	Yes	Yes	No	No	Yes	Yes
Dummies								
- Period	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Credit officer	No	Yes	No	Yes	No	Yes	No	Yes
Obs.	13611	13611	13611	13611	15156	15156	15156	15156
R <sup>2</sup> (within)	0.236	0.259	0.287	0.304	0.300	0.308	0.352	0.359

Panel B: Total sales								
	Large firms (Sales>Median)				Small firms (Sales<Median)			
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Distance	-0.153*** (-5.26)	-0.147*** (-4.75)	-0.150*** (-4.97)	-0.144*** (-4.55)	0.011 (0.37)	-0.002 (-0.07)	0.026 (0.99)	0.015 (0.57)
Control								
- Borrowers	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Loan contract	No	No	Yes	Yes	No	No	Yes	Yes
Dummies								
- Period	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Credit officer	No	Yes	No	Yes	No	Yes	No	Yes
Obs.	13676	13676	13676	13676	15091	15091	15091	15091
R <sup>2</sup> (within)	0.341	0.361	0.376	0.389	0.181	0.192	0.292	0.302

Panel C: Number of employees								
	Large firms (# Employees>Median)				Small firms (# Employees<Median)			
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Distance	-0.144*** (-5.87)	-0.142*** (-5.60)	-0.134*** (-4.99)	-0.132*** (-4.94)	-0.102* (-1.72)	-0.098 (-1.60)	-0.097 (-1.59)	-0.095 (-1.51)
Control								
- Borrowers	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Loan contract	No	No	Yes	Yes	No	No	Yes	Yes
Dummies								
- Period	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Credit officer	No	Yes	No	Yes	No	Yes	No	Yes
Obs.	7376	7376	7376	7376	21391	21391	21391	21391
R <sup>2</sup> (within)	0.326	0.357	0.387	0.406	0.245	0.253	0.293	0.301

The dependent variables is the total amount of loan. The sample is divided according to the criterium used to detect transparent firms: Age of the firm (panel A), total sales (panel B) and number of employees (panel C). Distance refers to the distance between a borrower and the closest branch of BoA. Within estimator is used and period- and industry-dummies as well as control variables (sales, immobilization, number of employees, and firm age) are included in all specifications. Other loan contract term are included as control in columns [3], [4], [7] and [8]. Standard errors are clustered at the borrower level. t-statistics are reported in parentheses. Standardized coefficients are reported.

Table 3.17: Impact of the distance to BoA on the collateral-to-loan ratio

Panel A: Age of the firm								
	Old firms (Age>Median)				Young firms (Age<Median)			
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Distance	0.022 (0.30)	0.024 (0.31)	-0.007 (-0.08)	-0.004 (-0.05)	0.052 (0.79)	0.063 (0.98)	0.055 (0.85)	0.066 (1.04)
Control								
- Borrowers	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Loan contract	No	No	Yes	Yes	No	No	Yes	Yes
Dummies								
- Period	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Credit officer	No	Yes	No	Yes	No	Yes	No	Yes
Obs.	13611	13611	13611	13611	15156	15156	15156	15156
$R^2$ (within)	0.056	0.073	0.075	0.090	0.106	0.115	0.118	0.128

Panel B: Total sales								
	Large firms (Sales>Median)				Small firms (Sales<Median)			
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Distance	0.129 (0.98)	0.136 (1.02)	0.112 (0.85)	0.118 (0.90)	0.088 (1.61)	0.099* (1.66)	0.092* (1.70)	0.101* (1.72)
Control								
- Borrowers	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Loan contract	No	No	Yes	Yes	No	No	Yes	Yes
Dummies								
- Period	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Credit officer	No	Yes	No	Yes	No	Yes	No	Yes
Obs.	13676	13676	13676	13676	15091	15091	15091	15091
$R^2$ (within)	0.021	0.027	0.024	0.031	0.047	0.067	0.05	0.07

Panel C: Number of employees								
	Large firms (# Employees>Median)				Small firms (# Employees<Median)			
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Distance	0.383*** (7.53)	0.376*** (8.07)	0.361*** (6.78)	0.352*** (7.18)	0.008 (0.12)	0.007 (0.10)	-0.002 (-0.02)	-0.003 (-0.05)
Control								
- Borrowers	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Loan contract	No	No	Yes	Yes	No	No	Yes	Yes
Dummies								
- Period	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Credit officer	No	Yes	No	Yes	No	Yes	No	Yes
Obs.	7376	7376	7376	7376	21391	21391	21391	21391
$R^2$ (within)	0.037	0.052	0.043	0.059	0.039	0.052	0.042	0.055

The dependent variables is the ratio of collateral value to loan value. The sample is divided according to the criterium used to detect transparent firms: Age of the firm (panel A), total sales (panel B) and number of employees (panel C). Distance refers to the distance between a borrower and the closest branch of BoA. Within estimator is used and period- and industry-dummies as well as control variables (sales, immobilization, number of employees, and firm age) are included in all specifications. Other loan contract term are included as control in columns [3], [4], [7] and [8]. Standard errors are clustered at the borrower level. t-statistics are reported in parentheses. Standardized coefficients are reported.

Table 3.18: Correlation

	Amount	Int. R	Mat ur.	Col/Lo	Sec/C	Sales	Immo	Empl.	Age	Nb.	Dist
Amount	1										
Int. rate	-0.09	1									
Maturity	0.32	-0.07	1								
Collateral/Amount	-0.00	0.08	-0.00	1							
Securities/Coll	-0.22	0.12	-0.06	0.38	1						
Sales	0.53	-0.11	0.01	-0.01	-0.15	1					
Immobilization	0.37	-0.09	0.19	0.06	-0.04	0.04	1				
Employees	0.27	-0.12	0.05	0.01	-0.06	0.25	0.10	1			
Age	0.21	-0.03	0.03	-0.03	-0.12	-0.16	0.08	0.12	1		
Number	0.31	-0.10	0.05	-0.17	-0.26	0.20	0.03	0.14	0.41	1	
Distance	0.01	-0.00	-0.01	0.02	0.01	0.05	-0.02	0.01	-0.01	-0.03	1

# Financial Information Seeking Among Small Enterprises

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**Résumé**<sup>1</sup>

Dans cet essai nous nous intéressons au rôle de l’alphabétisation financière pour expliquer le choix des emprunteurs entre institutions de microfinance (IMF) et banques commerciales à Madagascar. Dans un premier temps, nous illustrons les différences entre les produits des deux types d’intermédiaires financiers. Dans un second temps, nous étudions le niveau d’information financière des clients d’une IMF ainsi que les facteurs qui influencent leur décision de se renseigner sur des offres financières concurrentes. Sur la base d’une enquête réalisée auprès de 250 emprunteurs, nous constatons une méconnaissance importante des différences de taux d’intérêts qui existent entre les différents prêteurs. Nous observons également que le niveau d’éducation de l’entrepreneur et le niveau d’éducation financière de son entourage sont des facteurs importants pour expliquer sa décision de rechercher de l’information financière. Ainsi, les individus ayant un minimum d’éducation financière se renseigneront tandis que les autres demeureront ignorants. Nous soulignons les conséquences de cette ignorance pour le développement des petites entreprises.

**Abstract**

Our article deals with the importance of financial literacy in explaining a borrowers’ choice to resort to microfinance institutions (MFIs) instead of commercial banks in Madagascar. Firstly, we illustrate how financially costly it can be for micro and small enterprises (MSEs) to continue borrowing from MFIs once their financing needs reach a certain level. Next, we focus on the determinants of loan information seeking among such MSEs microfinance customers. Based on a field survey in Madagascar of 250 MSEs that obtained loans from a MFI, we observe that borrowers significantly lacked financial literacy, especially regarding the gap between interest rates offered by MFIs and commercial banks. Our results illustrate that both the financial literacy of a borrower’s entourage and his level of education are strong predictors of whether or not he will seek out information from banks. Our results suggest that borrowers with a minimum of financial literacy will inquire, while others are likely to remain ignorant about possible alternative (and cheaper) funding options. We shed light on the importance of financial literacy for MSEs and recommend bringing about more information transparency on local credit markets to allow borrowers to make optimal financial choices.

*Keywords:* Microfinance, financial literacy, micro and small enterprises, developing countries

*JEL classification:* D221, D883, O112

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<sup>1</sup> Je remercie les participants à la conférence des Journées de la Microéconomie Appliquée (2015).

## 4.1 Introduction

It is a common observation that in low income countries access to finance is one of the primary obstacles that disproportionately affect micro and small enterprises (MSEs), particularly in Africa (Beck and Demirguc-Kunt, 2006; Ayyagari et al., 2012; Beck and Cull, 2014). For instance, using data from the World Bank Enterprise Surveys (WBES), Stein et al. (2010) estimate that MSEs in developing countries face a financing gap of between \$2.1 trillion and \$2.6 trillion, which is equivalent to 30 to 36 percent of current outstanding MSE credit.

Thanks to the seminal work of Stiglitz and Weiss (1981), we know that MSEs in developing countries can be particularly credit rationed because of screening and enforcement problems. People without collateral that can be easily seized are considered as not credit worthy by the formal credit market and are thus excluded from it, regardless of the profitability of a given venture.

The emergence of microfinance institutions (MFIs) in the 1970's represented a major innovation in financing businesses excluded from the formal financial sector. MFIs developed specific methods such as group-lending to address screening and enforcement challenges (see Armendáriz and Morduch, 2010, for more details).

The microfinance sector has since grown and rapidly become an important financing alternative for borrowers previously unable to obtain formal financing. In 2013, the number of MFIs in Africa was estimated at 368 for 8.7 million active borrowers (62% of whom were women) and \$8.7 billion of gross loan portfolios.<sup>2</sup> In Madagascar, the number of microfinance clients increased by 88% between 2010 and 2014 while the outstanding credits (in real value) increased by 76%.<sup>3</sup>

In the wake of both economic and demographic growth in the country, micro and small entrepreneurs in urban areas began requiring significant financing. Before long, MFIs realized that a part of their clients were no longer low-income self-employed micro-entrepreneurs running informal street stalls or small-scale farms. Some of them appeared to be highly profitable and showed an aptitude for business.

As a result, MFIs have gradually been moving away from group-based loans with weekly repayment schedules to loans tailored to match the cash flow patterns of small growing businesses. This "upscaling process" (Vanroose and D'Espallier, 2013; Cull et al., 2014) has resulted in loans that are no longer "one-size-fits-all" but rather more customized and that vary according to their size, maturity and interest rate. In Madagascar, some MFIs have created products specifically tailored for MSEs. These products entail longer maturity (from one to three years) and larger loan amounts (to a maximum of \$38,000 USD<sup>4</sup>).

We can observe this trend in the portfolio of ACEP Madagascar, the partner MFI of our study, shown in Figure 4.1. While the average loan (expressed in constant US dollars) among third quartile borrowers rose by only 1% between 2000 and 2013<sup>5</sup>, the 90th, 95th

<sup>2</sup>Source: Mix Market (2015)

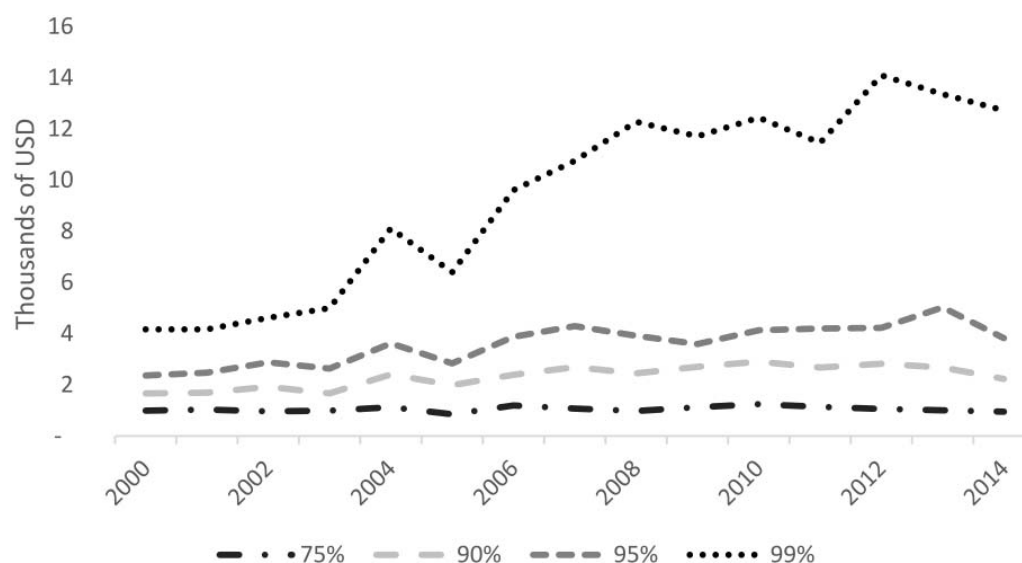
<sup>3</sup>[www.madamicrofinance.mg/index.php/chiffres-cles/statistiques](http://www.madamicrofinance.mg/index.php/chiffres-cles/statistiques)

<sup>4</sup>According to the exchange rate on May 24th 2015, 1 US dollar = 3,144 Ariary

<sup>5</sup>However, between 2000 and 2010, i.e., until the consequences of the political crisis emerged,

and 99th centile increased respectively by 33%, 61% and 205%, reaching \$2,673, \$5,000 and \$13,360. In comparison, the 2013 gross domestic product per capita in Madagascar was \$271, compared to \$286 in 2000 (-5%). Given that in 2013 the MFI partner had around 15,000 customers, the upscaling process concerned at least 1,500 clients (if we include the last decile).

Figure 4.1: Evolution of the average loan of ACEP's clients, by quartiles



This increase in loan size and duration did not exempt MFIs from monitoring their clients in order to prevent them from defaulting. Monitoring costs, the risk of the activities financed and high financing costs (for MFIs which do not collect savings) make MFIs' creditor interest rates quite high and superior to bank interest rates.

Precisely comparing interest rates between MFIs and commercial banks may be very complicated given the scarcity of the data and the diversity of the variables likely to influence interest rate computation. However, the information we collected suggests that MFIs' effective interest rates in Madagascar vary between 35% and 80% per year <sup>6</sup> while banks' interest rates vary between 5% and 25%. Therefore, as illustrated in Table 4.1, there is a minimum 13 percentage points spread between interest rates charged by these two types of financial intermediaries depending on the loan purpose and the loan maturity (see Table 4.10 in appendix for detail about MFIs' offer).

These observations raise a simple question: why do borrowers with significant and growing financing needs still resort to MFIs instead of turning to commercial banks that offer lower interest rates?

A similar question has already been dealt with by authors highlighting the fact that the third quartile rose by 25%.

<sup>6</sup>For level three MFIs, that is those who developed a specific offer for small and medium enterprises

Table 4.1: Comparison of Annual effective interest rate of microfinance institutions and commercial banks, in 2015

Type of loan	Commercial banks <sup>b</sup>		Microfinance institutions <sup>a</sup>	
	min	max	min	max
Short term credit (< 12 months) <sup>c</sup>	5.5%	24.9%	41.8%	80%
Medium term credit (12 - 36 months) <sup>c</sup>	7.7%	22.4%	35.2%	70%
Long term credit (> 35 months) <sup>c</sup>	8%	19.7%	No product offered	

<sup>a</sup> Based on financial products offered by Malagasy Microfinance Institutions of level 3.; [www.madamicrofinance.mg/cnmf/public.php?action=PublicPortail](http://www.madamicrofinance.mg/cnmf/public.php?action=PublicPortail)

<sup>b</sup> Information disclosed by the malagasy central bank (consulted in July 2016); [www.banque-centrale.mg/index.php?id=m5.2.2.1.2](http://www.banque-centrale.mg/index.php?id=m5.2.2.1.2).

<sup>c</sup> We considered only credits granted to enterprises.

application costs for a formal loan, from a commercial bank for instance, may be so high that continuing to resort to moneylenders still appears more profitable (Kochar, 1997; Mushinski, 1999; Straub, 2005; Giné, 2011)<sup>7</sup>.

However, concerning the tradeoff between MFIs and banks, the "savings" generated by avoiding bank transaction costs may not be so high when compared to what the borrower would have saved thanks to lower interest rates. For instance, obtaining a trade register number and a fiscal number (required to apply for a formal loan) costs an enterprise \$18<sup>8</sup>, while obtaining a land title generally costs approximately \$477<sup>9</sup>. This amount represents around 100% of the median loan of all of the clients of the MFI partner in 2014 and 1.5 times the gross domestic product per capita. Such costs would certainly discourage any small borrower from applying for a bank loan. However, while transaction costs are mainly fixed (a borrower has to register his activity just once, for instance), the benefits of resorting to a bank instead of an MFI are proportional to the loan amount. Therefore, above a certain loan amount the benefits will exceed the costs.

The following table provides us with the interest rates gap between MFIs and banks depending on the total amount borrowed by a client since their first loan. The amounts of money borrowers would have saved by securing financing from banks rather than MFIs represents 55% of the transaction costs for the last quartile, 163% for the last decile, i.e., 1,290 people, and 833% for the last centile.

Of course, these calculations do not comprehensively take into account all of the transaction costs. We focused on the monetary costs of only a subset of application costs while it is well known that administrative procedures can take a very long time. For instance, obtaining a land title in Madagascar may take as long as 6 years (Rahrimandimby, 2011; Observatoire du foncier, 2010).

<sup>7</sup>It is worth noting that none of these previous studies make the distinction between commercial banks and MFIs when talking about "formal lenders", while transaction costs are vastly different between these two types of lenders.

<sup>8</sup>[www.edbm.gov.mg/fr/Guichet-Unique/Creation-de-societe](http://www.edbm.gov.mg/fr/Guichet-Unique/Creation-de-societe)

<sup>9</sup>Given that one of the main explanations for credit rationing is the lack of formal collateral, we consider that the requirement of "formalized" collateral, for instance obtaining a land title, may represent a significant cost for securing a loan from a formal bank.



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Table 4.2: Interests paid depending on the loan amount and the interest rate

	Percentile of loans				
	50%	75%	90%	95%	99%
Total loan amount (in \$)	795	2,624	7,792	14,536	39,758
Interest gap (13 percentage points)(in \$)	103	341	1,012	1,889	5,168
Interest gap in % of the transaction costs for a bank (500 USD)	21%	68%	203%	378%	1034%
Interest gap in % of the loan granted in 2014	23%	36%	46%	49%	40%

However, 67% of the respondents surveyed already had a land title either for their work premises or for their residence, which means that the largest part of the application costs had already been completed. Moreover, we adopted a conservative hypothesis to explain the interest rate gap. Firstly, we consider a minimum average gap of 13%, while it could be far greater. Furthermore, we did not take into account that application costs for bank loans decrease relative to loan size increases since they can broadly be considered as fixed costs.<sup>10</sup> Finally, we did not consider that microfinance application costs may also be significant. For instance, ACEP requires at least 120% of collateral security (and at least 40% for a renewal), including 5% of compulsory savings, and even land title security as loan size increases.<sup>11</sup>

With these figures we want to highlight that among MFI borrowers there are people whose total financial needs are so great that the money they would save by benefiting from the lower interest rates of banks would be superior to the total application costs of bank loans. There are other factors that drive the behavior of borrowers. For instance, borrowers may believe that banks finance only the most affluent people or sizeable enterprises and feel too intimidated to enter a bank. Borrowers may also simply be discouraged, anticipating that they would not obtain a bank loan and therefore do not even try (Kon and Storey, 2003). In this article we suggest that a lack of financial literacy plays an important role in explaining the choice between MFIs and commercial banks.

In 2014, we conducted a field survey among 253 MSE clients of ACEP in Madagascar and observed that only 66% of respondents reported knowing the interest rate currently charged on their loan, and only 45% reported knowing the total repayment (interest + capital) they paid to the MFI for the life of the loan. More surprising, we found that of the borrowers who reported knowing their interest rate, 56% were in fact mistaken a) by more than 25% on their interest rate<sup>12</sup> and b) by 46% on the total interests paid. In other words, while there were borrowers who admitted ignorance of their loan terms, there were people who actually did not know that the amounts they thought they were paying were

<sup>10</sup>Indeed, obtaining land title and administrative documents need only be done once.

<sup>11</sup>However, it is worth noting that even if application costs for MFIs increase, it is very likely that they will remain below those of banks because they will remain more flexible about the collateral required. For instance, even if some MFIs require a land title, they only require a security and not a mortgage.

<sup>12</sup>For instance, if their interest rate was 20% per year, they stated it was 15% or 25%.

inaccurate.

We believe that such financial illiteracy plays a role in preventing borrowers from accurately assessing which financing sources could be the most suitable for them. Indeed, to estimate the value of a bank loan, it is necessary to have an idea of interest rates that banks offer, which is not necessarily common knowledge for the average Malagasy citizen. For instance, we found that 86% of the entrepreneurs in our study did not realize that the creditor interest rates applied by commercial banks were inferior to those charged by the MFI - 54% were actually convinced of the opposite.

In order to look further into the causes of financial illiteracy in Madagascar<sup>13</sup>, we investigated what drives borrowers to seek out information on financing options. We found that an educated person who has a bank customer in their entourage was more prone to inquire about various financing possibilities. We interpret these results in terms of the person's initial level of financial literacy. For instance, we believe that a borrower with a financially savvy entourage has a better perception of the interest rate gap between MFIs and banks. This suggests that people with low financial education are more likely to remain ignorant.

To the best of our knowledge, this is the first paper to investigate what influences MSE MFI customers to acquire information on lending conditions. We believe that exploring this question is crucial to explaining the low level of financial literacy among our respondents, particularly regarding interest rates. Through this study, we mean to contribute to the literature by emphasizing the necessity to deal with financial illiteracy and its consequences in terms of optimal financing decisions.

The rest of the article is structured as follows. Section 4.2 summarizes to what level financial literacy drives people's financial decisions. Section 4.3 presents our theoretical framework while section 4.4 describes the field survey and the original data on which our study is based. Section 4.5 presents our empirical results, which are then discussed in section 4.6.

## 4.2 Literature Review

A low level of financial literacy seems to be common all over the world and not only a feature of people in developing countries. A 2012 OECD report (OECD, 2012) on the financial literacy skills among students in 18 countries<sup>14</sup> documents low levels of financial literacy in several countries. Similar findings emerge from a work of Atkinson and Messy (2012) on financial literacy among adults in 14 OECD countries. Lusardi and Mitchell (2011) highlight specific patterns inside countries, depending education, gender and minority group.

<sup>13</sup>It would also have been interesting to assess the extent to which financial knowledge influences the decision for borrowers to opt for MFIs instead of banks. Unfortunately, because very few people in our sample (6%) applied for a bank loan at least once in their lifetime, we are not able to investigate this research question with accuracy.

<sup>14</sup>Australia, Belgium (Flemish Community), Shanghai-China, Colombia, Croatia, Czech Republic, Estonia, France, Israel, Italy, Latvia, New Zealand, Poland, Russia, Slovak Republic, Slovenia, Spain and United States.

In developed countries, previous studies have illustrated how closely financial literacy is linked to financial decision-making and outcomes. Lusardi and Mitchell (2007) and Lusardi (2008) find that the knowledge of interest compounding and the ability to perform simple calculations (such as a lottery division) were the strongest predictors of retirement planning among the US population. Hilgert et al. (2003) observed that most Americans fail to understand basic financial concepts, particularly those relating to stocks, bonds and mutual funds, documenting a positive link between financial literacy and financial behavior.

Other works have studied the relationship between financial knowledge and borrowing decisions. Lusardi and Scheresberg (2013) show that poorly financially educated people tend to borrow at higher costs. Lusardi and Tufano (2009) report that people with the lowest levels of financial literacy faced difficulties in assessing their debt position, leading to over-indebtedness and repayment difficulties.

In developing countries, studies are scarcer and results more ambiguous. Based on a field experiment, Cole et al. (2011) attempt to identify what best explains the low demand for financial services in Indonesia and India: limited financial literacy or the cost of formal financial services? Although financial literacy appears to be a strong predictor of the demand for financial services, the authors find that small subsidy payments have a large effect on the likelihood of opening a savings account while financial literacy programs impact only very uneducated and financially illiterate households. In the same vein, Cole et al. (2013) find no impact of a financial literacy program in India on demand for insurance services.

Some of the above results suggest that the cost of financial services could be a more significant obstacle than lack of financial literacy. However, other experimental studies find opposite results. They highlight that a lack of financial knowledge is a major constraint on the demand for insurance, suggesting that increasing farmers' understanding of insurance products could have a significant effect on the demand for insurance products (Cai and Song, 2012; Cai et al., 2012).

#### 4.2.1 What exactly is financial literacy?

According to the U.S. Government Accountability Office (GAO), financial literacy is "the ability to make informed judgments and to take effective actions regarding the current and future use and management of money. It includes the ability to understand financial choices, plan for the future, spend wisely and manage the challenges associated with life events such as job loss, saving for retirement or paying for a child's education."

More precisely, we can identify two aspects of financial literacy: 1) the financial knowledge which represents the "stock" of financial information a person has, 2) a person's capacity to perform calculations and to process information he obtains. These two aspects may not be linked. Indeed, people with a very low level of knowledge about percentage calculations may still be able to make good financial decision if they know the basic results of these calculations. For instance, people may know that banks charge lower interest rates on their loans while not being able to make accurate comparisons. Conversely, there may be people able to understand the difference between flat and effective rates but who are not

aware that different types of interest rates exist.

It is worth noting that financial education differs from financial literacy. According to (Cohen and Nelson, 2011), financial education refers to the process of improving one's abilities to effectively use financial products and services. It consists in reinforcing one's financial knowledge by getting a better understanding of financial options and principles.

But how does financial literacy concretely drive micro and small enterprises to choose between MFIs and commercial banks?

#### 4.2.2 Financial literacy is necessary to compare interest rates

Even in its basic formulation, borrowing decisions necessitate thoughtful analysis and reflection. A loan has four main characteristics: amount, maturity, collateral and interest rate. The interest rate represents the price of the loan. Contrary to the amount, the maturity or the guarantee required, it may be very difficult for an individual to understand the cost that the interest rate entails. This phenomenon in developed countries has already been highlighted. It has been found that people tend not to know the interest rates charged on their credit cards or mortgage balances (Moore, 2003; Lusardi and Tufano, 2009; Lusardi, 2011; Disney and Gathergood, 2013). Moreover, an inaccurate perception of the interest rate often leads to borrowing more money, on a shorter term basis and at a higher interest rate, thus ultimately resulting in a borrower accumulating lower amounts of wealth (Stango and Zinman, 2009; Lusardi, 2011).

In our case, we believe that the difficulty of processing interest rates and comparing them between different lenders stems particularly from the diversity of interest rates that can be charged. Indeed, interest rates can be expressed on a different time-period basis (years, months, days). It can also include the application fees or not, and be calculated on a flat-rate method or on a declining balance method. All of these characteristics can make understanding and comparison quite difficult for anyone, particularly for a financially illiterate borrower.

For example, a flat interest rate refers to a pricing structure that charges a single fixed fee for credit, regardless of capital repayment, while if we use the declining balance method, the interest rate is charged only on the outstanding capital for each repayment.

Even if equal at first glance, interest rates can, in fact, vary dramatically. For example, a flat rate of 2% per month applied on a one-year credit of \$1,000 will generate \$240 of interest, while an interest rate of 2% per month (calculated with the declining balance method) will generate only \$135 of interest. Therefore, a 2% flat interest rate amounts to a 3.47% nominal interest rate.

The use of flat interest rates is particularly prevalent in Africa, where about 70% of loan products include interest calculated using the flat rate method as compared to Latin America where the ratio is just 5% (Microfinance Transparency, 2011). Conversely, commercial banks use the declining balance method to compute interest rate, especially because of national regulation.

Therefore, the lack of standardization by financial institutions, combined with a low level of financial awareness among the population can make comparison of interest rates

very difficult. Indeed, if people experience difficulty understanding interest rates, they may have a biased perception of interest rates available on the market. Initial inaccurate perception<sup>15</sup> may discourage them to obtain more information on bank lending conditions simply because they do not perceive their interest in doing so.

The level of financial literacy in the population may increase if the information available is accurate and easily understandable. For instance, although we did not assess it, we believe that it is very likely that people are perfectly aware that MFIs and banks offer lower interest rates than moneylenders.<sup>16</sup> This is mainly because moneylender interest rates are so high that it is not even necessary to understand the different type of interest rates to know that MFIs are more affordable. This is not the case, however, for the difference between MFIs and commercial banks. Because the interest gap is small (compared to the gap between formal and informal lenders), although still significant and complex (because of the different types of interest rates), this gap is not common knowledge shared by the average person.

However, the level of financial literacy does not depend only on the information people receive. If people inquired about bank loan conditions when they received information, they would have less misconceptions. As inquiring appears to us to be an important determinant of financial literacy, we choose to study the determinants of inquiring about bank loan conditions. Understanding what drives people to seek out financing information appears to be important in order to encourage them to acquire a higher level of financial literacy on their own.

### 4.3 Conceptual framework

We consider financial literacy as the capacity for an individual to process information and make optimal financial decisions. Therefore, the level of financial literacy depends on the capacity of the agent to make calculations and the stock of accurate information about financial mechanisms. If we follow this framework, the low level of financial literacy observed in our data may come from either an incapacity to perform calculations or a low level of information.

To increase one's level of financial literacy, an entrepreneur can obtain information in order to understand how interest rates are computed by banks and how to compare them. More simply, he can also obtain information on the results (bank interest rates are always cheaper than MFI rates) without understanding the difference of calculation between flat and effective interest rates.

For our study, we are interested in identifying what drives an agent to increase his financial knowledge, that is to acquire financial information. [Stigler \(1961\)](#) was the first to

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<sup>15</sup>By "initial perception" we mean the perception that one has before they inquire and check its accuracy.

<sup>16</sup>According to [Steel et al. \(1997\)](#), moneylender rates range from 10% a month in Ghana to 50% a month in Malawi. Although highly variable across countries, the interest rates charged by commercial banks cannot exceed the maximum legal rate. In the Economic Community of West African States, this maximum rate is around 2% per month. Unfortunately, the Malagasy Central Bank does not disclose this information currently.

shed light on the importance of information and why it may be in a consumer's interest to increase his awareness about an offer. Stigler (1961) starts from the premise that prices vary constantly and that no one can know all of the prices offered by different sellers at any given time. Therefore, anybody who wishes to find the most favorable price has to seek information from various sellers.

Stigler (1961) suggests that the total benefit of seeking information is equal to the expected reduction in price (which depends on price dispersion which in turn depends on the similarity of sellers and how much their offers vary in time) as a result of the search multiplied by the quantity purchased (as well as the frequency of the expenditure). The costs of seeking information are proportional to the number of (identified) sellers and their geographical dispersion.

However, although this theoretical framework can illuminate the costs and benefits that result from obtaining additional information on a given offer, it may appear quite limited in explaining a borrower's decision of whether or not to seek out information on financing products and services.

According to Stigler (1961), the decision of inquiring is influenced by the initial level of the amount of price dispersion when a new buyer enters a market. When a buyer enters a wholly new market, he doesn't have an accurate idea of the dispersion of prices and therefore has no idea of the rational amount of searching he should do. Therefore, his decision of inquiring depends a lot on his initial perception of the current price dispersion. For common products, Stigler (1961) assumes that a buyer approaches a market with some general knowledge of price dispersion. For instance, he uses a car as an example and points out that it is easy to assess that everyone knows that all car manufacturers produce several makes of cars at different price levels and therefore this understanding may be assumed to be common knowledge.

In the case of financial products, the perception of price dispersion may vary significantly between individuals for two primary reasons. Firstly, the characteristics of a loan, such as its size or its maturity, may vary depending on the characteristics of the borrower. For instance, all else equal, a borrower with a riskier project will be asked to pledge more collateral than a borrower with a less risky project. Secondly, and more importantly, as we explained above, it can be very difficult to compare offers between several lenders because of the different types of interest offered by lenders.

For these two reasons, it may be very difficult for potential borrowers to have a clear and an accurate perception of the "average interest rate" on the market and therefore the interest rate dispersion. The initial perception of the interest rate dispersion will depend on the borrower's initial level of financial literacy. The higher his financial literacy level, the better he will be able to understand the characteristics of the loan and to compare different type of interest rates between lenders.

Few works have focused on the determinants of the decision to acquire financial literacy. Delavande et al. (2008) consider financial literacy as a form of human capital and the acquisition of financial knowledge as an investment which increases the profitability of a household's savings. Using data collected thanks to questionnaires sent through the Internet, they find that the amount of additional financial knowledge acquired by the agent

depends on his effort, his intelligence and his level of financial literacy. However, they are not interested in explaining what motivates people to make this effort to acquire the information.

Jappelli and Padula (2013) develop an inter-temporal consumption model of investment in financial literacy. Using in-depth microeconomic data in several developed countries, they find that the level of financial literacy before entering the labor market is a strong predictor of the current stock of a person's financial literacy, which is itself an important determinant of wealth. Their results also suggest that countries with more generous social security systems lower individual incentives to invest in financial literacy. However, they do not describe how and why an agent will try to acquire financial information or not.

In our study, we are interested in understanding what influences MFIs' borrowers in Madagascar to inquire about bank loan conditions. As far as we know, this is the first work focusing on this question in a developing country where the level of financial inclusion is very low<sup>17</sup> and perception of the interest rate dispersion particularly complicated to grasp.

### 4.3.1 What influences borrowers to inquire?

At first glance, this question can be answered very trivially. Borrowers will inquire if their expected benefits to do so are higher than the expected costs. The benefits of inquiring stem from the opportunity for the borrower to secure a loan from banks, while the costs may result from the geographical dispersion of banks. However, a loan is not a basic service in the sense that there is no certainty for an individual to obtain financing from the bank after he applies. Therefore, there may be agents who do not try to obtain information on a bank loan because they believe that they would not manage to secure one if they tried (Kon and Storey, 2003). However, a borrower has to know this information and be able to process it in order to accurately weigh the pros and cons of inquiring. For instance, if a borrower does not know a bank's minimum requirements, he cannot predict his chances of obtaining a bank loan. In other words, the choice of whether to further inquire may depend on an agent's perception of the benefits of doing so, which depends upon the agent's level of financial knowledge.

Therefore, as already highlighted by Delavande et al. (2008) and Jappelli and Padula (2013), an agent's current level of financial knowledge plays an important role in the decision of whether to inquire.

### 4.3.2 The specific role of financial literacy

We can identify three different ways that financial literacy can influence the decision to seek out information on a given potential financing source.

First, the value of the additional information. The more financially literate you are, the better you understand interest rates dispersion and therefore, the value of obtaining

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<sup>17</sup>There are only 6% of adults declaring having an account at financial institution, against 29% on average in Sub-Saharan Africa (SSA) and only 15% of enterprises have declared having a bank loan/line of credit in 2013, against 23% for SSA (Global Financial Inclusion Database - september 2015).

additional information. Secondly, the effort of acquiring more information. The more financially educated you are, the easier you can understand additional and more complex information. For instance, if the borrower already understands how a flat interest rate is computed, he will understand more easily what a declining balance method involves. Thirdly, the more financially educated you are, the less additional information you need.

These arguments make us hypothesize that there is an inverted U-shaped relationship between the individual's stock of knowledge and his probability of inquiring. People with a very low level of financial knowledge have a low probability of making inquiries because they do not perceive the interest in doing so. For instance, they do not understand the different type of interest rates charged and therefore do not understand interest rate dispersion. As one's stock of financial knowledge increases, one's perception of the value of financial knowledge improves and we can expect their likelihood of inquiring to increase. Above a certain level of financial literacy, even if grasping information is easier than before, the additional information gained is less and less beneficial.

## 4.4 Database and variables

Both primary and secondary data were used for this study. In September 2014 we undertook a survey designed to extend research on borrowing behavior and financial literacy among small business clients of ACEP, a microfinance institution in Madagascar. We randomly selected 292 clients of ACEP in Antananarivo, capital city of Madagascar. Sampling was done according to the loan amount and activity sector of the clients. We interviewed 252 MFI clients who had borrowed at least \$954, which corresponds to the highest quartile of clients according to the loan amounts granted by ACEP. Ten people among the 252 interviewed were considered insufficiently reliable for the sample, resulting in a sample of 242 people. We also dropped 20 people for which data was incomplete.

We chose people with high loan amounts for whom transaction costs may not be sufficient to explain why they borrowed from an MFI instead of from a commercial bank. On average, surveyed borrowers had been clients of ACEP for almost 6 years and had increased their loan amount by 30% during this period.

The size of the sample was kept small due to budget and time constraints. Some questions about profitability, accounting practices and fiscal behavior were particularly sensitive and therefore required a lot of time to be assessed accurately.

The survey consisted of a private one-hour interview with each identified client. Interviews took place at ACEP branches during the repayment period. The questionnaire was designed to yield a picture of the financial situation of each small enterprise, including their investments, their financing needs and sources and their accounting practices as well as the entrepreneur's motivation and business prospects and his administrative training. More specifically, the questionnaires focused on the entrepreneur's financial literacy and knowledge of banking processes. We completed this information with income and expenditure data collected by the partner MFI.



Table 4.3: Descriptive statistics

	Obs.	Mean	Std. Dev.	Min	Max
<b>Individual characteristics</b>					
Age	222	43.7	8.2	23	62
Gender (1 = Female; 0 = Male)	222	0.54	0.49	0	1
<i>Highest level school</i>					
Primary education (1 = Yes; 0 = No)	222	0.22	0.41	0	1
Secondary education (1 = Yes; 0 = No)	222	0.58	0.49	0	1
Tertiary education (1 = Yes; 0 = No)	222	0.19	0.39	0	1
<b>Firm characteristics</b>					
Number of employees	222	4.9	3.9	0	26
Monthly amount of sales (in USD)*	222	4,834	8,842	159	89,694
Monthly net income (in USD)*	222	616.2	681.4	90.8	4,452
Fixed assets	222	2,839	8,969	15.9	109,732
<b>Borrower characteristics - MFI relationship</b>					
Number of credits	222	6.03	4.1	1	25
Duration between first and last credit (in years)	222	6.14	4.46	0	17
Amount of the first credit (in USD)	222	2,464	3,152	42	16,73
Amount of the last credit to date (in USD)	222	3,594	3,975	954.2	27,004

\*At the time of the survey, 1 \$ = 3,144 Ariary.

Std. Dev., standard deviation; Obs., Observation

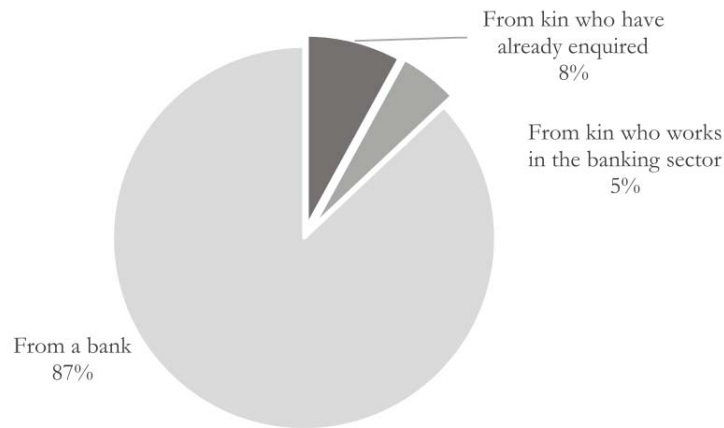
58% of the small businesses in our study were operating in the commercial sector as wholesalers, grocers or specialized retailers; 25% were operating in the services sector primarily as transporters, private schools or caterers; and 17% were operating in the textiles or food processing industries. We intentionally excluded clients whose main activity was in the farming sector, mostly due to logistic constraints.

#### 4.4.1 Variables

##### 4.4.1.1 How to detect people who inquired?

Our dependent variable is binary and takes 1 if the agent ever inquired about bank loan terms and 0 if never. By "inquiring" we mean "having purposefully tried to get information about bank loan conditions". Figure 4.2 shows the three different ways of inquiring mentioned by respondents. It is worth noting that we insisted on the proactive aspect of the inquiry process in order to distinguish from a "someone told me" scenario.

Figure 4.2: How respondents inquired.



These three options produce different results and involve different costs. For instance, while going to a bank to seek out information directly may be costly - especially in terms of time and social costs, - the consumer knows that the information he obtains is 100% reliable whereas seeking information from friends and family is far less costly but also less reliable since the agent cannot be sure that his entourage possess accurate information. These hypothesis are consistent with what we observe in our sample as illustrated in Table 4.4. Borrowers who obtained information from friends rather than directly from banks appear to be less financially literate. Therefore, we believe that the agent makes a tradeoff between the reliability of the information and the cost to obtain it.

Table 4.4: Perception of the interest rates dispersion

% of people declaring that the creditor bank interest rate is inferior to the microfinance one	Nb. Obs.	Mean
Full sample	222	14%
People who did not inquire	152	12%
People who inquired	70	20%
- obtained information from friends or relatives	10	10%
- obtained information directly from banks	60	21%

It is also worth noting that people may have an inaccurate perception of the level of their own knowledge. Indeed, it may be very difficult to gauge your knowledge given that your capacity ability depends precisely on your knowledge. If one is not able to assess one's current level of knowledge, he is not able to identify his needs of knowledge either. In other words, people may have inaccurate information without knowing it because they may be insufficiently educated to be able to tell whether their information is reliable or not. For instance, [Lusardi and Mitchell \(2011\)](#) observe that the older population believes itself well informed, even though it is actually less well informed than the average. Therefore, a person who knows that she is ignorant is more likely to inquire than someone who is unaware of her ignorance. Unfortunately, our data do not allow us to control for this potential gap between self-perception and objective fact. However, we can still illustrate this "misperception" phenomenon by comparing respondents' answers about their current loan interest rate to the actual value we obtained from the partner MFI.

145 borrowers (65% of the sample) declared knowing their current loan interest rate and 99 (44% of the sample) declared knowing their total repayment (interest + capital), which are quite low rates. Moreover, [Table 4.5](#) illustrates a significant error margin in the estimation of total repayment amount among borrowers. Indeed, if we divide entrepreneurs sample depending on the accuracy of their estimation, we can see that people among the first quartile (that is the 25% of respondent who gave the best estimation) have only an approximation of 16% for the interest rate and 4% for the total amount repaid. But people of the third quartile are wrong more than 83% and 46% for the interest rate and the total amount repaid respectively. Therefore, there are borrowers who are aware not knowing the terms of their loan and others who are not aware that they are mistaken.

Table 4.5: People ignoring they do not know accurately their current loan conditions, by quartile

	Error margin	
	Concerning the interest rate (Nb. Obs. 145)	Concerning the total amount repaid (Nb. Obs. 99)
First quartile	16%	4%
Second quartile	33%	10%
Third quartile	83%	46%

Source: Author's fieldwork

#### 4.4.1.2 How to measure financial knowledge?

Of course, there is a dual causality between possessing financial literacy and the impulse to seek out additional information. If we observe that people who are the most likely to inquire are also those with a high level of financial literacy, it can be difficult to determine which one influenced the other initially. Ideally, we would know the level of financial knowledge at the beginning of a borrower's financial life, but we do not have this information. In the absence of this information, we will use two proxy. We will use the educational level of the borrower to take into account the borrower's capacity to perform calculations, such as comparing interest rates, as [Jappelli and Padula \(2013\)](#) who measure initial literacy as mathematical skills at school age. We created a dummy if the borrower went to high school and an additional dummy if he went to college.

As we explained above, another crucial aspect is the level of financial knowledge, such as the initial perception of price dispersion when an agent enters a new market. An agent may not be able to grasp how interest rates are computed, but he may still have the information that commercial banks offer lower interest rates than MFIs. To take into account this aspect, we consider the level of financial knowledge of his family and close friends. We believe that having a financially literate entourage influences the borrower's decision of whether or not to inquire about various financing options. His entourage may influence his decision positively by allowing him to realize that he does not have enough information about bank lending conditions or by allowing him to have a better perception of price dispersion (which corresponds to better financial knowledge). This is the same mechanism highlighted by [Cai and Song \(2012\)](#) who find that the decision for rural producer in China to adopt a weather insurance is positively influenced by the diffusion of knowledge about insurance by farmers' friends. A positive link could also indicate that respondents belong to a social and cultural environment less reluctant to borrow from banks. The entourage can also influence the borrower's decision negatively if it allows him to obtain enough information and that there is no need to inquire further. We have created two dummies equal to one if the respondent has someone in his entourage who is currently a bank customer or working for a financial institution (commercial bank, microfinance institution, etc.).

Finally we use the variable "compare" equal to one if the borrower had compared offers of several MFIs before obtaining their loan. We believe this variable illustrates the general borrower's awareness of the fact that interest rates may vary between lenders and that it may be beneficial to compare them before obtaining a loan.

#### 4.4.1.3 How to measure advantages and costs?

We also take into account the costs and benefits for an entrepreneur to apply for a bank loan. We assess the financing needs by the current amount of the loan. The enterprise profitability has been assessed by the ratio net income/sales. Given that the anticipated probability of obtaining a loan (or not), as well as the potential application costs can negatively influence the decision of seeking out financial information, we create a variable "formalization" to assess to what extent the enterprise was administratively registered. This variable is the mean of three dummies, one for each of the three required administrative documents in Madagascar - namely the fiscal identification number, the company register and the statistical security number. We also use the variable "Accountancy" to assess the accuracy of accounting practices. This variable is "one" if the entrepreneur reported computing his net income mentally, "two" if he reported using a regular notebook, "three" if he reported using basic word processing software, "four" if he reported using an account book, "five" if he declared using a particular accounting software program and finally "zero" if he declared not calculating his profits at all. We use the dummy "Land title" (the variable is "one" if the entrepreneur reported having a land title for his house or his premises) to control for the collateral value of the borrower.

Loan application costs may also stem from the distance to the nearest commercial bank. To control for this aspect, we geolocalized the 102 bank branches in Antananarivo and calculated the distance between each respondent and the nearest branches. The median distance of the sample is 785 meters. Of course this measure is imperfect given it is only distance "as the crow flies" and does not take travel time into account, but we still find it is quite interesting (see Figure 4.3 in Appendix).

Finally, we created a dummy "gender" because women tend to be less financially literate than men [Lusardi and Mitchell \(2011\)](#). Moreover, women may be more risk adverse and consider bank loans too risky (because of a more sizeable collateral to pledge, for instance). We also take into account the age of the borrower as older people tend to inquire less ([Jappelli and Padula, 2013](#)). Older people, who are close to retirement, for instance, may consider that they will not benefit from the advantages of obtaining a bank loan. All of the variables used in our regressions are summarized in the Table 4.8 in the Appendix.

## 4.5 Method and Results

### 4.5.1 The model

To test our hypothesis, we regress borrowers decision of inquiring on level of financial level and other explanatory variables.

Our baseline model is the following probit regression:

$$Pr(Inquiring) = \Phi(\beta_0 + \beta_1 Financial\ Literacy + \beta_2 Information\ Costs + \beta_3 Bank\ application\ Costs + \beta_4 Individual's\ characteristics)$$

Where *Inquiring* is measured by a dummy equals to one if the borrower ever inquired about bank loans conditions and 0 otherwise, *Financial Literacy* are proxy for the borrowers financial knowledge level (the financial knowledge of borrowers' entourage, their education level and if they compare MFIs offers before applying for their first loan), *Information Costs* are proxy for costs of inquiring (distance in kilometers between the borrower and the nearest commercial bank), *Bank application Costs* represents borrowers' difficulties for obtaining a loan from a commercial banks (proxied by the size of the business, its profitability, its level of formalisation and if the borrower has a land title). Finally, *Individual's characteristics* are control variables such as gender and borrowers' age.

We add sectorial fixed effects in order to control for specific effects of the three sectors of our sample (commerce, services, manufacturing). Table 4.6 presents five regressions. Regression 1 refers to the variables related to the borrower's level of financial knowledge. Regression 2 refers to the borrower's educational level and Regression 3 concerns the variables related to the application costs and the probability of obtaining a bank loan. Finally, Regression 4 presents results with all of the variables and Regression 5 illustrates the same regression but considering only people who obtained information directly from banks (and not from friends and relatives) as people who "inquired". Coefficients express the marginal effects.

### 4.5.2 Empirical findings

Our "entourage bank client" variables appear to be significantly positive, suggesting that personally knowing someone who is or has been the client of a commercial bank or is currently working for a financial institution (commercial bank, microfinance institution, etc.) increases the probability of inquiring. However, only the former remains significant after adding control variables. According to our theoretical framework, we interpret this result in terms of knowledge improvement. In fact, we believe that the result may indicate

that a better informed entourage spreads more accurate information, especially on the interest rate gap. For instance, knowing at least that creditor interest rates charged by banks are lower than those charged by MFIs may encourage people to inquire because they have a better perception of their interest to do so.

Our "entourage variables" could also be interpreted from a cost perspective. As we said, obtaining information from banks may be costly. It involves finding and going to a bank, meeting someone at the reception desk or obtaining an interview with a loan officer etc., all of which require time and money. We can also imagine that entering a bank, which are often considered as "only for the rich", can be very intimidating for a small business owner or micro-entrepreneur in a developing country. Knowing someone who is already a client of a given bank may considerably facilitate this process. For instance, this person may help connect the potential borrower with his loan officer. This is an aspect of research costs that our variable "distance from the nearest bank" does not take into account. Moreover, our "entourage variables" could illustrate that borrowers have obtained information from friends and relatives. To take into account this aspect we run the final regression by considering that borrowers who obtained information from friends or relatives and not directly from banks did not really inquire. Our results remain unchanged: knowing someone who is or has been the client of a commercial bank increases the probability of inquiring from a bank.

"Entourage variables" may also indicate that the borrower belongs to a more affluent social group and is therefore more familiar with how banks function. However, the variable "land title", which allows us to take into account the wealth aspect of the borrower, could control for this aspect. The fact that personally knowing someone who works in a bank does not appear to be relevant may be due to the fact that people who know someone who works in a financial institution consider that they have enough information and therefore do not need to inquire. Our variable "compare" which is supposed to represent the initial awareness of a borrower about the value of comparing lending practices of different lenders is not significant.

Education appears to be a very important determinant of financial information seeking, particularly having a higher education. We interpret this in terms of financial literacy where the level of education illustrates the borrower's capacity to understand financial information, such as interest rates. One could argue that people with a higher education level are more affluent and thus more familiar with banking practices, but as with the "entourage" variable, we believe that the variable "land title" controls for this wealth effect.

We are a bit surprised to observe that none of our variables concerning the application costs for a bank loan (having an activity registered and accurate accounting practices) or the probability of obtaining a loan (having a land title) are significant. Indeed, we expected that the more a borrower possessed what banks usually require as security, the more he would be motivated to inquire, given that this probability of obtaining a loan is higher. However, this argument would only hold if the borrower knew the bank's current requirements, which may not have been the case for our respondents. These results may also be explained by the fact that even with quite accurate accounting practices and with solid collateral such as a house or deed of property, borrowers believe that their application will be rejected

Table 4.6: Probit estimations

Variables	[1]	[2]	[3]	[4]	[5]
Entourage bank client	0.186*** (0.0673)			0.120* (0.0672)	0.112* (0.0630)
Entourage bank worker	0.101* (0.0592)			0.0589 (0.0582)	0.0256 (0.0514)
Compare	0.0750 (0.0608)			0.0845 (0.0587)	0.0446 (0.0515)
Secondary education		0.166** (0.0799)		0.140* (0.0805)	0.155** (0.0770)
Higher education		0.421*** (0.0819)		0.356*** (0.0871)	0.226*** (0.0848)
Formalization			-0.0321 (0.108)	-0.0412 (0.101)	-0.0585 (0.0898)
Accountancy			0.0465* (0.0248)	0.0217 (0.0245)	0.00615 (0.0211)
Land title			0.0324 (0.0666)	0.00468 (0.0632)	-0.0173 (0.0551)
Borrowers' age	0.000379 (0.00378)	0.00131 (0.00372)	-0.00170 (0.00386)	0.00203 (0.00377)	0.00437 (0.00337)
Gender	-0.102* (0.0588)	-0.101* (0.0568)	-0.113* (0.0595)	-0.0874 (0.0565)	-0.106** (0.0492)
Last loan amount	1.32e-09 (2.28e-09)	1.35e-09 (2.13e-09)	2.55e-09 (2.32e-09)	1.06e-09 (2.13e-09)	-1.14e-10 (1.96e-09)
Fixed assets	8.79e-11 (1.84e-10)	1.34e-10 (1.73e-10)	7.35e-11 (1.91e-10)	1.34e-10 (1.74e-10)	1.25e-10 (1.47e-10)
Profitability	0.263** (0.124)	0.225* (0.119)	0.241* (0.124)	0.249** (0.119)	0.186* (0.0995)
Borrowers-banks Distance	-0.0387 (0.0345)	-0.0475 (0.0358)	-0.0637* (0.0377)	-0.0319 (0.0349)	-0.0526 (0.0335)
Observations	222	222	222	222	222
Pseudo $R^2$	0.118	0.158	0.086	0.185	0.164

The dependent variable is a dummy equals to one if the respondent has declared having tried to obtain information on bank terms, whatever the source of information. All models are estimated using a probit specification. Standard errors are in brackets. \*, \*\*, \*\*\* indicate significance at 10, 5 and 1% respectively.



because they are convinced that banks do not finance these types of businesses. They may be "discouraged borrowers" as illustrated by [Kon and Storey \(2003\)](#). "Distance to a bank", intended to control for application costs, and "amount of the last loan obtained", meant to control for financing needs, are not significant either.

The "enterprise profitability" variable is positively significant. We can assume that the higher the profitability, the greater the investment opportunities and therefore the bigger the incentives to find more and cheaper financing. It appears that women are less prone to inquire than men. This may be explained by the fact that women may face more constraints than men. For instance, they may have less time to seek out information due to household and childcare responsibilities. Finally, the age of the borrower does not seem to influence her probability of inquiring.

## 4.6 Conclusion and policy implications

Enhancing access to financing for micro and small enterprises is a crucial issue for the development of the private sector. Microfinance institutions have played, and still play, a significant role in meeting the growing financing needs of MSEs excluded from the formal financial sector. However, mainly because of high interest rates and short maturity, MFI financing may be ill-fitted for enterprises that need a certain loan amount.

While several factors can explain why MSEs may prefer resorting to MFIs rather than to commercial banks, this article focus on the lack of financial literacy among entrepreneurs. Based on a field survey of 250 MSEs that obtained large loan amounts from a MFI in Madagascar, we found that 34% of respondent declared not knowing the interest rate currently charged on their loan, and 55% declared not knowing the total repayment (capital + interest) of the current loan. More surprising, we found that among people declaring knowing, an important share of them were mistaken actually. We argue that this lack of financial literacy results in a wrong perception of interest rates dispersion between MFIs and commercial banks. For instance, we found that 86% of the entrepreneurs in our study did not realize that the creditor interest rates applied by commercial banks were inferior to those charged by the MFI - 54% were actually convinced of the opposite. The fact that MFIs and commercial banks use different methods to compute interest rates complicates the perception of rate dispersion between different lenders and makes financial literacy even more important.

The fact that the lack of financial literacy negatively influences individual's financial behavior, especially concerning borrowing decisions, has already been documented. In this article we focused on the determinants of loan information seeking among MSEs who are MFI customers. As far as we know, there is no previous work that highlights the importance of either financial literacy in the tradeoff made by small enterprises between MFI and commercial banks or that focuses on the determinants of loan information seeking.

We find that education level and having relatives who are banking customers are strong predictors of a borrower's decision to do loan information research. We interpret this result as attesting to the influence of financial literacy. Our results suggest that there may be a vicious circle where those people who are most in need of information on financing options

are those who are less likely to seek it out. This is particularly true when we consider borrowers who erroneously believe that they are well-informed on financing options.

In addition, our study raises important concerns about the economic costs of financial illiteracy. Along the same lines as [De Mel et al. \(2008a\)](#) who demonstrate that microenterprises in Sri Lanka have an average real return on capital (ROE) between 55% and 63% per year, which is far above the market interest rate, we find that ACEP's borrowers show a median profitability ratio (net income/sales) of 20.5% in 2014. This simple ratio, calculated with the net income after the monthly loan repayment, although different from a ROE ratio, highlights how profitable these microenterprises are, despite the significant interest rates they are paying for financing. By preventing these small businesses from obtaining more affordable sources of financing, financial illiteracy may have significant consequences in terms of economic growth.

Making financing information easily available for MFI clients is a first obvious step. Many steps have been taken especially when it has appeared that financial illiteracy was an important cause of MFI client over-indebtedness ([Schicks, 2014](#)). For instance, the Smart Campaign Initiative tries to promote better customer protection by encouraging MFIs to be fully transparent in the pricing, terms and conditions of all financial products. However, it is also important that borrowers have easy access to information on other lenders. People need benchmarks in order to compare their loan terms to other financial products and interest rates on the market.

Therefore, standardizing the way that MFIs and banks communicate their creditor interest rates is of primary importance. This involves communication using standard calculation methods and transparent disclosure of hidden costs (compulsory savings, application fees etc.).

The next step is to make sure that people are able to benefit from this information. Training programs are an interesting option to promote financial literacy and teach financial concepts. However there is still a debate on whether financial literacy can be taught efficiently. As illustrated by [Drexler et al. \(2014\)](#), the effectiveness of financial literacy programs depends a lot on their design and basic programs appear to generate better results than more accurate but more complicated trainings. Moreover, because of their costs, programs, even basic ones, are only able to reach a small percentage of the population. As [Lusardi \(2008\)](#) argues, "as illiteracy was not eradicated with a handful of lessons or in a matter of months, so financial illiteracy cannot be eradicated with small interventions, such as a few seminars or one benefit fair". Discovering the best way to improve financial literacy still remains a fruitful area for further research.

Of course, further works are necessary to overcome the limits of our study. An obvious limit is that our sample is only composed of MFI clients who therefore likely have particular characteristics in terms of financial literacy. It would be interesting to lead similar analyses on non-MFI clients. Moreover, we do not know what information is most important for borrowers to choose between the lender they will secure financing from. We focused on interest rates because it seemed to be the most difficult parameter to interpret, but it may be that the type and the amount of collateral play an important role in this choice as well. It would have also been interesting to have in-depth data on what information potential

borrowers ask for (interest rate, collateral etc.) and how reliable they think their source is. This information would allow us to tailor specific training leaflets encouraging people to inquire further.

## 4.7 Appendix

### Calculating interest rates

#### Flat rate method

The amount of interest paid is calculated as a percentage of the total loan size. A fixed amount of interest is paid for each repayment installment. Flat rate interest is not dependent on the amount that has been repaid.

Flat rate calculations are done with these four formulas:

- Monthly interest payment = loan amount x monthly interest rate
- Monthly principal payment = loan amount / loan term (in months)
- Total monthly payment = monthly interest payment + monthly principal payment
- Remaining balance (in a specific month) = loan balance outstanding (in that month) - monthly principal payment

#### Declining balance method

The amount of interest paid is calculated on the outstanding balance of the loan at the time of each payment installment. If the payment installment is constant, the interest portion decreases each month, and the principal repayment portion increases. The declining balance method is more accurate, in the sense that it is a true representation of how much someone has to pay to borrow money.

The monthly payment formula is given by the following formula:

$$\text{Monthly payment} = \frac{\text{Loan amount (principal)} \times \text{Monthly interest rate}}{(1 - (1 + \text{Monthly interest rate})^{-\text{loan term}})}$$

Then we can calculate :

- Interest payment = Outstanding loan balance x monthly interest rate
- Principal payment = Monthly repayment - interest payment
- Remaining balance (in a specific month) = outstanding loan balance from previous month - principal payment

These formulas allow us to calculate interest rates equivalent to flat rates, i.e. generating the same amount of interest that flat rates. See Table 4.7 below for an example.

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Table 4.7: Illustration of the financial costs gap resulting from the use of different interest rates calculation methods

Amount borrowed : 1000			
Maturity	6 months	12 months	24 months
Amount of interest with a 2% flat rate per month(A)	120	240	480
Amount of interest with a 2% rate <sup>a</sup> per month (B)	71	135	269
(A) - (B)	49	105	211
Difference in % of loan	5%	11%	21%
Equivalent interest rate <sup>a</sup> generating the same amount of interest as the 2% monthly flat rate	3,34%	3,48%	3,41%

<sup>a</sup> calculated with the declining balance method.

### Other figures and tables

Figure 4.3: How bank interest rates compare with MFI interest according to survey respondents.

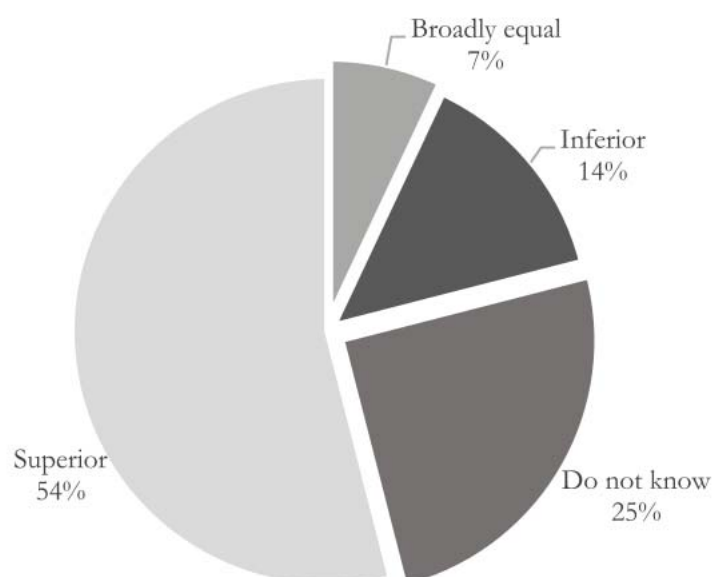


Table 4.8: Variables description

Name	Description	Mean	Std. Dev.
<b>Dependent variables</b>			
<i>Bank inquiring</i>	1 if the respondent has declared having tried to obtain information on bank terms, whatever the source of information.	0.32	0.47
<b>Independent variables</b>			
<i>Entourage bank client</i>	1 if the respondent has declared personally knowing someone who is a client of a commercial bank, 0 neither.	0.69	0.46
<i>Entourage bank worker</i>	1 if the respondent has declared personally knowing someone who works in a commercial bank, 0 neither.	0.38	0.49
<i>Compare</i>	1 if the respondent declared having compared the offer of several MFIs before becoming a client of the MFI partner.	0.41	0.49
<i>Secondary</i>	1 if the respondent was enrolled at a secondary level school, and 0 neither.	0.59	0.49
<i>Higher education</i>	1 if the respondent was enrolled at a tertiary level school (post high school certificate), and 0 neither.	0.19	0.39
<i>Formalization</i>	Mean of three dummies for each required administrative document (fiscal identification number, company register and statistical security number).	0.61	0.31
<i>Accountancy</i>	This variable is 1 if the entrepreneur declared computing his net income mentally, 2 if he declared using a regular notebook, 3 if he declared using the a basic tabulation software, 4 if he declared using a specific account book, 5 if he declared using a specific accounting software, 0 if he declared not calculating his profit at all.	1.85	1.18
<i>Land title</i>	1 if the entrepreneur has a land title, 0 if none.	0.67	0.47
<i>Borrowers' age</i>	Age of the borrower in years	43.7	8.2
<i>Gender</i>	1 if the respondent is a woman	0.54	0.4
<i>Last loan</i>	Amount of the loan obtained from the MFI at the time of the survey, in US dollars	3,594	3,975
<i>Fixed assets</i>	Amount of MSEs' fixed assets at the time of the survey, in US dollars	2,840	8,970
<i>Profitability</i>	Average monthly net income/average monthly sales.	0.27	0.25
<i>Distance from banks</i>	Distance in kilometers between a borrower and the nearest commercial bank.	1.28	3.51

Table 4.9: Information on the distances between borrowers and the closest branch of a commercial bank

Distance in Kilometers	
Mean	1.28
Std. Dev.	3.51
Min	0.04
Max	49.23
First quartile	0.37
Median	0.79
Last Quartile	1.28

Table 4.10: Details on the microfinance offers of other lenders

Financial products	Duration (in months)	Flat interest rate per month (in %) <sup>a</sup>	Equivalent interest rate per month calculated with the declining balance method (in %) <sup>a</sup>	Effective interest rate (in %) <sup>b</sup>	Effective interest rate after controlling for inflation (in %) <sup>c</sup>
<b>Microfinance institution level 3</b>					
CECAM	Building plot purchase	36	2.5 - 3.5	3.98 - 5.3	47.8 - 63.6
	Building cultivable land	24	3	4.89	58.7
	Long term crops	36	2	3.29	39.5
	Trade	4	12	6.62	79.4
	Building maintenance and repairs	24	3	4.89	58.7
	Equipment maintenance and repairs	18	3	5	60
	Production	12	2.5 - 3.5	4.28 - 5.86	51.4 - 70.3
	Transformation	12	3 - 3.5	5.08 - 5.86	61 - 70.3
	Short term credit	12	2	3.48	41.8
	Medium term credit	36	1.75	2.93	35.2
ACEP	Individual credit	6	2.5	4.15	49.8
	Equipment credit	12	2.5	4.28	51.4
	Rural group-lending credit	6	2.5	4.15	49.8
	Credit for women	6	2	3.35	40.2
					30.3
<b>Commercial banks with microfinance products<sup>d</sup></b>					
Microcred	Micro and small enterprise credit	12	2.17	3.75	45
	Micro and small enterprise credit	24	2.17	3.66	43.9
	Micro and small enterprise credit	36	2	3.29	39.5
	Medium enterprise credit	36	1.8	2.9	34.8
Acces Banque	Express credit	24	2.23 - 2.32	3.76 - 3.89	45.1 - 46.7
	Micro and small enterprise credit	30	2 - 2.1	3.35 - 3.45	40.2 - 41.4
	Micro and small enterprise credit	36	1.8 - 2.05	2.9 - 3.36	34.8 - 40.3
	Farming credit	24	2.22 - 3.08	3.74 - 5	44.9 - 60
SIPEM	Classic credit	18	2	3.46	41.5
	Housing credit	18	1.65	2.9	34.8
	Micro enterprise	12	2	3.48	41.8
	Small enterprise	18	2	3.46	41.5
	Medium enterprise	24	1.75	3.02	36.2

<sup>a</sup> Interest rates are available here : [www.madmicrofinance.mg/cmuf/public.php?action=PublicPortail](http://www.madmicrofinance.mg/cmuf/public.php?action=PublicPortail). When only flat rates were disclosed, conversion had to be done using the formula described in Table 4.7.

<sup>b</sup> Calculated with the proportional formula : annual interest rate = "monthly interest rate" x 12

<sup>c</sup> Deflated annual interest rate =  $[(1 + \text{"annual interest rate"}/100) / (1 + \text{"inflation rate"}/100)] - 1$ . The inflation rate was 7.6% in Madagascar in 2016.

<sup>d</sup> It is worth noting that Microcredit and SIPEM were MFIs who converted into banks.

# Conclusion

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According to the International Monetary Fund (IMF), by 2035 the number of Africans entering the work force will exceed that of the rest of the world combined. Currently, one out of two Africans is unemployed and those who work rarely have access to quality jobs with decent wages or good working conditions. As a result, despite steady economic growth rates over the last fifteen years, extreme poverty in Sub-Saharan Africa has increased in absolute terms, and if the current rate of economic growth does not accelerate, it will take 60 years to reduce the poverty ratio to 9%, i.e. the current level of the average middle income country. For policymakers and development practitioners, a critical policy question arises : how do we create new jobs quickly?

Micro, small and medium-sized enterprises hold high potential for job creation and income generation. However, lack of financing, among numerous other obstacles, significantly impedes small business development. Microfinance institutions have played, and continue to play, a significant role in meeting the growing financing needs of MSEs, who are largely excluded from the formal financial sector. In this thesis, we attempt to shed light on some issues that could help to increase microfinance impact on MSEs in developing countries.

## 5.1 Contributions of the dissertation

In Chapter 1, we illustrate that around a third of entrepreneur clients of ACEP change activity sectors in the first five years after starting their business. While this change could be explained by serial entrepreneurship or overconfidence, we suggest that it is due to initial financial constraints entrepreneurs face when they launch their original enterprise: a lack of financing prevents them from starting a business in the sector they want or from investing in that sector at the optimal level required for their enterprise to succeed. Because of limited opportunities in the job market, these individuals are "forced" to start their own business in a second-choice sector.

Our work raises important questions about entrepreneurial talent allocation and how MFIs can influence it. Ensuring a good match between an individual's aspirations and his business endeavors is a critical aspect of economic development (Bianchi, 2010; Gries and Naudé, 2010). The sector changes we observe on the part of entrepreneurs may indicate a successful rematching process to which MFIs may contribute through providing essential financial support to new business ventures. However, such "sectorial migrations" also illustrate an initial mismatch and we do not know to what extent constrained entrepreneurs manage (or not) to change sectors. Without additional qualitative information on the perspective and initial motivations of "migrating entrepreneurs", we have no idea whether they



represent the majority or the minority of "constrained entrepreneurs". More generally, our study emphasizes the need for start-up financing in order to enable entrepreneurs to invest in their business of choice from the outset and thus reduce the risk of initial mismatches.

In Chapter 2, we discuss the "upscaling" strategies that have been initiated by some MFIs in order to better meet the demand of small growing businesses with increasing financing needs. We illustrate that these strategies may actually result in competition with commercial banks, especially for the "largest" and most promising MSEs. Contrary to our initial beliefs, MFIs and commercial banks are no longer operating in a segmented market. In other words, the upscaling strategy launched by MFIs can be viewed as a substitution for bank financing and not necessarily as an explicit attempt at decreasing credit rationing for people excluded from the formal financial sector, which is the purpose for which MFIs were created.

The net economic impact of the upscaling process is hard to know. On the one hand, the upscaling strategy may provide MFIs higher profits that they could use to improve financial inclusion for the poorest entrepreneurs. In addition, competition could actually lead to better loan conditions for small business owners. On the other hand, the upscaling process could prevent MSEs from obtaining more attractive financing from banks. In fact, by granting large loan amounts with less administrative requirements than banks (such as proof of sound accounting practices), MFIs may unintentionally discourage MSEs from formalizing. As the formalization of a business may be a push factor for the economy (McKenzie et al., 2010; Bruhn and McKenzie, 2013) and high interest rates can hinder investment, upscaling strategies may ultimately be detrimental to economic development. Of course, the accuracy of this last statement depends upon the real motivations and capacity of entrepreneurs to pass through the bank application process.

One may ask why entrepreneurs with significant and growing financing needs still resort to MFIs instead of turning to commercial banks that offer lower interest rates. Studying the entrepreneurs' choice between moneylenders and formal lenders, previous works have documented that entrepreneurs may be excluded from the formal financial sector because of their poverty level (small financing needs, lack of collateral) or that they may be discouraged by the bank application process and consider that transaction costs associated with banks actually offset any potential financial benefit (Kochar, 1997; Mushinski, 1999; Kon and Storey, 2003; Straub, 2005; Boucher et al., 2008; Giné, 2011).

In Chapter 3, we investigate this question for MFIs and banks and offer an alternative explanation. We suggest that an entrepreneur's choice of lender could in fact be biased by a lack of financial literacy even on the part of business owners who borrow large sums. Indeed, we document that many small business owners in our study did not know the interest rate charged on their loan or the total amount of interest they were paying. More surprisingly, the vast majority of our participants were actually convinced that commercial banks charged higher interest rates than MFIs, when in fact banks charge significantly lower rates than MFIs.

We suggest that a lack of information on the difference in interest rates between banks and MFIs is a strong predictor of a borrower's choice on where to seek financing. Indeed, contrary to the obvious difference between the interest rates charged by moneylenders and

formal financial institutions, comparing financing costs between MFIs and banks rates may be quite difficult, especially because they use different methods to calculate and present interest rates to clients.<sup>1</sup>

We investigated the determinants of information-seeking about bank lending terms and found that borrowers with at least a minimum of financial literacy will seek out information about alternative financing options, while financially illiterate borrowers are likely to remain ignorant.

There is no doubt that thanks to their upscaling strategy, MFIs are meeting the growing financing needs of MSEs excluded from the formal financial sector. However, there may also be entrepreneurs who continue to resort to MFIs rather than turning to traditional financial institutions largely because of a lack of information, which highlights the economic costs of financial illiteracy.

## 5.2 Discussion

There are currently more than a thousand MFIs which serve at least 130 million clients worldwide, a fact that is proof in and of itself that MFIs are meeting real needs. However, the impact in terms of poverty alleviation remains mixed for three main reasons. First, other impediments such as the lack of infrastructure or entrepreneurial skills among borrowers may cancel MFIs impacts. Second, MFIs do not serve only growth-oriented entrepreneurs but also those who use credit to finance personal consumption (of food, health services, education, housing etc.) rather than to expand their business (Berner et al., 2012). Finally, evidence suggests that many growth-oriented small-scale entrepreneurs are inadequately served by the current finance options available (Banerjee and Duflo, 2012; McKenzie et al., 2010; Hampel-Milagrosa and Loewe, 2015). High interest rates and short term repayment cycles may not allow entrepreneurs to realize long-term investments in machinery or introduction of new production and process standards, etc. (Dalla Pellegrina, 2011; Field et al., 2013; Banerjee et al., 2015b), that would help them increase their productivity.

MFIs contribute to economic growth by providing enough financial support to enable household and small businesses to buy goods and services, i.e. MFIs finance intermediate and final consumption. However, the traditional MFI model does not provide adequate resources to allow businesses to invest in growth or realize productivity gains which are vital to the fueling of the economy. Thus, despite the real support that MFIs provide, the development of small and mid-sized businesses in developing countries is still inherently limited by a lack of financial resources and support.

The lending methodology of MFIs is essentially driven by information asymmetry and economically fragile institutions. Loans are short-term in order to keep the likelihood of default low, and interest rates are high in part because monitoring MSEs is costly. Although

<sup>1</sup>MFIs typically use a flat interest rate method with a single fixed fee for credit, regardless of capital repayment, while banks use a declining balance method, where the interest rate is charged only on the outstanding capital. While these methods may appear equal at first glance, interest rates can, in fact, vary dramatically.

MFI funding characteristics limit borrowers from substantially increasing their productivity, this has been necessary for MFIs to be profitable and continue supporting smaller businesses.

That said, can we expect MFIs to offer new financial services and products, more favorable to MSE development, if the institutional context remains as difficult as it is now in low income countries? We believe that the answer is probably yes and that the resulting economic and social benefits generated might well be achieved without compromising the sustainability of MFIs.

On the whole, microfinance is a tool whose potential has not yet been fully exploited. "Digital finance", such as "mobile banking" has been rapidly developing over the past decade and offers the potential of increasing financial inclusion in the poorest and most remote areas. However, there is plenty of room for the microfinance sector to better support the entrepreneurial spirit. New technologies could help decrease adverse selection and lower monitoring costs. The resulting financial gains could be used to create better suited financial products to benefit "gazelles" and "self-entrepreneurs", both of whom need substantial support to generate productivity gains and, ultimately, to contribute to economic growth.

Any innovative approaches aimed at better serving MSEs would surely involve MFIs developing "tailor-made solutions" for those MSEs with the highest potential for growth (i.e. the "gazelles"). Such a complementary philosophy would require MFIs to train their staff to handle more sophisticated products. We provide some ideas to consider below.

At the end of 2015, there were 1.4 million microfinance clients in Madagascar<sup>2</sup>. If only a fraction of those have the potential to grow and create profit and jobs, it is worth making the effort to support them.

### 5.3 Limitations

There is no denying that our work suffers from several limitations.

The main limitations concern data. For Chapter 1 and 2, we use the client databases of a large MFI in Madagascar. Although these databases offer a wealth of information (on more than 15,000 clients over 20 years), some client information that could be helpful is not available. For instance, we have no information about the entrepreneurs' education, family background or social aspirations, which would have been very useful for Chapter 1. Without this data, we cannot know with certainty what an entrepreneur's first choice business may have been and why, or whether they benefited from other financing sources such as relatives or commercial banks.

In Chapter 2, we mainly lack information about how entrepreneurs negotiate their loan conditions with MFI loan officers. We make the hypothesis that the proximity of a bank branch gives less opaque entrepreneurs (i.e., those who run the largest and most established MSEs) some bargaining power which enables them to obtain more attractive loans. It would have been very interesting to compare our hypothesis and qualitative data. Moreover, we lack information about entrepreneurs' skills, particularly their accounting and management practices, to tell if entrepreneurs that we suppose are targeted by banks

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<sup>2</sup>[www.madamicrofinance.mg/index.php/chiffres-cles/statistiques](http://www.madamicrofinance.mg/index.php/chiffres-cles/statistiques)

really have the capacity and willingness to apply for a bank loan. Finally, we undertook a substantial amount of work to localize bank branches in the nine administrative areas where our partner MFI had been working between 2008 and 2014. However, it has not been possible to do the same for competitor MFI branches given that very few of them disclose their address.

For Chapter 3, we led a field survey among 252 entrepreneur clients of our partner MFI who had borrowed at least \$954, which corresponds to the highest quartile of clients according to the loan amounts granted by ACEP. This survey suffers from the usual time and budget limitations. For example, ACEP required that the interviews last less than 50 minutes in order not to disturb their clients' schedules. Therefore, we were unable to collect some useful information. For instance, it would have been interesting to have in-depth data on what information potential borrowers ask about financial products (interest rate, collateral, etc.) and how reliable they consider their source to be. Moreover, it appeared afterwards that we had failed to consider cultural factors which may in fact be quite important. Indeed, we have since learned that credit is perceived quite negatively in Malagasy culture; it tends to be seen more as a sign of poverty than as a means of growth.<sup>3</sup> Taking this factor into account would have been very interesting.

Although we are well aware of these limitations and we used several robustness checks to take them into consideration, there is no denying that additional works are needed to broaden our research and challenge our conclusions.

## 5.4 Areas for further study

Our work suggests some areas for future study for researchers, policy makers and development practitioners. First, it would be interesting to challenge the external validity of our results in order to see if they are specific to Madagascar, or even to our MFI partner. Indeed, the entrepreneurs we study are microfinance clients, so potentially quite different from other entrepreneurs in Madagascar. Investigating how unbanked entrepreneurs, and entrepreneurs who secure financing from commercial banks, change sector and choose their lender would be very interesting.

For Chapter 1, it could be interesting to understand the role played by microcredit in the "sectorial migrations" we observe in our study. For instance, are entrepreneurs constrained because of lending terms such as the loan amount, loan maturity or interest rate charged? Identifying whether there is a type of loan that would enable an entrepreneur to reach their

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<sup>3</sup>For illustrative purposes, we can report here two anecdotes from our survey. First, coincidentally, we interviewed an entrepreneur who ran a small grocery in which one of our local team members regularly did her shopping. Learning this entrepreneur had gotten a large loan, she declared quite surprised "I thought that this entrepreneur was doing well!", suggesting that taking out a loan was more a sign of failure than an indication that the entrepreneur was investing in his business. Second, our partner MFI is also established in Cameroon and we learned it has developed a completely different manner for its credit officers to meet clients on the street. In Cameroon, credit officers wear a noticeable uniform, whereas in Madagascar they wear civilian clothes so that clients can hide the fact that they have pursued a loan.

first-choice sector more rapidly would also be very useful. Finally, investigating whether entrepreneurs experience higher sales and profit growth after changing sectors is also crucial.

For Chapter 2, it would be very interesting to assess the global impact of the upscaling strategies implemented by some MFIs, i.e., whether these strategies really help decrease credit rationing among MSEs. In particular, the hypothesis that MFI upscaling strategies may "divert" the largest MSEs from applying for bank loans and thus from improving their level of formalization deserves specific attention.

Finally, Chapter 3 encourages us to better understand what biases may prevent individuals from making optimal financial choices. As highlighted, a lack of financial literacy is central, but some social and cultural factors appear to play a major role as well. Through our interviews, we learned about negative views that many Malagasy people seem to hold about commercial banks, and more generally about credit; and how many perceived the pursuit of credit more as failure than as a sign of the pursuit of economic ambition.

Our research also suggests valuable areas of work for development practitioners, especially those in the microfinance sector.

As we saw in Chapter 1, initial financial constraint may greatly influence the allocation of entrepreneurial talent across sectors. With more attractive financing (longer loan terms, lower interest rates, inclusion of grace periods, etc.) would-be entrepreneurs could launch a business directly in the sector they want. While more effectively assessing the risk of financing a start-up is not easy for lenders, it is essential if MFIs are to assist MSEs through this critical beginning stage of development. At the time of start-up, the information asymmetry between loan applicants and lenders is at its maximum. MFIs generally use progressive lending as a screening and monitoring process: each round of lending provides more information about the creditworthiness of the client. However, MFIs could use the information generated by other institutions that interact with their clients. For instance, there are job training centers in many developing countries that provide youth with vocational skills. Partnerships could be made between MFIs and these centers to help MFIs identify the best students, i.e. presumably the most promising borrowers. An identical certifying process could be made with businesses incubators, such as "La maison de la petite entreprise" in Burkina Faso<sup>4</sup> or in Chad<sup>5</sup> for instance. Of course, such partnerships would require that MFIs reinforce their screening process, for instance by assisting potential entrepreneurs in building their business plan, and by designing new financial products adapted to start-ups.

On the whole, the need for new financial products is clear. In Chapter 2, we suggest that the upscaling strategies initiated by some MFIs may result in effectively diverting clients from obtaining financing from banks rather than in a decrease credit rationing.

MFIs offer MSEs many advantages over banks, such as close proximity to entrepreneurs and simple lending process. However, the tight repayment schedule and high interest rates of loans they offer, do not enable entrepreneurs to make profitable investments. Previous studies suggest that extending loan maturity and including grace periods may generate significant impacts (Field et al., 2013) on MSEs development. Of course, offering more

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<sup>4</sup>[www.me.bf](http://www.me.bf)

<sup>5</sup>[www.mpetchad.com/company](http://www.mpetchad.com/company)

generous lending terms could also lead to higher default rates lenders. However, MFIs collect enough information on borrowers, particularly thanks to progressive lending, to effectively screen the lowest-risk entrepreneurs and thus keep default rates low.

Entrepreneurs in developing countries are usually striving in a very hostile environment and may lack financial and management skills. Moreover, they are often running their business alone and without skilled middle-management staff to help them with decision-making. Therefore, in addition to more attractive financing, entrepreneurs may also need guidance to manage and invest in their business, choose the best machinery, technologies, etc.

Last but not least, Chapter 3 emphasizes the need, which is well-known, for information transparency on local credit markets. Many steps have already been taken, especially once it appeared that financial illiteracy was an important cause of MFI-client over-indebtedness (Schicks, 2014). For instance, the Smart Campaign Initiative tries to promote better customer protection by encouraging MFIs to be fully transparent in the pricing, terms and conditions of all financial products.

However, it is also important that borrowers have easy access to information on other lenders. People need benchmarks in order to compare their loan terms to other financial products and interest rates on the market. Therefore, standardizing the way that MFIs and banks communicate their creditor interest rates and using standard calculation methods and transparent disclosure of hidden costs is of primary importance. This need is not specific to developing countries. The French government launched a web site in 2016 that enables people to easily compare bank products<sup>6</sup>. The same could certainly be done in developing countries whose internet and smartphone penetration rates have been steadily increasing over the last couple of years<sup>7</sup>.

After all is said and done, MFIs have the potential to do more to boost MSE growth. To do this would require MFIs to develop new financial products and offer business development services specifically targeted at two types of MSEs: the start-ups and "gazelles" (either current or futures ones). Implemented in-house methodology, dedicated to these types of MSEs, would certainly require MFIs to reinforce their staff and mobilize more attractive financing. The initial phase might be costly, but new products and services would also attract new clients and increase their growth. More importantly, such strategies have the potential to generate significant economic and social impacts, a point that should be a source of motivation for development practitioners and impact investors to look further in this direction.

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<sup>6</sup><http://www.tarifs-bancaires.gouv.fr/>

<sup>7</sup>Internet penetration in Sub-Saharan Africa has grown from 9.8% to 22.4% since 2010 (World Development Indicators, 2017).



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