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**Financial Constraint, Entrepreneurship  
and Sectoral Migrations**

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# Financial Constraint, Entrepreneurship and Sectoral Migrations\*

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## 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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# 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 Lovallo, 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 micro-

finance 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 sectoral migrations in developing countries.<sup>1</sup> Using data from Vietnamese 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,

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<sup>1</sup>[Bernard et al. \(2006\)](#) scrutinize this phenomenon in the U.S. and they find that eight percent of manufacturing firms switched activities during five-years periods between 1977 and 1997.

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; Quattraro 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 implicitly 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 (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 summarizes to what level financing constraint and sectorial entry costs may drive an entrepreneur's business decisions. Section 3 presents our data, variables and method while Section 4 displays our econometric results. The final section concludes.

## 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>2</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

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<sup>2</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)

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%. [Banerjee et al. \(2015\)](#) provide close results. 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 Pellegriana \(2011\)](#) find that tight repayment schedules may preclude borrowers from undertaking long-term investments. According 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. The expected gain of the employee activity is the average wage times the probability of getting the job while an entrepreneur starts a business with capital investment and realizes profit. 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>3</sup> in developing countries are reluctant to finance individuals whose entrepreneurial talent has not yet been demonstrated. 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>4</sup> 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 A1 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, we assume that entrepreneurship expected earnings are always superior to employee's expected income.

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<sup>3</sup>Commercial banks and microfinance institutions as well.

<sup>4</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 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.

In the case of high constraints on the job market, 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, 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. However, [Hurst and Lusardi \(2004\)](#) show that financial constraint is not more binding for industries with high start up costs than for those with low start up costs. We may therefore observe that financial constraint has no impact on first sector choice and subsequent migrations. At the opposite, 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.

## 3 Data and variables

### 3.1 Data

We benefited from a comprehensive client database of 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>5</sup> Our data 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, the MFI has been collecting business information (sector, sales, profit, fixed assets, number

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<sup>5</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 2015)

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>6</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>7</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>8</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 MFI clients and therefore present particular characteristics compared

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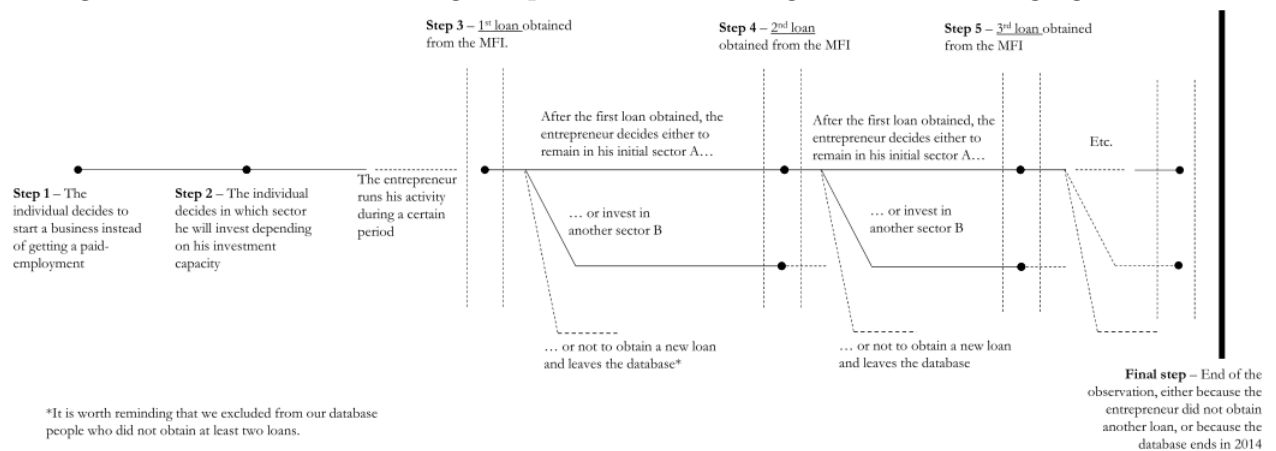
<sup>6</sup>De Mel et al. (2009) shed an interesting light on the difficulty of accurately assessing the income of microenterprises with field surveys.

<sup>7</sup>Before 2008, the partner MFI did not have the same process to collect information concerning the borrowers

<sup>8</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.

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 the partner MFI that same year, thus appearing in our database in 2008. As illustrated by Figure 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 the MFI in step three. It is from this point that the entrepreneur appears in our database where we can observe whether of not he changes sectors afterwards.

Figure 1: Timeline illustrating the process of obtaining a loan and changing sector



Thus, we do not know whether borrowers had previously changed business sectors before obtaining a loan from the MFI. This probability is negatively correlated with the time between step two and step three. As illustrated in Table A3 in the Appendix, 18% of our sample is composed of entrepreneurs that obtained their first loan the same year they created their business; and on average, there are 2.3 years between the creation of the enterprise and the granting of the first loan. As presented in Figure 1, we have

information only when entrepreneurs obtain a new loan. Therefore, we do not know what happens between two subsequent loans (8 months on average). 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 A3 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 4.

## 3.2 Variables

### 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 the MFI. The great majority of loans granted by the MFI 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 the MFI 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 the MFI grant a new loan only to entrepreneurs who did not face difficulties to reimburse the previous one. The MFI considers 38 different business sectors (firms in our database operate in 27 of these sectors). After a discussion with the MFI staff, we regrouped these into 14 homogenous sectors as some activities are virtually indistinguishable to us.<sup>9</sup> Table A1 presents the different sectors and the

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<sup>9</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.

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 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 the MFI, 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 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 the MFI). 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.

### 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 business as well as to one's borrowing capacity.<sup>10</sup> Unfortunately, we do not information on the individuals' wealth level in our database.

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<sup>10</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.

However, we observe the first loan amount secured from the partner MFI. 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.

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 242 clients of our partner MFI and less than ten percent of clients used a loan from relatives or money lenders as an additional source of financing.<sup>11</sup>

### 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:

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

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 sector and 0 otherwise,  $B_i$  is first loan obtained by  $i$  (proxy of financial constraints) and  $\mathbf{X}_i$  is a set of

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<sup>11</sup>In September 2014 we conducted a small field survey among clients of the last quartile of the MFI’s portfolio in Antananarivo. The bulk of the data has been used for another study, but some of the information is still relevant for this article.



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 entrepreneur 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 granting 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 A4, 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 A5 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

sector and ask for a small loan because of a common shock<sup>12</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 A1 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 sector before he secure the credit from the MFI, and therefore the lower the probability of observing sector 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 financ-

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<sup>12</sup>These computations are based on 1,925 clients of the database localized by the MFI.

ing 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>13</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, [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

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<sup>13</sup>Using dummies instead of values of profit allows us to control for outliers.

”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 will not be able to observe it) or because they did so before 2013 (again, we will not be able to observe this).

## 4 Results

### 4.1 Descriptive statistics

Before investigating in detail the determinants of migration, we provide some simple statistics. Descriptive statistics are presented in Table 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 US dollars but dispersion is wide.

We implement different t-tests to study whether movers and stayers differ. Results are reported in Table 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.

Table 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.

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 A1 in the Appendix.<sup>14</sup>

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 A1.<sup>15</sup> Therefore, sectorial migration appears to be a very complex

<sup>14</sup>Net migration is positive if the dark bar (% of immigrants in the final sector compared to the number of MSEs in the initial sector at the first observation) is higher than the bright bar (% of emigrants in the initial sector).

<sup>15</sup>The same conclusions can be drawn if we consider these sector changes in relative number of firms

Table 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.

phenomenon, with no particular pattern, as illustrated by the Figure A2 in the Appendix: all sectors gain/lose enterprises and "emigrant/immigrant" enterprises can represent a very large share of firms in any given sector.

## 4.2 Baseline model

The econometric results, of our baseline model are presented in Table 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>16</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 sector. This result may suggest that entrepreneurs changed sector before obtaining his first loan. Another explanation is that the longer this period between the firm creation and the first loan, the smaller the observation period. In addition, 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.

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by sector.

<sup>16</sup>Marginal effects in the Table 3 are reported for financial figures in 1,000 USD. The economic effect of a one-standard deviation is obtained as follows:  $\hat{\beta} \times \text{Std Dev.} = -0.014 \times 1.396 = 0.0194$

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), 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. As a result, they changed sectors as soon as they are financially able.

As discussed in Section 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 average loan amount granted by the same MFI branch. Indeed, one might expect that the second instrument (average loan offered to firms operating in the same sector during the same year) could be endogenous. 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



Table 3: Probit estimations: Baseline results

	Probit		Instrumentation			
	[1] Probit	[2] Probit	[3] 2SLS	[4] IV-Probit	[5] 2SLS	[6] 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

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.

### 4.3 Robustness checks

Our baseline results document that the smaller the financial constraint at the time the entrepreneur 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 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 first credit year and the firm's starting year increases (see Table A3 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 be larger and not reflect financial constraint 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 they have had less time to accumulate their 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

Table 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.

constraint matters only for the sub-sample of young entrepreneurs.<sup>17</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 their business in all future loan requests, whereas we expect a "portfolio entrepreneur" would report both their previous and new sector sequentially. 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>18</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.

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<sup>17</sup>Our results are unchanged if we use the first quartile age of 29 as threshold.

<sup>18</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.

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>19</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 5. The coefficient associated with the initial loan amount is not statistically different

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<sup>19</sup>Due to the limited period of time, we cannot consider firms created after 2011 as an additional robustness test.

Table 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

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 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>20</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.

#### 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>21</sup> of MSEs that obtained their credit the year they were created (during 2008-2014, nb. obs.

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<sup>20</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>21</sup>Total assets are defined as the sum of fixed assets and working capital



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 A3 and Table A2 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>22</sup> Of course, all of these reasons are important for explaining sector changes. 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.

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<sup>22</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 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 Lovallo, 1999). Finally, sectoral changes can also be driven by individual characteristics, such as boredom.

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 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 7, we regress the probability for an entrepreneur to be a High-Low mover (column [1]), or to be a 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>23</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 entrepreneur initially prevented from investing in their first choice sector because of financial constraint.

## 5 Conclusion

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

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<sup>23</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 6: "Low-High" and "High-Low" entrepreneurs

	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 7: "Low-High" and "High-Low" entrepreneurs

	Low-High entrepreneurs	High-Low entrepreneurs
	[1]	[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 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.

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 constraint 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 are financially able. Literature on the relationship between entrepreneurship and financial constraint 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 constraint.

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 constraint 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.

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## Appendix A Additional Tables and Figures

Table A1: 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%
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 A2: Entry costs accross sectors<sup>a</sup>

Sectors	5th centile of total assets <sup>b</sup>	25th centile of total assets	50th centile of total assets
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. We consider as a measure of entry costs the average total assets of new firms created in a specific sector. Figures are in US dollars.

<sup>b</sup> The total assets are the sum of fixed assets and working capital

Table A3: 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							
	2008	2009	2010	2011	2012	2013	2014	Total
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							
	2008	2009	2010	2011	2012	2013	2014	Total
2008		30	65	64	193	342	431	1125
2009		1	11	70	184	247	572	1085
2010				20	119	253	415	807

Table A4: Distance<sup>a</sup> between MFI clients and their credit officer, by city

	Mean	Median	Std. Dev.	Minimum	Nbr. 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 (4th arrondissement)	4.8	2.5	15.3	0.05	69
Ambohitrimanjaka	6.2	6.6	2.6	0.82	12
Antananarivo (6th arrondissement)	1.5	1.1	1.4	0.06	64
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
Antananarivo (2th arrondissement)	5	2.1	21.6	0.19	96
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 A5: Average and median surface of activity for credit officers, by city

	Average surface (Km <sup>2</sup> )	Average perimeter (Km)	Mediane surface (Km <sup>2</sup> )	Mediane perimeter (Km)
Mahajanga	14.1	16.6	13.8	16.4
Tsaramandroso	22.7	21.1	14.6	17.1
Antananarivo (1st arrondissement)	37.9	24.5	34.7	23.8
Antananarivo (4th arrondissement)	58.3	34.7	32.1	27.7
Ambohitrimanjaka	42.2	35.4	42.2	35.4
Antananarivo (6th arrondissement)	18.8	18.1	18.9	19.7
Ivato Ambohibao	131.9	55.1	131.9	55.1
Ambohimangakely	31.2	21.9	14.6	20.5
Ankadikely Ilafy	48.7	31.9	51.9	30.4
Tanjombato	25.8	20	32.3	26
Antananarivo (2th arrondissement)	33.3	24.4	27.5	24.2
Ambatolampy	12.9	15.7	12.9	15.7
Ambohimandroso	75.4	43.7	75.4	43.7
Soamalaza Mahatsinjo	65.4	47.1	53.8	37.8
Ambositra I	12.2	20.5	12.2	20.5
Tanana Ambany	41.8	31.7	21.3	19.3
<b>All sample</b>	<b>42.5</b>	<b>30.3</b>	<b>31.3</b>	<b>25.5</b>

Figure A1: Proportion of "emigrants MSEs" and "immigrants MSEs" by sector

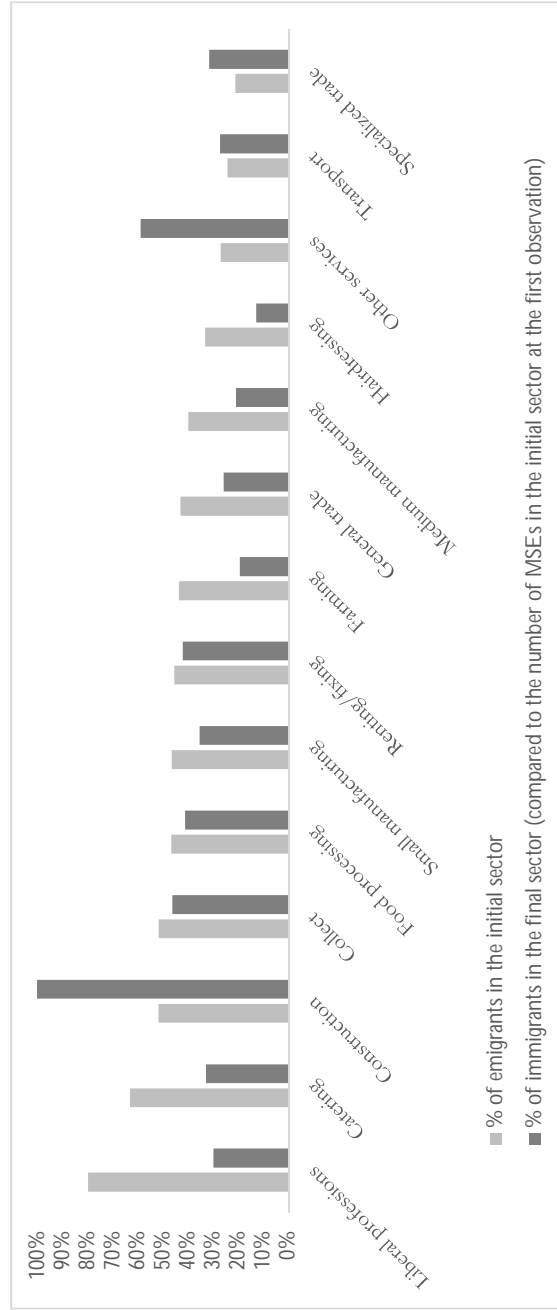


Figure A2: Sectorial migrations between 2008 and 2014

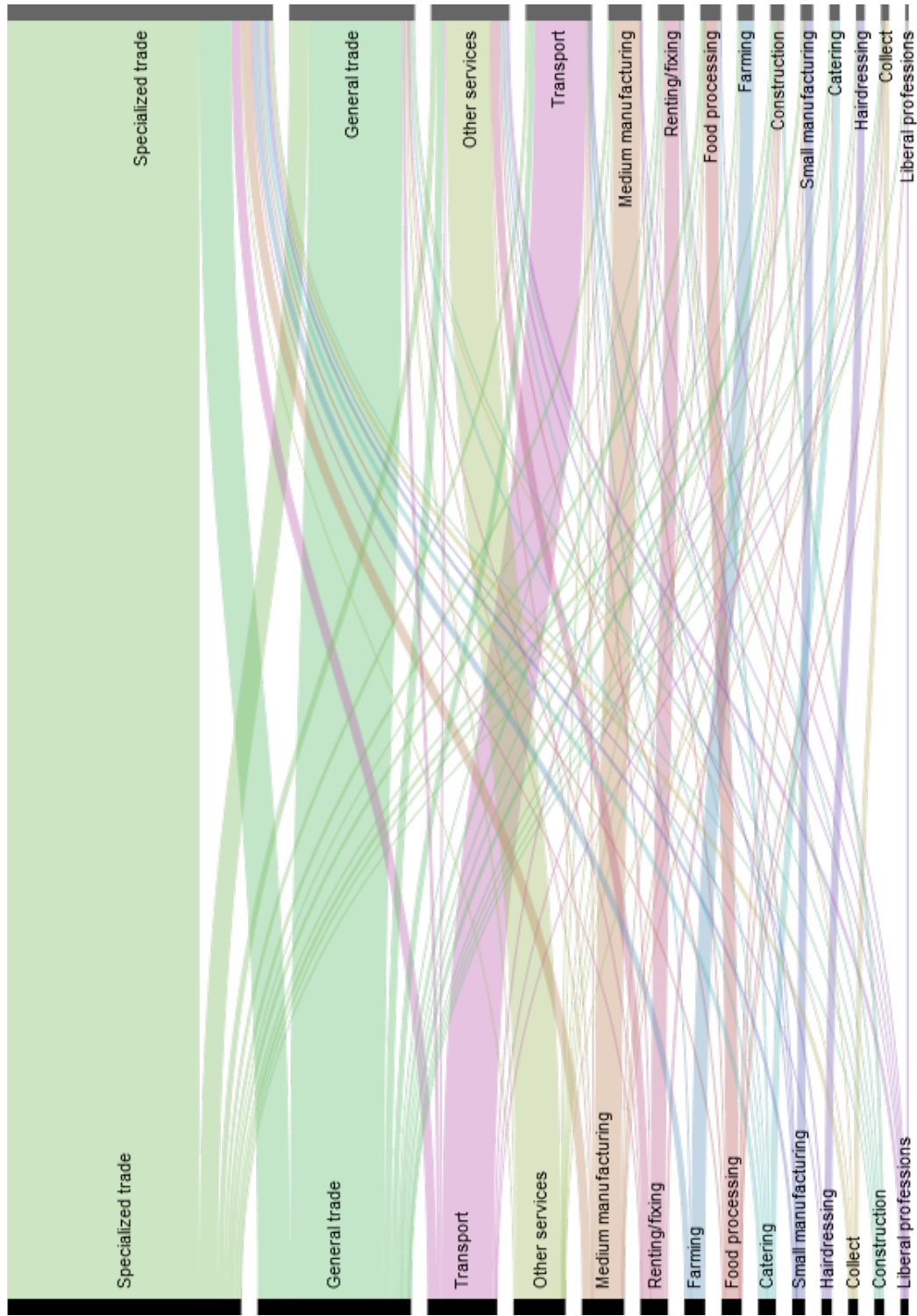




Figure A3: Total assets (fixed assets + working capital) median of MSEs that obtained their credit the year they have been created (2008-2014), by sector, nb. obs. 732, in USD

