

Does low population density restrain microfinance development? The case of Niger

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Abstract

Niger is characterized by low population density. Distances involved to access basic services can constitute a major barrier to development. This paper analyzes the relationship between the distance separating households to microfinance institutions' offices in Niger and the low levels of development and performance of the microfinance sector in the country. Our main finding suggests that distance can affect microfinance activities through three channels: (i) first, the spatial distribution of the demand for finance creates a mechanical positive correlation between distance and portfolio risk, (ii) transaction costs are increased and (iii) by making monitoring costs higher, distance implies less effective loan supervision. To cope with these effects, microfinance institutions adapt their policies through more restrictive loan conditions, higher interest rates and more intensive screening. We then address the tension between access and microfinance institutions sustainability.

1. INTRODUCTION

Niger is a West African country with an area of 1,267,000 square kilometers and an estimated population of 12.4 million people, growing at an annual rate of 3.1 percent. With a Gross Domestic Product (GDP) per capita in 2005 of US\$280, 78.4% of the population is rural, 63% (more than 7.8 million) lives under the poverty line and 35% (4.3 million) under the extreme poverty line¹. Around 75% of the country consists of the desert, and most natural resources (water, vegetation, etc.) are in the southern regions, with “sahélien” weather characteristics. The country is divided into 7 regions and the urban community of Niamey is the capital.

One of the main features of the country is its population density. On average, the population density of 9.8 people per square kilometer makes Niger one of the lowest-density countries in the Economic Community of West African States (ECOWAS), as we can observe from Table 1.

Table 1: ECOWAS countries' density population

Other ECOWAS Countries	Population Density (people / km ²)
Benin	67.4
Burkina Faso	50.8
Cote d'Ivoire	54.4
Guinea Bissau	50.5
Mali	9.9
Senegal	58
Togo	104.4
Niger	9.8

Most of the population concentrates in the Southern regions (90%) and the northern part of the country consists of the Ténéré desert. In Table 2 we can observe that the region with the lowest density -also the largest one- is Agadez, with its territory essentially belonging to the Sahara desert. The region with the highest population density is Maradi, with 33.3 people per square kilometer, which remains a low figure compared to other ECOWAS countries. Looking at these figures, we wonder whether such low population density might not involve high distances to cover for households to access facilities and services such as microfinance institutions, health centers, or schools. The intensity of this effect is determined by factors such the geographic distribution of the population and/or the development of the country's transportation infrastructures and services. With distance, economic activities are likely to represent higher transportation costs, affecting multiple aspects of households' livelihoods.

Table 2: Niger's regions density population

Region	Population Density (people / km ²)
Agadez	0.3
Diffa	1.2
Dosso	30.3
Maradi	33.3
Tahoua	11.3
Tillabéri	13.7
Zinder	9

¹ The absolute poverty line corresponds to a daily per capita consumption of 2 USD, or 1,159.8 FCFA (Franc de la Communauté Financière Africaine) while the extreme poverty line corresponds to a per capita daily consumption of 1 USD, or 579.9 FCFA at the 2003 average exchange rate.

In this paper, we explicitly investigate the impact that distance can have on the development of microfinance institutions (MFIs) in Niger. In the rest of the paper, distance will refer to the physical distance that separates a household's village from the office of the MFI. As we can see in Tables 1a, 1b and 1c in Appendix, some important characteristics of the microfinance sector in Niger are its low levels of development compared to other ECOWAS countries both in terms of beneficiaries, deposits and outstanding loans. With the lowest number of MFI offices, the MFIs' networks are less developed than in neighboring countries. With the highest rate of credits at risk per beneficiary, the quality portfolio of the MFIs is also comparatively poor. In addition, when we look at the number of employees per 10,000 beneficiaries we nevertheless see that it employs a relatively important labor force. To a certain extent, with two institutions serving 31.1% of the clients, mobilizing 39.2% of the deposits and granting 25.5% of the loans, we could also consider that the sector is highly concentrated.

Some organizations contend that distance may be an important factor restraining microfinance in some countries. Some authors have also concluded that "the provision of microfinance services has proven to be quite costly in the Sahel. The reasons for these high costs are more related to the environment (low population density, poor infrastructure, poverty, illiteracy) than to the methodology of group lending itself" (Paxton, 1996). However, there is a general lack of studies focusing on population density and the costs associated to distance that it may entail.

As we are going to argue all along this paper, distance has three different effects on microfinance activities: it affects the nature of the demand, transaction and monitoring costs. Distant borrowers by their intrinsic characteristics are more risky, therefore MFIs adapt their policies to cope with them through more restrictive conditions. Second, transaction costs are higher and make interest rates higher, and third, as ex-post monitoring is more costly, the quality of portfolio worsens on the intensive margin (costs of managing and monitoring a loan). These effects all lead to microfinance institutions to screen clients more carefully to ensure financial sustainability. Such strategy however comes at the cost of access, especially for the poorest of the poor. The cost of distance is actually born in part by borrowers, who face higher interest rates and more constraints to obtain a loan, but is also faced by the marginal credit-constrained household who is then excluded from the semi-formal credit market. We will come back to this sustainability/access tension at the end of the paper.

Our paper falls in the literature of geography-based economic development (see e.g. Fujita et al. 1999, Redding and Venables, 2002), and the interplay between geographical isolation and development. However, micro-econometric evidence is scarce. A large part of the literature dealing with isolation and its relationship to economic development has discussed the impact of infrastructure on access to public services and markets (see e.g. Jacoby, 2000). By its descriptive nature, our paper relates to Fafchamps and Whaba (2006) who look at the spatial distribution of child labor in Nepal. Fafchamps and Moser (2003) also find that isolation is a source of weaker law order and enforcement. Our paper is thus an attempt to look at the effect of isolation on access to financial services, and by doing so we try to disentangle supply-side from demand-side effects. Finally, the

tension between sustainability and outreach addressed in the paper relates to the analyses of Paxton and Fruman (1997).

The paper is organized as follows: Section 2 introduces the potential mechanisms that would induce distance to affect microfinance development; section 3 will present the data and methodology; results and analysis are presented in section 4, and finally section 5 concludes.

2. DISTANCE AND THE DEVELOPMENT OF MICROFINANCE: THEORY

When considering an economic transaction between two agents -and in our case between a household, and individual or group of individuals and a microfinance institution-, the effect of distance consists of the physical cost that one of the agents (or both) need to pay in order to be able to realize the trade. The cost of transportation and the opportunity cost of time induce a net increase in the costs of the trade, making the transaction potentially inefficient.

In the specific context of access to finance, the typology adopted consists of three categories: distance has a direct cost on microfinance through higher transaction and monitoring costs, and indirect effects (extensive margin effect) that will also be discussed.

By transaction costs, we refer to the actual cost that agents need to pay to sign a contract, take the loan, and reimburse the loan. Such costs are either borne by the borrower, or the lender. However, under the assumption of perfect competition on the credit market, costs borne by the lender end up in equilibrium to be borne by borrowers in the form of fixed costs to be paid upfront, mandatory savings, or higher interest rates. For now, we will abstract from subsidization schemes from donors or governments.

Monitoring costs are the physical costs paid by microfinance institutions to follow up on a loan. Such follow-up activities consist of enforcement of repayments, monitoring of activity of the borrower, etc. We explicitly distinguish these costs from transaction costs, as the effect of distance might not increase the aggregate cost of monitoring: it might induce MFIs to monitor less, potentially increasing the default rate and in equilibrium, this translates into higher interest rates for borrowers, more stringent borrowing conditions ex-ante, and among these, mandatory savings, lower amounts lent, more frequent reimbursements, and higher denial rate of loan applications.

Finally, distance might affect microfinance by affecting the demand faced by MFIs. One factor relates to the spatial distribution of potential customers: MFIs essentially locate in urban areas, or large communities in rural areas. Clients who are further away might differ in their education levels, the productivity of their investments, or the volatility of their production, and hence constitute a higher risk demand. A second factor, related to the first is that low population densities, and higher distance to travel to markets or health centers, implies that local communities are more isolated, and thus more vulnerable to shocks. Far away markets do not allow local communities to hedge output risks, as

distance to health centers makes health shocks more difficult to address, potentially affecting output when individuals fall sick.

Thus, the effect of distance on the viability of MFIs is twofold: on the intensive margin, distance directly increases the costs of managing and monitoring a loan, while, on the extensive margin, distance affects the intrinsic characteristics of the demand for finance: we are likely to observe a riskier demand as the distance to the MFI increases. From this quick analysis, we can make the following remark: while better management of MFIs can increase monitoring efficiency and in the end decrease intensive margin costs, the effect of distance on the extensive margin still remains. Such demand might not be profitable, and might not be the mandate of an institution which seeks to maximize profits, or at least balance its budget. We will come back to this important policy aspect later in our discussion.

The previous discussion suggests that there are two dimensions we should be looking at: how does the profile of the customers change as the distance to the MFI office increases? In other words, can we detect a gradient in observable characteristics as function of distance? And second, we will attempt to identify the impact of distance on the quality of an MFI's portfolio.

3. DATA AND METHODOLOGY

Data have been collected in July 2005. The specificity of the data is that they both include information on the MFI side, and socio-economic information on the client's side: this approach allows to record information on clients' assets, education, and household composition data, which are not collected by the MFI.

The population of reference consists of MFI's clients in 5 out of the 7 regions of Niger. The sample is stratified, representative at the regional level. However, as the focus of the present study was the investigation of the impact of distance on MFI performance, demand for finance has also been stratified as a function of distance. As a consequence, each sampled MFI branch was asked to sample clients for each stratum. The precise sampling method and computation of statistical weights is detailed in the appendix.

The final sample consists of 191 loan applications and 163 corresponding clients. Table 3 summarizes the main socio-economic variables for these individuals: as we see, clients are nearly 51 years old, have a basic literacy education level and a household income per capita that does not reach 3,000 FCFA per month. On average, the clients got married around 16 and 17 years old, and have families with nearly 6 children and more than 8 members per household.

Table 3: Niger's regions density population

	Age	Education*	Age 1 st marriage	Children	Household size	Household monthly per capita income
Average	50.8	1.1 (Literacy)	16.5	5.9	8.4	2,897.9 FCFA
Std. Dev.	11.7	2.1	4.0	2.5	5.3	5,815.2 FCFA

* 0:None, 1:Alphabetization, 2:Primary Public, 3:Primary Private, 4:Secondary Public, 5:Secondary Private, 6:Superior

The methodology we will follow consists of comparing client characteristics, contractual forms, monitoring activities and outcomes as distance between clients and the MFI increases. We are fully aware that we capture there equilibrium characteristics, but under some weak assumptions, some light will be shed on the effect of distance on access and performance of the microfinance sector in Niger. We also need to point out that the technical difficulties that we faced when implementing the survey (long distances to travel for few observations), and the economic conditions of the time the survey was fielded (Niger was going through a famine, and households we visited were definitely affected by lack of food), had a significant impact on the quality of the information collected. We conduct a statistical analysis when possible, and for issues we do not have data to address, we will rely on semi-structured interviews we had with farmers and breeders.

4. RESULTS

There are three issues we are interested in investigating further. First, whether distance affects the nature of the demand for finance, second, whether distance affects the transaction costs for the MFI and third, the effect of distance on the MFIs' ability to monitor loans.

4.1. DISTANCE AND THE DEMAND FOR FINANCE

In this section we are going to summarize different socioeconomic aspects of the demand for finance as function of the distance, namely education, age, household conditions, and economic conditions such as occupation, income and seasonal economic variations.

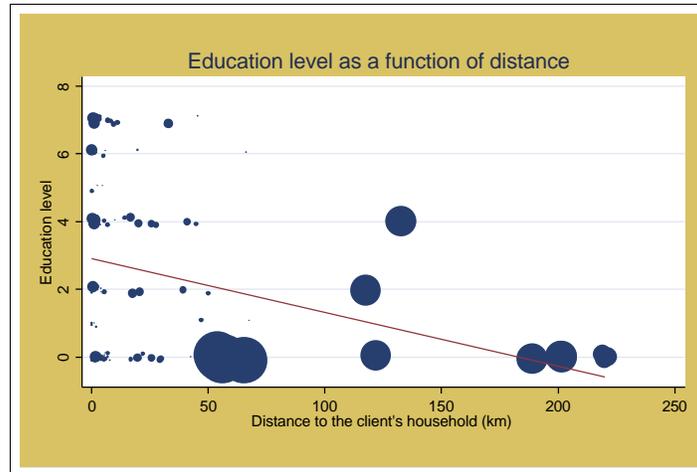
Table 4: Correlation between distance and some of clients' characteristics*

	Distance
Educational level	-0.3254***
Did you attend school?	-0.2805***
Household income per household member	-0.1817**
Client's salary in the last month – first activity	-0.0983
Client's salary in the last month – second activity	-0.5072***
Partner's salary in the last month – first activity	-0.0392
Partner's salary in the last month – second activity	-0.0491
Seasonal variations	0.2410***

* Corrected for sampling weights. Significance: * 10%, ** 5%, and *** 1%

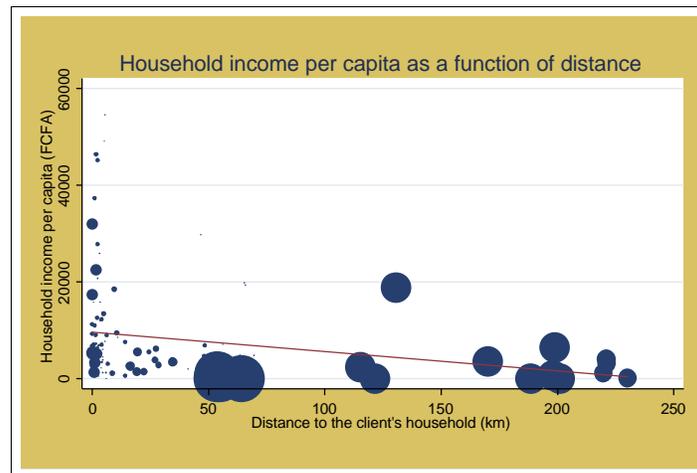
In Table 4 and Graph 1 we can see that the further the clients live from the MFI office, the least likely they attended school, and the lower their educational level is.

Graph 1



Looking at households' living standards, we find the consistent pattern that clients living further away live in worse economic conditions, both in terms of income levels than income variability. In Graph 2, we plotted the relation between distance and households' per capita income.

Graph 2



Finally, if we compare the distance with the client's occupation in Table 5, we observe that the further away we go from the MFI office, the more the clients are likely to work in the agricultural sector.

Table 5: Correlation between distance and main activity of the client*

	Trader	Breeder	Cultivator	Handcrafter	Retired	Civil servant	Employee	Services	Industry
Distance	0.0431	0.1687	0.2606**	-0.0379	-0.0459	-0.0706	-0.1105	-0.0696	-0.1233

* Corrected for sampling weights. Significance: * 10%, ** 5%, and *** 1%

These last results might just be the consequence of occupational activities in Niger's countryside, where most households are engaged in agriculture.

Such preliminary analysis suggests that as one goes further away from MFIs' offices, living conditions deteriorate in all observable accounts. Keeping in mind that we sampled MFIs' clients, who are likely to represent the upper tail of the income distribution, this suggests that demand characteristics worsens even more as one goes to more isolated places. We can indeed make the arguably weak assumption that more educated and wealthier households would be more likely to apply and obtain a loan with MFI institutions. Thus, observing clients would capture the upper tail of the income or human capital distribution. Our results are therefore consistent with the observation that a first effect of distance on MFIs' portfolio has to do with the intrinsic characteristics of the demand.

4.2. DISTANCE AND BORROWER PROFILE

As we discussed in the previous section, the spatial distribution of borrower characteristics is not homogenous. Next, we look at whether financial contracts offered to borrowers differ as their location gets further away.

4.2.1. Distance and Borrower type

In Table 6 we can see that men live further than women and groups live further than individuals. However, the relation between distance and the group's gender is significant only for women.

Table 6: Distance related to gender and to gender of group members*

	Individual clients	Male Individual clients	Female Individual clients	Group clients	Male Group clients	Female Group clients	Mixed Group clients
Distance	-0.5094***	-0.4474***	-0.2179***	0.5094***	-0.1389	0.4694***	-0.0400

* Corrected for sampling weights. Significance: * 10%, ** 5%, and *** 1%

In Table 7 we see that men associate in groups roughly three times bigger than women, but those who benefited from the last loan were 32% of the member groups, whereas in the women's groups, 97% of the members benefited from the last loan. In addition, as indicated in Table 8, when the presidents of the groups were asked about the reasons for creating the group, social union and development is the most important reason for both men and women. Nevertheless, financial independence is an allegedly important motive for women, whereas it is less so for men.

Table 7: Number of members and people who benefited from the last loan and groups' gender

	Men's Groups	Women's Groups
Number of members	45.7**	15.7
Standard deviation	27	10.9
People who benefited from the last loan	14**	15.3
Standard deviation	6.4	10.5

* Between 15 and 30 observations ** Less than 15 observations

Table 8: Reason for the creation of the group and gender of group's members

	Men	Women	Both	Total
Financial Independence	1	14	0	15
Social union and development	5	18	1	24
Information exchange for professionals of one sector	2	3	0	5
Total	8	35	1	44

4.2.2. Distance and Loan purpose

We now turn to loan purposes. In Table 9, we observe that the larger the distance to the households, the higher the tendency to use loans for commerce, agriculture and agro-business related industries, and the less the clients use micro-loans for livestock, education, social events and housing.

Table 9: Distance related to the object of the loan*

	Distance
Trade	0.4576***
Livestock	-0.2336***
Agriculture	0.1577***
Handicraft	-0.0433
Education	-0.1419*
Social events	-0.1525**
Housing	-0.1281*
Transport	-0.0698
Services	-0.0361
Agro-business related industries	0.1817**
Don't remember / Others	-0.0462

* Corrected for sampling weights. Significance: * 10%, ** 5%, and *** 1%

The amount of information that can be drawn from this Table is limited. The correlation can either reflect changing patterns and occupations of the demand, or shifts in MFI's strategies.

Nevertheless, a careful look at the correlations in Table 9 reveals that commerce activities are largely privileged as distance increases. While this clearly does not reflect changing occupations of the rural population (see Table 5), it seems that MFIs are more inclined to lend for some purpose where cash flows are immediate, in line with the short-term characteristics of the loans, as we will see later on. Thus, the pattern of lending purposes is more oriented towards investment needs rather than consumption needs, and biased in favor of activities delivering cash in the short run. Education, social event financing, and housing purposes are less likely as clients live further away. More interestingly, when looking at the "Livestock" purpose, loans are less likely to be conceded as one goes further away, while farmers are more likely to be breeders (though the effect is not significant, see Table 5).

4.2.3. Distance and Loan characteristics

We previously saw that MFIs were screening customers in a systematic way as distance increased. We next move to the analysis of whether loan conditions themselves differ as the borrower lives further away from the MFI.

In Table 10 we look at the correlations of distance with other variables that take part into the loan application process. We see some signs indicating that clients living further are considered more costly, MFIs adapting their policies in function of the nature of the clients: potential borrowers being further away are more likely to receive the visit of a credit officer. As to other characteristics of loans, distance is also associated with shorter and smaller loans, and stricter restrictions: longer processing times, more frequent reimbursements over smaller period of time. These additional transaction costs naturally lead to higher interest rates charged to loans taken further away from the MFI. Accordingly, clients living further away have previously benefited from fewer loans.

Table 10: Distance related to other loan characteristics*

	Distance
Did the credit officer visit you before the decision? (Yes = 1, No=0)	0.3358***
Loan term	-0.1844**
Loan amount	-0.2057*
Number of days to process application	0.2355***
Periodicity of reimbursements	0.3953***
Loan amount	-0.2057*
Interest rate	0.8560***
How many loans have you borrowed before?	-0.7468***

* Corrected for sampling weights. Significance: * 10%, ** 5%, and *** 1%

The results shown in Table 10 suggest that more screening of clients that live further away is taking place. Ex-ante monitoring is more likely to be exercised, and most likely clients' characteristics are observed more carefully. This is consistent with the observation we made before: the pool of borrowers is more and more restricted to cash generating activities. Such strategy is enforced by pre-loan visits to the borrower that are more likely as distance increases. Higher interest rates also screen borrowers who will accept high interest rates under the condition that their activities generate sufficiently high cash flows to cover all these excess ex-ante monitoring costs.

4.3. DISTANCE AND EX-POST MONITORING AND OUTCOME

We have seen that the MFIs adapt their policies in function of the different nature of the clients, who are differently spatially distributed. In this section we focus on the reimbursement patterns and the effect of distance on monitoring costs, which are paid by MFIs to follow up with a loan after it has been granted.

From Table 11, we observe that monitoring decreases with distance, whether or not the client is behind schedule. There are two confounding factors at play: first, distance imposes a physical cost onto the MFI that decreases the marginal benefit from monitoring; second, ex-ante monitoring activities described in the previous section, suggests that ex-ante screening has already been undertaken, so that ex-post monitoring is less necessary. Distinguishing the adverse selection from the moral hazard problem identified here is beyond the scope of this study.

Table 11: Correlation between distance and other monitoring variables*

	Distance
Number of visits you go visit the clients, per month	-0.3155***
How many days after the due date do you go visit the clients, if they do not reimburse?	-0.2970**

* Corrected for sampling weights. Significance: * 10%, ** 5%, and *** 1%

We now turn to outcomes. Do clients from far away put MFIs' portfolios more or less at risk? In Table 12 we can see that clients living further away are less likely to have made any late payments. However, the result is not robust to additional controls. Table 14 in appendix presents the results from the linear regression in which the dependent variable is whether clients had delays in their payments. We can see that distance loses its relevance when we control for other variables such as age, household income or income seasonal variations. This is then consistent with the idea that distance has an effect through the intrinsic characteristics of the demand faced by MFIs and screening allows to mitigate distance-related risks.

We also perceive that there is a significant relationship between making any late payments and some types of clients: individuals are more likely to make late payments - especially men- whereas women -both individually and in groups- usually have a tendency to pay on time. In this regard, qualitative discussions revealed that it was considered shameful for women to receive a visit from a credit officer because she had not reimbursed, whereas that problem did not seem to affect men. Note that these results are consistent with MFIs' strategies to restrict lending to groups and groups of women as distance increases. Finally, we consider interesting two other effects: i) the higher the income seasonal variations, the more likely clients made any late payments, and ii) the more loans a client has benefited from, the least the probability of reimbursing late.

Table 12: Correlation between making any late payments and other variables*

	Have you made any late payments?
Distance to the MFI	-0.1973**
Clients in general (0=Man, 1=Woman, 2=Group)	-0.2185***
Individual clients (1=Yes, 0=No)	0.1667**
Individual male clients (1=Yes, 0=No)	0.2601***
Individual female clients (1=Yes, 0=No)	-0.1395*
Group clients (1=Yes, 0=No)	-0.1667**
Men's group clients (1=Yes, 0=No)	0.0724
Women's group clients (1=Yes, 0=No)	-0.2367***
Mixed group clients (1=Yes, 0=No)	0.0116
Number of group members	-0.0551
Economic seasonal variations	0.1903**
How many loans have you borrowed before?	-0.7225***

* Corrected for sampling weights

Significance: * 10%, ** 5%, and *** 1%

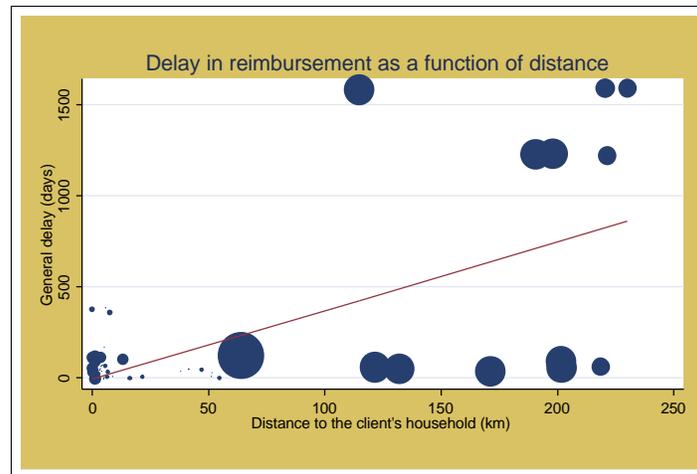
But now let's look at delays in reimbursement: delays in payments are positively correlated with distance, as pointed out in Table 13. This effect applies to all clients, although it is stronger for groups and among them for men's groups. In Graph 3 the delay in the reimbursement is represented as a function of distance.

Table 13: Correlation between distance and other monitoring variables*

	Distance
Delay (days)	0.4460***
Delay (days), individual clients	0.2541
Delay (days), group clients	0.3780**
Delay (days), group clients, males	0.9884***
Delay (days), group clients, females	0.5495**

* Corrected for sampling weights. Significance: * 10%, ** 5%, and *** 1%

Graph 3



The result found in Table 12 could seem a priori counterintuitive, but reflects the mechanism we have been emphasizing all along: ex-ante screening of clients allows MFIs to reach a more creditworthy segment of the population as distance increases. However, consistently with the observation in Table 11 that monitoring for loan recovery is less likely to occur as distance increases, the delay in reimbursement on the other hand tends to be more important for further away clients (Table 13).

Table 15 in the appendix presents the results from a linear regression, in which the dependent variable measures delay in reimbursement. We find that when clients live further away, they tend to exhibit longer delays. This reduced-form result should be taken with caution however. It can be either due to the fact that ex-post monitoring being more costly, hence less frequent, timely reimbursements are less well enforced. Or, if clients living further away are more likely to be subject to uninsurable shocks, this correlation might just capture the likelihood of default, and the severity of the income shock.

4.4. TOWARDS AN ASSESSMENT OF THE IMPACT OF DISTANCE

Having analyzed the available data we see three different aspects related to distance:

First, at different distances borrowers have different characteristics; in general as distance increases they are more economically vulnerable and have less access to financial services. Second, distance increases the general transaction costs. This rise in the costs makes the MFIs see more distant clients as more costly. Therefore, the conditions for them are more restrictive: higher interest rates, smaller payback periods and higher processing time of their applications, among others. Third, distance increases monitoring costs, and consequently monitoring activities drop, which increases the probability of default, also resulting in more restrictive loan conditions.

As a consequence, we observed that the profile of borrowers as a function of distance is more and more biased towards safe and short-term activities such as trading and less for consumption purposes. This conclusion should be taken carefully given fungibility.

The cost of distance in rural Niger has two distinct effects as emphasized in this paper: first, transaction costs are higher and make interest rates higher; second, as ex-post monitoring is higher, and the creditworthiness of the demand for finance is also low, MFIs need to screen clients more carefully, making the need for ex-post monitoring and repeated visits in case of delay a less likely event. Nevertheless, once that the client has defaulted the delays in reimbursement will be higher as distance increases.

5. CONCLUSION

We started the paper with the presumption that distance would impose a cost on microfinance institutions. However, how the cost would be transmitted to borrowers was an open question. The analysis conducted here suggests that the cost is born in part by borrowers who face higher interest rates, and more constraints and delays to obtain a loan, but is certainly also faced by marginal borrowers who are then excluded from the semi-formal credit market. The marginal borrower is moving higher up in the income distribution as distance increases.

We do not make any normative statement on whether the microfinance sector is developed enough or not. The results shown in this paper bring back the tension that exists between outreach and financial sustainability. If microfinance institutions need to be sustainable, they need to manage their portfolio carefully. Distance will de facto impose a risk on their portfolio, so that they will need to screen the demand for finance accordingly. There is therefore an intrinsic contradiction between outreach and sustainability that is exacerbated by the low population density making distance an important parameter in this tradeoff.

Our findings also suggest that limiting outreach has important consequences, as distant clients are more likely to be traders, while producers (especially breeders) are more likely to be left out of the credit market. Beyond the efficiency concern, we also raise the equity concern whereby the poorest of the poor might be more likely to be excluded as they live further away from economic centers, and are engaged in activities that would not deliver enough cash to interest MFIs. Screening activities undertaken by MFIs to maintain the quality of their portfolios will potentially hurt the poor first.

The policy debate in Niger has focused on the “professionalization” of the microfinance sector, with the elaboration of a comprehensive legal framework. While ensuring good governance of microfinance institutions is definitely needed, this paper raises the question of whether credit markets in their current forms are not limited by other important factors which require public attention. For example, in some neighbor countries such as Benin, the government heavily subsidizes cotton production, by guaranteeing prices of output, so that cotton producers constitute a safe demand for finance for MFIs. Production in Niger is less export-oriented, and might then receive less attention from authorities. Subsidizing output in this case constitutes an indirect subsidization of financial services.

Finally, our findings are restricted to the provision of one specific type of financial services. It is also likely that similar results will hold in other types of services such as health, education, or basic infrastructure (water, electricity...). More micro and macro-economic analyses are necessary to fuel the debate about whether low population density is an important bottleneck in Africa's growth and road out of poverty.

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7. APPENDIX

Tables 1a: Niger's microfinance sector (2002)

Country	Number of institutions	Number of MFI offices	Number of direct beneficiaries	Deposits (Millions FCFA)	Outstanding loans (Millions FCFA)	Risky credits (Millions FCFA)	Net result	Number of employees
Benin	71	268	997,777	35,074	46,264	1,253	3,077	1,468
Burkina Faso	29	378	601,983	19,409	18,297	740	108	1,908
Cote d'Ivoire	16	211	487,639	38,789	14,785	4,284	-690	888
Mali	68	772	523,883	20,049	24,818	1,137	1,115	2,157
Niger	57	177	84,584	2,981	2,829	431	57	310
Senegal	280	504	498,543	31,898	30,954	1,017	2,390	1,630
Togo	53	265	277,895	17,922	14,549	1,292	124	885

Tables 1b: Niger's microfinance sector related to population (2002)

Country	Population (Millions)	Outstanding loans / Population	Depots / Population	Beneficiaries / Population	MFI offices / Population	Employees / 1000 habitants
Benin	6.736	6,868	5,207	0.15	0.39786	0.22
Burkina Faso	13.002	1,407	1,493	0.05	0.29072	0.15
Cote d'Ivoire	16.631	889	2,332	0.03	0.12687	0.05
Mali	13.007	1,908	1,541	0.04	0.59353	0.17
Niger	11.972	236	249	0.01	0.14784	0.03
Senegal	10.095	3,066	3,160	0.05	0.49926	0.16
Togo	4.909	2,964	3,651	0.06	0.53982	0.18

Tables 1c: Niger's microfinance sector related to beneficiaries (2002)

Country	Outstanding loans / Beneficiaries	Deposits / Beneficiaries	Risky credits / Beneficiaries	Result / Beneficiaries	MFI offices / 100 Beneficiaries	Employees / 10,000 Beneficiaries
Benin	46,367	35,152	1,256	3,084	0.027	14.71271
Burkina Faso	30,395	32,242	1,229	179	0.063	31.69525
Cote d'Ivoire	30,320	79,544	8,785	-1,415	0.043	18.21019
Mali	47,373	38,270	2,170	2,128	0.147	41.17332
Niger	33,446	35,243	5,096	674	0.209	36.64996
Senegal	62,089	63,982	2,040	4,794	0.101	32.69527
Togo	52,354	64,492	4,649	446	0.095	31.84656

SAMPLING METHOD AND STATISTICAL WEIGHTS

	MFI offices	Loan Applications	Outstanding Loans
Universe	All the MFI offices of the country, estimated at 177 ² .	All the loan applications submitted in the country in the last 5 years. Data N/A.	All the microfinance outstanding loans. Data N/A.
Population	All the MFI offices with an authorization of the Ministry of Finance to offer microfinance services, estimated at 59 ³ .	The Loan applications submitted at the selected MFIs within the last 5 years. Data N/A.	All the outstanding loans in the country, estimated at 14,572 ⁴ .
Sample Frame	BCEAO's list of MFI offices with an authorization from the Ministry of Finance to offer microfinance services ⁵ .	The Loan applications submitted at the selected MFIs within the last 5 years. Data N/A.	-
Sample	12 MFI offices.	191 Loan applications.	-
Effective sample	-	-	163 surveys actually administered to the clients.

The total weight for client i is given by the expression:

$$\text{Total Weight (i)} = \text{MFI office weight (i)} * \text{Sample size weight (i)} * \text{Client-Distance weight (i)}$$

² Source: National Microfinance Strategy, World Bank.

³ In 2002, Source : West African Countries Central Bank (BCEAO)

⁴ In 2002, Source : West African Countries Central Bank (BCEAO)

⁵ In 2002, Source : West African Countries Central Bank (BCEAO)

ROBUSTNESS CHECKS

Table 14. Linear regression: Has the client made any late payment?

Dependent variable:	Has the client made any late payment?					
Independent variable:	(1)	(2)	(3)	(4)	(5)	(6)
Distance, in km, to the client's household	0.005*** [10.45]	0 [0.13]	0.001 [0.65]	-0.001 [0.56]	-0.001 [0.60]	0.001 [0.49]
Age of client		0.016*** [4.90]	0.015*** [6.19]	0.009*** [2.81]	0.009*** [2.76]	0.012*** [3.71]
Household income per person			0.000*** [3.75]	0.000** [2.03]	0.000** [2.04]	0.000* [1.90]
Income seasonal variations				0.006*** [2.80]	0.006** [2.16]	0.007** [2.56]
Education: no studies					0.055 [0.28]	0.045 [0.25]
Education: literacy					0.074 [0.26]	0.179 [0.59]
Sex: Group clients						-0.423 [1.25]
Observations	167	124	99	93	93	93
R-squared	0.44	0.65	0.76	0.81	0.81	0.82
Robust t statistics in brackets						
* significant at 10%; ** significant at 5%; *** significant at 1%						

Table 15. Delay in reimbursement

Dependent variable:	General delay in reimbursement (days)?					
Independent variable:	(1)	(2)	(3)	(4)	(5)	(6)
Distance, in km, to the client's household	3.728*** [3.76]	3.990** [2.60]	3.977** [2.48]	3.095** [2.06]	3.128** [2.05]	4.674** [2.09]
Age of client		-3.153 [1.12]	-3.461 [1.18]	-6.546 [1.37]	-6.404 [1.25]	-2.474 [0.58]
Household income per person			-0.004 [0.42]	-0.004 [0.37]	-0.007 [0.44]	-0.01 [0.72]
Income seasonal variations				3.132 [1.06]	3.627 [1.05]	6.75 [1.44]
Education: no studies					-62.435 [0.22]	-65.464 [0.24]
Education: literacy					-81.676 [0.36]	36.063 [0.15]
Sex: Group clients						-704.232 [1.33]
Observations	73	52	47	45	45	45
R-squared	0.51	0.52	0.5	0.5	0.5	0.53
Robust t statistics in brackets						
* significant at 10%; ** significant at 5%; *** significant at 1%						