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Loyalty, trust, and glass ceiling

The gender effect on microcredit renewal

Mathilde Bauwin[1] and Walid Jbili[2]

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Abstract: Whereas most research into microfinance tends to focus on the impact of access to such services, very little pays attention to what happens over time once a person becomes a client. The paper aims at analysing the conditions of loan renewals as most microfinance institutions foster client retention and apply a progressive lending policy. Moreover, as previous studies have shown that women are not always favoured regarding loan amounts granted, the progressive lending policy is analysed from a gender perspective. The work is based on a case study about the main Tunisian microfinance institution using longitudinal client data. The analysis focuses on the growth rate of amounts granted over credit cycles. As some clients leave the microfinance institution after one or several loans, we follow a procedure enabling us to correct the selection bias with panel data. The results show that, all things being equal, the growth rates tend to increase over cycles, probably reflecting an increasingly trusting relationship between the microfinance institution and its clients. However, this increase is slower for women, revealing a less favourable progressive lending policy towards women. Consequently, as women already start from a lower position, initial inequalities cannot be counterbalanced.

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[1] Université Paris-Dauphine, INED, Paris, France, and Enda Inter-Arabe, Tunis, Tunisia, corresponding author: mathilde.bauwin@gmail.com, [2] Enda inter-Arabe, Tunis, Tunisia.

1   Introduction

Despite the various polemics sparked by certain institutions in recent years, microfinance keeps growing, with double-digit growth rates in the number of borrowers in 2013, 2014, and 2015[1] (Convergences 2015, 2016) reaching 111.7 million clients throughout the world in 2014. These numbers confirm that microfinance is still considered today as a lever of development thanks to its significant role in financial inclusion, which is intended to contribute to the reduction of poverty and the empowerment of vulnerable people. The term 'financial inclusion' has been gaining importance since the early 2000s, especially following a speech given on 29 December 2003 by the former General Secretary of the United Nations Kofi Annan, who said: 'The great challenge before us is to address the constraints that exclude people from full participation in the financial sector'. Since then, financial inclusion has gradually become one of the primary objectives of international institutions.

As a consequence, attention has been focused for about a decade on the number of people holding a bank account, with microfinance becoming a tool to help increase this number. However, these striking numbers, showing the progress made towards financial inclusion, not only illustrate the increasing reach of microfinance worldwide, with even more new clients or 'banked' people every year, they also illustrate another concomitant phenomenon, i.e. the retention of older clients. Once people get access to microfinance, they remain 'financially included', meaning that they keep returning to these products and services.

So far, client retention, or client loyalty, in the microfinance sector has not appeared as a major issue of interest. Instead, being inherent to microfinance's modus operandi, it is included in impact assessment studies as a way to control for the duration of inclusion in a microfinance programme. However, client retention is at the core of some recent scandals about the 'mission drift' of microfinance. Indeed, over-indebtedness, in particular, is more likely to occur after a client has received several loans than after they have received the first loan—all the more so as loan amounts usually increase over credit cycles. Thus, this paper aims at more deeply analysing the conditions of loan renewals.

Another common presupposition about microfinance concerns women. Even although they made up 81 per cent of clients of microfinance institutions (MFIs) in 2014 (Convergences 2016), microfinance is often considered as a positive discrimination tool for favouring women's access to financial services and consequently their economic empowerment. The success of the Grameen Bank, which, in its early years, only targeted women in borrowing groups, has contributed to the image of microfinance as being specifically conceived for women. However, women are not the exclusive target of MFIs. Although, women make up 81 per cent, on average, of MFIs' clients, one can observe a wide diversity of rates according to geographical area. For example, women represent 92 per cent of clients in Southern Asia but only 60 per cent in the Middle East and North Africa (MENA) region and even a minority in Eastern Europe and Central Asia with a rate of 44 per cent (Convergences 2016).

Furthermore, some researchers have recently questioned the reality of the advantages of lending to women, even although it was commonly acknowledged until recently that women are an attractive target for MFIs in terms of their financial and social performance as they are less likely

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[1] Microfinance Barometer 2016. Numbers are based on the data provided by the microfinance institutions reporting to the Mix Market.

to default or repay late (Khandker et al. 1995) and are more likely to have a beneficial impact on their whole household from the additional revenues from their microcredit (Khandker 2005). Roodman and Morduch (2014), however, found no proof of causal links between credit access and impacts, and Morduch and Bauchet (2010) highlighted a negative correlation between profitability and the proportion of female clients. Finally, if it is also recognized that women tend to seek smaller loans, which automatically increases MFIs' transaction costs (Armendáriz and Morduch 2010), then this goes against the idea that lending to women is more profitable for MFIs.

As a consequence and as has been shown by Agier and Szafarz (2013) in relation to Brazil as well as by our previous case study on Tunisia (Bauwin forthcoming), women are not necessarily favoured in the microcredit allocation process, particularly in terms of amounts granted. These findings have proved that, in order to foster women's economic empowerment and gender equality more generally, efforts should not be focused only on the issue of access to financial services but also on the conditions for granting credit, which should at the very least be fair.

This paper therefore focuses on the conditions of loan renewals from a gender perspective. In particular, the objective is to analyse the policy of progressive lending by the Tunisian MFI Enda inter-arabe to check if the initial gap observed between amounts granted to new male and female clients is persistent or not over credit cycles.

Indeed, this initial gap seems to be accounted for by stereotypes about women's projects, which are generally considered to be smaller and less profitable, whereas Agier and Szafarz (2013) as well as our previous work (Bauwin forthcoming) on first loans granted by Enda showed that the gap exists, all projects' characteristics being equal. This means that representations of women's projects may lead to statistical discrimination. In the same way, the main hypothesis in this paper is that the same kind of stereotypes may have an effect on the application of a progressive lending policy. Since gender division of labour within the household remains significant in Tunisia (MAFFEPA 2005),[2] women could be considered to have less time to dedicate to their projects. As a consequence, we assume that loan officers are likely to conclude that if women invest less time on average in their activity, they should also need less money. However, applying this average characteristic to all individual clients could lead to statistical discrimination in the form of a slower progressive lending policy for women that cannot be justified by project characteristics.

To check this hypothesis, we use longitudinal client data from the main Tunisian MFI and analyse its progressive lending policy through the growth rate of loan amounts granted while correcting the selection bias as not all clients renew their loan. The main result is that loan amounts granted to women grow more slowly from one credit cycle to another than those granted to men, all things being equal. Section 2 reports microfinance's client retention in practice and in the literature, section 3 introduces the Tunisian context, section 4 describes the data, section 5 details the empirical method and states the results, and section 6 concludes.

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[2] The time-use survey, carried out by the Tunisian Ministry of Women Affairs in 2005 to 2006 (MAFFEPA 2005) on men and women in Tunisia and regularly referred to in reports on gender issues, indicates that women dedicate more than five hours a day to domestic work against an average of 39 minutes for men.

2 Client retention in practice and in the literature

2.1 Client retention in microfinance

Few questions are generally raised, other than about the issue of impact, concerning what happens after a client has received their first microcredit. Yet, what happens is very specific to the microfinance sector. As Armendáriz and Morduch (2010) explain, the mission of microfinance institutions is to provide financial products to people who do not otherwise have access to them, usually because they are too poor and/or because of weak coverage by traditional banks. To meet these people's needs, MFIs offer very low loan amounts and, as a result, face higher transaction costs than traditional banks as it costs as much to grant low loan amounts as it does to grant higher amounts, but it is not as profitable. As a strategy to reduce these costs, MFIs implement 'progressive lending' (Armendáriz, and Morduch 2010: 143): they progressively increase the loan amounts over credit cycles, provided that the client has demonstrated good repayment behaviour. This enables MFIs to remain profitable as their transaction costs progressively decrease relative to loan amounts. In a broader perspective, one of the strategies implemented by MFIs is to encourage client retention by creating 'good dynamic incentives […] through attractive long-term relationships with clients' (Armendáriz and Morduch 2010: 161). Progressive lending is one of these good dynamic incentives designed to encourage the client to keep resorting to the MFI. Finally, progressive lending is also what enables MFIs to avoid potentially large losses as, in practice, loan officers can test borrowers' repayment behaviour with small loans at first before allowing them to climb up the loan scale.

As a result, client retention and progressive lending are part and parcel of the microfinance system. They are even considered as an indicator of clients' levels of satisfaction and are used by rating organizations to assess MFIs—they are mentioned in the Universal Standards for Social Performance Management (Social Performance Task Force 2014: 22) and included in the SPI4—the universal tool to enable MFIs to assess their own social performance. However, no additional recommendation is provided about how progressive lending is supposed to be implemented. This lack of indicators has been recently pointed out in the Microfinance Barometer 2015 by Oikocredit, (Convergences 2015) a worldwide cooperative and social investor. Oikocredit considers that more attention should be paid to the evolution of MFIs' clients both by MFIs themselves and investors. Consequently, the organization decided to provide its partners in the sector with capacity building services in management and analysis of longitudinal client data to better assess the evolution of clients' lives. Up until now, it has mainly been researchers who have been collecting such panel data, mostly to implement specific impact studies at a certain time in a certain place. Introducing such a concept into the Universal Standards would enable practitioners as well as researchers to better analyse and understand the ins and outs of client retention in a more systematic way.

2.2 Client retention in the literature

With regard to academic literature, client retention appears mostly in impact studies as a way of distinguishing between treatment and control groups to assess the effects of benefiting from microfinance services. Client retention is used to estimate the potential impact of microfinance after a certain period of time (OECD 2007; Banerjee et al. 2009, 2015; Weber and Ahmad 2014), and no questions are raised about what happens during the period in terms of number of loans, increased amount of loan, or variation in credit costs as interest rates may differ according to the amount, with low amounts usually being more expensive than higher amounts.

The meta-analysis achieved by Chliova et al. (2015) is very meaningful in this respect. They gathered the maximum possible number of quantitative studies about the impact of microfinance since 1980, ending up with 91 studies. In most of these studies, the independent variable of interest is dichotomous and represents the participation, or not, in a microfinance programme, i.e. receiving at least one loan. Chliova et al. (2015) also used some other studies (representing a minority) in which participation is captured by a continuous variable and measured by time since the reception of the first loan. Nothing other than time is used to consider client retention in impact analyses.

Some recent studies focus on client retention, however, from the MFI's point of view. Epstein and Yuthas (2013) explain that client retention is a factor of financial sustainability as well as a key measure of social impact, and they assert that MFIs could increase both their financial and social performances by developing in rural regions where client retention is higher. The authors deplore the lack of attention paid to client retention by MFIs, rating organizations, and researchers as no standard indicator of client retention actually exists—at least three different indicators used by various organizations are identified by the authors.

By contrast, another recent study (Pearlman 2014) focuses on the determinants of dropouts. Pearlman distinguishes between continuing borrowers, defaulters (that is to say clients who do not repay their loan and exit the programme), and dropouts (who are the clients who repay their loans but do not renew them). He also regrets the lack of interest in this phenomenon as dropouts are definitely costly for MFIs.

Despite this very recent interest in the phenomenon, to the best of our knowledge the conditions of client retention or loan renewal have not yet been analysed. Before attempting to make a contribution to this end, the Tunisian context should be introduced.

3   Context

The MENA region is the one where financial inclusion is making the slowest progress. Whereas 62 per cent of adults worldwide reported having a bank account (World Bank 2014), this average rate hides huge disparities among geographical areas, with respective rates of 69 per cent in East Asia, 14 per cent in the Middle East, and 27 per cent in Tunisia. The gender gap is especially high in Tunisia, with 20.7 per cent of women having an account in 2014 against 34.2 per cent of men. People living in rural areas are also less likely to hold an account (22.4 per cent) than the average, as is the case for young people under 25 (18.8 per cent).

The MENA region is also the region where microfinance is the least developed in the world, with only 31 microfinance institutions (Convergences 2016) reporting to the Mix Market and a total portfolio of US$1.2 billion dollars, against US$8.2 billion in Sub-Saharan Africa or US$11.3 billion in Eastern Europe and Central Asia.

Tunisia is also currently facing economic difficulties particularly in terms of employment. The labour force participation rate, as defined by the International Labour Organization, was 47.2 per cent[3] for the second quarter of 2016, but this hides a significant gender gap with rates of 68.5 per

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[3]Figures from the Tunisian National Institute of Statistics, Tunisia (n.d.) and from the World Bank database for other countries or regions (World Bank n.d.).

cent for men and 26.6 per cent for women. The total unemployment rate for the same period was 15.6 per cent but was higher for women (23.5 per cent against 12.4 per cent for men).

As a consequence, the development potential of the microfinance sector is huge in Tunisia. New regulations on microfinance were therefore designed in 2011 after the Jasmine Revolution and implemented in 2013 in order to foster the development of the sector. The new law allowed private companies in particular to operate and deliver microcredits.

Before the new regulations, Enda inter-arabe (hereinafter Enda) was in a quasi-monopoly situation. Created in 1990 in Tunis, it is now active over the whole Tunisian territory with 79 branches spread over the 24 governorates[4] in 2016. According to its last activity report in December 2015, Enda was serving 271,000 active clients. Its portfolio-at-risk at 30 days was 1.07 per cent in 2015, which is very low compared to the global average in the sector (3.7 per cent in 2014: Convergences (2016)), and its default rate was 0.68 per cent, which is also very low even though default rates are usually less than 2 per cent in microfinance. These good numbers are in keeping with the various awards and global recognition the Tunisian MFI has received in recent years for both its financial and social performance.

The MFI serves clients in all activity sectors, that is to say agriculture, production, services, and trade,[5] and it adapts its financial products accordingly—for instance, some products have been specifically conceived for agricultural projects, with irregular instalment schedules, grace periods, and prime rates intended to take account of seasonal activities. The interest rates do not vary by client but depend on the characteristics of by-products as these are usually higher in the microfinance sector for products corresponding to lower amounts, and they decrease as amounts increase.

With regard to Enda's social mission, women have been a priority in its official targeting policy from its earliest days. However, Enda decided not to grant women exclusivity as this could have negative effects, for example, by inducing men to send their wives, sisters, or daughters to request loans of which they would be the actual beneficiaries. To avoid such drifts, Enda has voluntarily started to target men more directly from 2007. As a consequence, the share of women clients went down from 80 per cent in 2007 to 65 per cent in 2015.

4   Data

4.1   Data preparation and management

Enda's information system was significantly enhanced in 2012 and is able to provide detailed information about clients, their households, projects, and loans. Enda provided us with a complete panel dataset containing information about all new clients from June 2012 to December 2013 and about all the loans they received from June 2012 to March 2016. We decided to limit the dataset to new clients up to the end of December 2013 as the situation in the country changed in 2014, with the entry of new actors in the microfinance sector leading to the possibility that new clients in 2014 may have been selected in a different way.

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[4] Tunisia is divided into various levels of administrative units, in particular into 24 governorates and 264 delegations.

[5] Enda uses the classification of the national office of Tunisian handicraft.

The whole dataset consists of 69,301 clients (63.5 per cent of whom are women) who received a total of 183,109 loans. One client can hold two loans concurrently but not two project loans. Indeed, Enda also offers other types of loans to fund personal projects or to grasp a market opportunity. These loans do not add any information about the on-going project, and were removed from the dataset—they represent only 2,636 loans though, i.e. 1.42 per cent of all the loans granted over the period. However, a dummy variable was created to take this information into account.

4.2   Descriptive statistics

Credit cycles and attrition

The average loan period is 11 months but can run from 3 to 33 months. Therefore, the number of loans received by clients, or 'credit cycles', does not necessarily correspond to the number of years since they became a client. However, the most recent clients logically got fewer loans, on average. Overall, 23.8 per cent of clients received one loan only over the period, while 19.4 per cent received two, 30.2 per cent received three, and 22.4 per cent received four (Table 1).

Table 1: Repartition of clients by the number of credit cycles over the period

Credit cycles	1	2	3	4	5	6	7	8	9	10	11
Clients (n)	16,505	13,441	20,938	15,573	2,561	199	55	24	3	1	1
Clients (%)	23.82	19.40	30.21	22.47	3.70	0.29	0.08	0.03	0.00	0.00	0.00

Source: Authors' calculations.

Women tend to receive slightly more loans than men, with a mean of 2.67 against 2.59 respectively.

Regarding attrition, from the MFI's point of view, if a client does not renew its non-agricultural loan the month following the closing date of its previous loan, it is considered to be a dropout. The delay is three months for clients who had an agricultural loan. Dropouts represent 46 per cent of our dataset. However, the default rate remains very low even among dropouts (3.1 per cent). Overall, 37 per cent of all the disbursed loans in our dataset were repaid late, but this share goes up to 55.9 per cent among the loans disbursed to dropouts and down to 28.7 per cent among those disbursed to continuing borrowers.

Finally, clients who left the MFI were more likely to do so early as 52 per cent of dropouts left after the first credit cycle, 33 per cent after the second, and 13 per cent after the third, resulting in a cumulative proportion of 98 per cent of dropouts who left at the end of the third cycle or before.

Clients' socio-demographic profiles

The average client age at the first loan's disbursement is 38.6 years, with no significant difference between men and women. Women tend to be less educated than men as 14 per cent of female clients are illiterate compared to only 4 per cent of men. By contrast, 43 per cent of male clients have a secondary level of education against 32 per cent of women. Women are also relatively more likely to be married (77 per cent against 65 per cent respectively), whereas men are more likely to be single than women (34 per cent against 19 per cent respectively). Most clients own their own house (79 per cent), and have at least one other active member in the household—this proportion being slightly higher among women (82.4 per cent) than men (77.7 per cent). This can be explained by men having the highest labour force participation rate, meaning that female clients are more likely to have an active husband than male clients are to have an active wife.

Clients' projects

The main activity sector is agriculture among both male and female clients, followed by trade (Table 2). However, women are more likely to lead projects in the production sector (i.e. mainly textile production, food production, or handicrafts) whereas men are more likely to work in services (especially transport or mechanics).

Table 2: Activity sector by gender (in %)

	Men	Women	Total
Agriculture	41.96	36.79	38.67
Trade	25.81	31.35	29.33
Production	13.11	22.78	19.25
Services	15.38	5.83	9.32
Not documented	3.75	3.25	3.43
Total	100.00	100.00	100.00

Source: Authors' calculations.

As often observed in microfinance, female clients tend to lead smaller projects than men. Here, the classification concerns the type of financial products which are intended to be tailored to each type of project. When clients receive their first loan, women are relatively more likely to receive a product designed for income-generating activities, or 'micro projects', whereas men are relatively more likely to receive credit for very small enterprises, especially in the non-agricultural sector. In addition, a specific financial product is designed for young people only (under 35 years of age) to enable them to start an activity, and men are more represented in this category than women (Table 3). The financial products differ, in particular, in terms of maximum amounts and interest rates. Although they are supposed to be tailored to the size and type of clients' projects, the choice of financial product is at the discretion of loan officers. We therefore cannot conclude with certainty that a client's project exactly corresponds to the category the product is supposed to be designed for—this classification only reflects the assessment of loans officers.

Table 3: Financial product by gender (in %)

	Men	Women	Total
Micro project	48.68	66.38	59.92
Very small enterprise	16.43	5.07	9.21
Creation	5.25	3.04	3.85
Agri. micro project	26.71	25.02	25.63
Agri. very small enterprise	2.93	0.50	1.39
Total	100.00	100.00	100.00

Source: Authors' calculations.

A striking gender difference concerns the evolution of financial products over credit cycles. If we estimate that the financial product granted actually corresponds to the project's size and type, a micro project may turn into a very small enterprise whether in the agricultural sector or not, or a project may regress and a small enterprise may decline into a micro project. In the same way, the creation of an activity by a young client may then turn into a micro project or a very small enterprise. In any case, the evolution of financial products from one credit cycle to another reflect at least the way officers see the evolutions of clients' projects, if not actual evolutions. The evolution of men's and women's projects (or received financial products) can be compared using

Tables 4 and 5 where the rows shows the initial situation (striking numbers in bold characters). Men who receive a first credit for a micro project are more likely to receive subsequent credits for small enterprises than women, who are more likely to keep receiving credits for micro projects. By contrast, women receiving credits for small enterprises seem more likely to decline in terms of financial product than men.

This could reflect the fact that women's projects develop less quickly than men's, possibly because of the gender division of labour in the household, differences in priorities, inequalities in access to resources, or starting inequalities in education, training, and skills, etc. The second possibility is that this evolution reflects the evolution of loan officers' assessments, especially of their clients' financial needs, as financial products are distinguished not only by activity sector but also by their maximum amount. This is why we will turn to other more objective indicators to take the size and type of projects into account in the econometric analyses. The dataset has two indicators for non-agricultural loans only, i.e. being part of the formal sector or not (which means the activity is officially registered) and the location of the project (at home or in independent premises). It has two other indicators for agricultural loans, i.e. the useful area for the activity and the project size assessed by the value of fixed assets.

Table 4: Transitions from one financial product to another over credit cycles (men)

	Micro project	Small enterprise	Creation – youth	Agri. micro project	Agri. small enterprise	Total
Micro project	**55.59**	**32.38**	0.15	10.09	1.88	100.00
Very small enterprise	**11.98**	**83.74**	0.43	1.91	1.9	100.00
Creation	**13.47**	**20.62**	**59.95**	3.81	2.15	100.00
Agri. micro project	7.89	4.40	0.04	69.56	18.10	100.00
Agri. very small enterprise	0.46	2.02	0.11	5.33	92.07	100.00
Total	27.67	34.64	1.43	22.20	14.06	100.00

Source: Authors' calculations.

Table 5: Transitions from one financial product to another over credit cycles (women)

	Micro project	Small enterprise	Creation – youth	Agri. micro project	Agri. small enterprise	Total
Micro project	**76.16**	**15.24**	0.15	7.86	0.59	100.00
Very small enterprise	**23.57**	**71.91**	0.29	2.69	1.54	100.00
Creation	**35.36**	**14.74**	**41.93**	7.27	0.70	100.00
Agri. micro project	8.48	2.18	0.06	78.53	10.75	100.00
Agri. very small enterprise	0.56	1.39	0.06	10.99	87.01	100.00
Total	52.83	17.05	0.71	24.21	5.21	100.00

Source: Authors' calculations.

Clients' financial situations

When receiving a loan, clients should provide a guarantee, which can take several forms as is usual in microfinance. Once again, the types of collateral offered by clients vary according to gender (Table 6). Women tend to resort more to their social network for guarantees, especially the clients' network: these includes joint surety guarantees, which imply several current clients, and mutual guarantees, which imply only one other client. Conversely, men have more recourse to financial or physical guarantees. This could reflect the existing gender inequalities in terms of access and control over resources. In particular, most female clients are married and have one

other member of their household who is active, these proportions being higher among women than men. We can therefore expect women to be at least as likely as men to offer salary as collateral, but salary is the most common collateral offered by men and not by women, which would imply that women cannot use their household's resources as collateral or prefer not to.

Table 6: Type of collateral by gender

	Men	Women	Total
Personal network	*35.84*	*34.05*	*34.7*
Former client	22.74	22.83	22.79
Parental engagement	1.10	0.97	1.02
Own background	12.01	10.25	10.88
Clients' network	*25.98*	*38.75*	*27.2*
Joint surety	2.70	5.57	4.54
Mutual guarantee	23.39	33.17	29.63
Physical guarantee	*38.18*	*34.17*	*31.13*
Salary	35.58	25.53	29.13
Pledging of equipment	2.60	1.67	2.00
Total	*100.00*	*100.00*	*100.00*

Source: Authors' calculations.

With regard to specific financial indicators, if the household's financial situation does not differ much between men and women, the project's financial indicators are higher for men than women when all credit cycles are taken together (Table 7). Households' median expenses and revenues are comparable, whereas median fixed assets, current assets, and monthly profits (applicable to non-agricultural projects only) are higher for men's projects than for women's.

Table 7: Median financial indicators by gender, all credit cycles combined

	Household's monthly expenses	Household's monthly revenues	Fixed assets	Current assets	Monthly profit (non-agri. projects)
Men	445	600	3,740	1,800	700
Women	425	650	1,000	1,150	337

Source: Authors' calculations.

To take a first look at the evolution of these indicators over credit cycles, we consider them in terms of ratios with the baseline being the value of the indicator when the client took his or her first loan. As there is high variability from one client to another, we consider the median ratios instead of average ratios. The evolution of these ratios is represented in Figures 1a and 1b, which concern only clients who had four credit cycles (i.e. 15,572 clients from our dataset) to avoid selection bias and compare comparable clients. The fixed assets of men's projects seem to increase more quickly than those of women's projects, but the opposite may be observed for current assets as well as monthly profits. This questions the assumption that women's projects grow more slowly: instead, they seem to manage their projects differently and to make different choices in terms of investments. With regard to households' financial indicators, both revenues and expenses seem to increase slightly more quickly for women than for men, which could also indicate different choices in terms of allocation of resources. These evolutions will be taken into account in the analysis of loan renewals.

Figure 1: Evolution of financial indicators over cycles in ratios (clients with 4 cycles only)

Figure 1a. Evolution of project's financial indicators over cycles in ratios (clients with 4 cycles only)

Figure 1b. Evolution of household's financial indicators over cycles in ratios (clients with 4 cycles only)
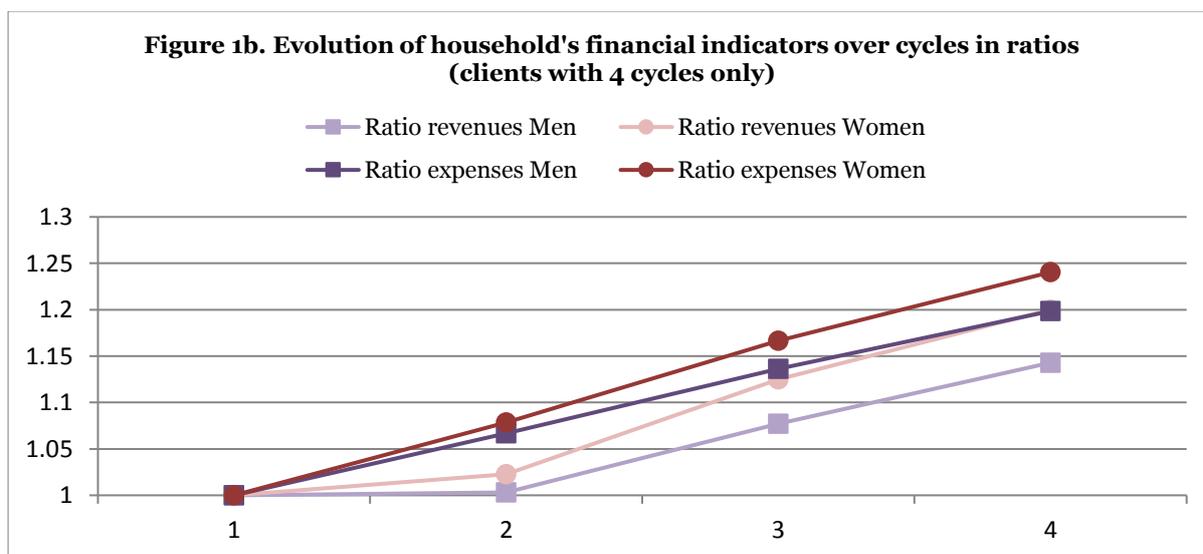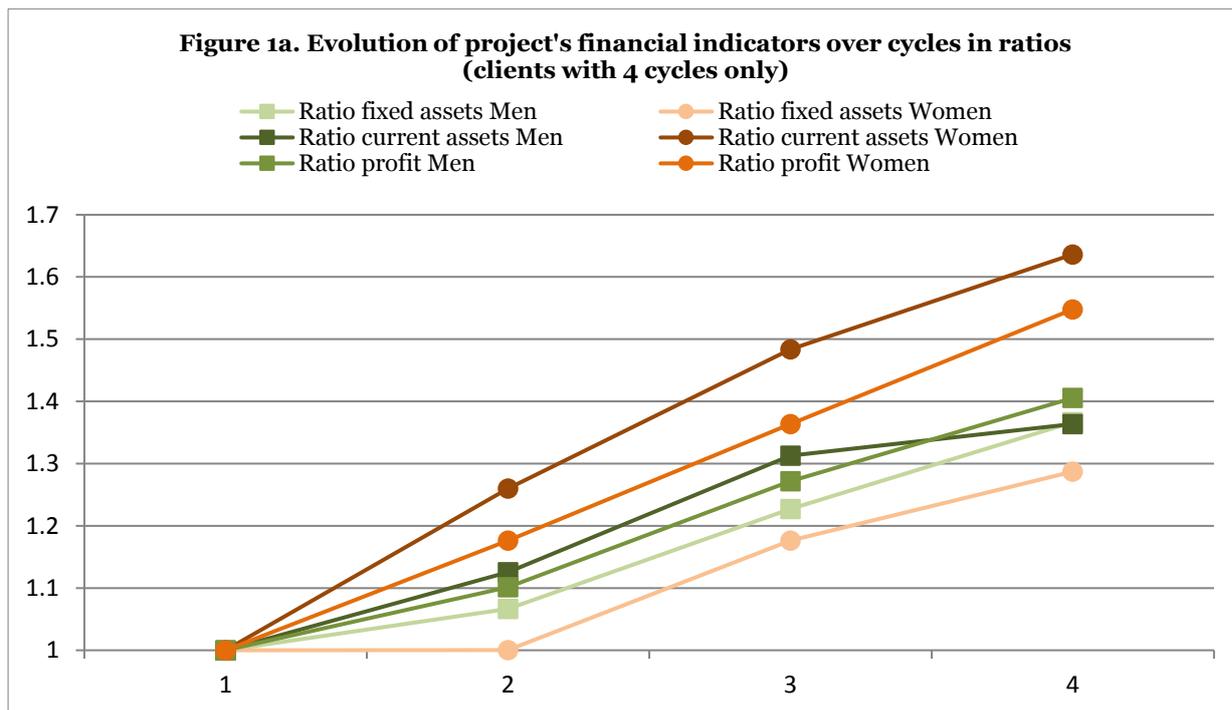
Source: Authors' calculations.

Loan amounts

As is the case for most microfinance institutions, Enda applies a policy of progressive lending: amounts granted go from an average of TND 678 for the first loan up to TND 2,364 for the fifth loan (Table 8). Not surprisingly, the amounts are higher for male clients, which could be explained by the differences between men's and women's projects in terms of size, type, or financial indicators. The econometric analysis will attempt to check if these differences totally explain the gaps observed in amounts granted or not. It also seems that amounts granted increase more quickly over credit cycles for men than for women, as the gaps between amounts granted to men and women become increasingly higher over cycles (Figure 2).

Table 8: Average loan amount by credit cycle and by gender

Cycle	1	2	3	4	5
Men	882	1,401	1,899	2,329	3,058
Women	560	924	1,274	1,577	1,912
Total	678	1,093	1,494	1,838	2,364

Source: Authors' calculations.

Figure 2: Average amounts granted over credit cycles by gender
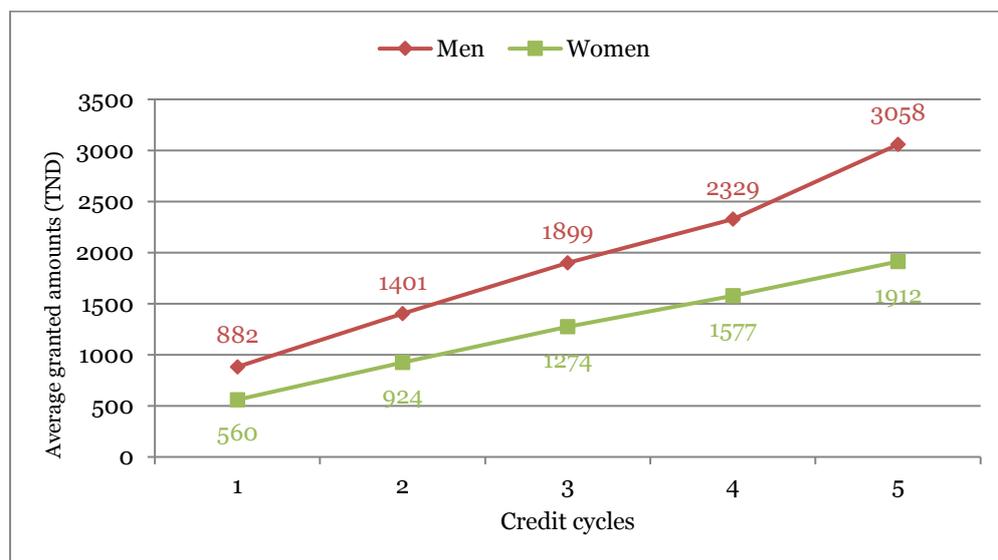
Source: Authors' calculations.

To consider the evolution of these loan amounts in greater detail, we again consider ratios; this time, as loan amounts are limited (the ceiling being TND 5,000), we do not expect extreme values and use average ratios. However, the evolution of loan amounts over credit cycles can be considered in two ways: the growth rate of loan amounts from one credit to the next one and the growth rate of the first amount over credit cycles.

The evolution of the first type of growth rate is represented in Figure 3 and the second in Figure 4. Unsurprisingly, if the first type of growth rate is substantial from the first credit to the second, it tends to be lower afterwards. Indeed, the leeway for increasing the amount is high after the first loan and then decreases. The evolution of both growth rates is similar for men and women. Nonetheless, knowing that the amounts at the first credit cycle are much lower for women, such similar growth rates can end up with increasing gaps in terms of loan amounts, as seen in Figure 2. Moreover, as financial indicators evolve differently for men and women, we cannot know at this stage if these similar growth rates represent a fair progressive lending policy which takes the evolution of projects into account.

Figure 3: Evolution of loan amounts from one credit cycle to another by gender (in ratios to the previous amount)
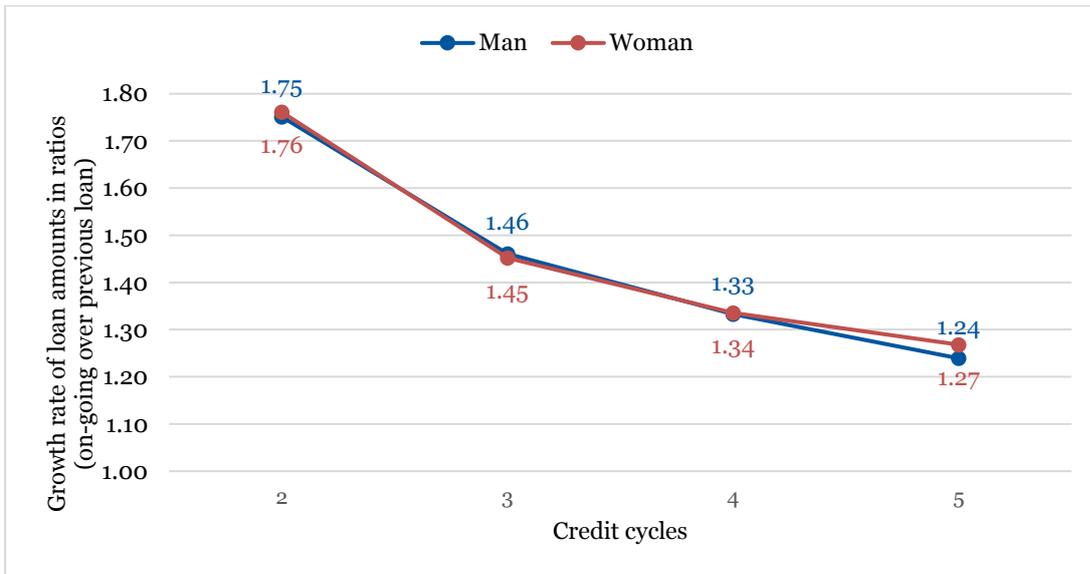
Source: Authors' calculations.

Figure 4: Evolution of loan amounts over credit cycles by gender (in ratios over the first amount)
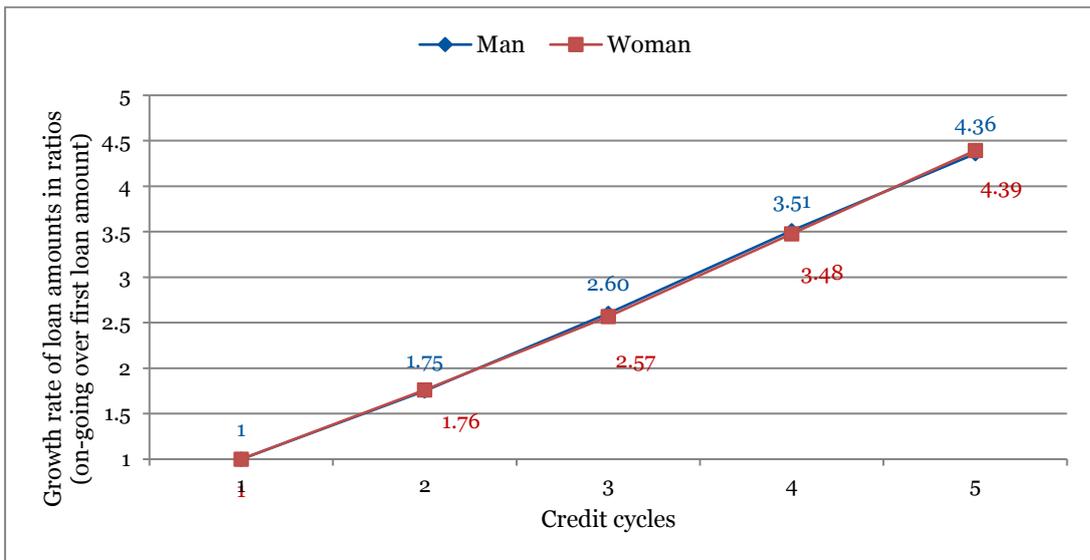
Source: Authors' calculations.

5   Method and results

The aim of the paper is to analyse the conditions of loan renewals and, in particular, to check if the loans are renewed in a fair manner between men and women. However, the first emerging issue is the fact that not all clients renew their loans. There is a significant amount of natural attrition[6] in our dataset, which corresponds to the clients who left the MFI. As dropouts seem to have specific characteristics, whether they left the MFI after defaulting or not, we suspect that

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[6]Here attrition does not correspond to data collection issues but to an actual phenomenon.

the selection (whether it is self-selection by clients themselves or exclusion by the MFI—our dataset does not enable us to distinguish between the two cases) is not random.

5.1 The probability of renewing a loan

Before analysing the conditions of loan renewals, we will focus on the probability of a loan being renewed.

As previously mentioned, most dropouts leave the MFI after the first loan, but not all of them do. As a consequence, we will include the characteristics of the credit in the analysis, as well as the client's socio-demographic and financial characteristics and the details of his or her project. Indeed, we suspect that starting inequalities in terms of education and/or socioeconomic background could be correlated with entrepreneurial skills and then have an effect on a client's capacity to start and run an activity in the long term. In the same way, the composition and financial situation of the household could be determining (as having other sources of revenues may help keep the project running in the case of difficulty), as well as the type of collateral (which may reflect the client's social network). With regard to the characteristics of the loan, the amount could be determining, as a high amount could enable the activity to maintain or develop and could provide an incentive for the client to stay. However, too high an amount could also represent too high a financial burden and put the client and/or his or her project at risk.

To take all these parameters into account, we estimate a sequential probit model, i.e. a structural equation model where one equation corresponds to the estimation of the probability of renewing a loan at the end of a specific credit cycle. We include five equations, meaning that we estimate the probability of renewing a loan at the end of the first five credit cycles. Indeed, the sixth cycle concerns only 199 clients, which is too few for us to include a sixth equation. Such a model enables us to allow correlation between the errors of each equation as unobserved individual effects could indeed be correlated over time.

We consider the following probit model which is estimated at each t separately, allowing correlation between the errors of each equation:

$$P(s_{it}=1 \mid Z_{it}) = \varphi\,(Z_{it}\varphi_t) \tag{1}$$

with Z_{it} representing the client's socio-demographic and financial characteristics (some being time-varying, i.e. changing from one credit cycle to another, and others being time-invariant) as well as the characteristics of the project and the loan (being time-varying), and e_{it} following a normal distribution.

The marginal effects of the estimated model are presented in Table 9.

Table 9: Probability of renewing a loan at the end of a cycle (marginal effects)

	Cycle 1		Cycle 2		Cycle 3		Cycle 4		Cycle 5	
Client's profile										
Female	-0.0228	(0.0139)	-0.0329*	(0.0161)	-0.0249	(0.0219)	-0.0309	(0.0491)	0.155	(0.160)
Age (10 years)	-0.00932	(0.00674)	0.0177*	(0.00768)	0.0301**	(0.0103)	0.0525*	(0.0233)	0.0839	(0.0816)
Education (vs. illiterate)		(.)	0	(.)	0	(.)	0	(.)	0	(.)
Primary	-0.00232	(0.0216)	0.0437	(0.0244)	-0.0355	(0.0351)	0.0513	(0.0800)		
Secondary	-0.0104	(0.0242)	0.0530	(0.0272)	-0.0966*	(0.0383)	0.0697	(0.0870)	-0.104	(0.153)
Higher	-0.130***	(0.0328)	-0.0660	(0.0376)	-0.0913	(0.0530)	0.0818	(0.121)		
Single	-0.177***	(0.0162)	-0.127***	(0.0189)	-0.0912***	(0.0254)	-0.112*	(0.0551)	0.334	(0.208)
Household size	-0.00603	(0.00366)	-0.00288	(0.00425)	-0.0171**	(0.00579)	-0.0111	(0.0128)	-0.0256	(0.0451)
Housing (vs. tenant)		(.)	0	(.)	0	(.)	0	(.)	0	(.)
Free lodging	0.0126	(0.0279)	-0.0170	(0.0308)	0.0373	(0.0388)	0.103	(0.0772)		
Owner	0.00431	(0.0226)	0.0249	(0.0251)	0.0548	(0.0314)	0.130*	(0.0621)	0.207	(0.159)
Other active member	0.0839***	(0.0152)	0.0980***	(0.0178)	0.0213	(0.0252)	0.0938	(0.0578)	0.312	(0.174)
Household's monthly exp. (TND 1,000)	0.0177	(0.0229)	0.0230	(0.0239)	-0.0249	(0.0297)	-0.0390	(0.0593)	0.0236	(0.176)
Project										
Sector (vs. griculture)		(.)	0	(.)	0	(.)	0	(.)	0	(.)
Commerce	0.0306	(0.0174)	0.0148	(0.0199)	-0.163***	(0.0272)	-0.265***	(0.0684)		
Production	-0.0138	(0.0183)	-0.00527	(0.0208)	-0.131***	(0.0282)	-0.175*	(0.0708)		
Services	0.118***	(0.0255)	0.0310	(0.0281)	-0.100**	(0.0377)	-0.360***	(0.0846)	0.508	(0.299)
Not documented	-0.0329	(0.0341)	-0.120*	(0.0484)	-0.252***	(0.0694)	-0.462**	(0.144)		
Project age	0.00190*	(0.000922)	0.00229*	(0.00103)	0.00459**	(0.00141)	0.00176	(0.00324)	0.0172	(0.0123)
Fixed assets (log)	0.00662***	(0.00201)	-0.00270	(0.00235)	-0.00148	(0.00313)	-0.00207	(0.00716)	-0.0237	(0.0303)
Employees (vs. none)		(.)	0	(.)	0	(.)	0	(.)	0	(.)
Seasonals only	0.0790	(0.0507)	-0.0461	(0.0508)	0.0658	(0.0718)	-0.0528	(0.146)		
Regular workers only	0.0275	(0.0245)	0.0247	(0.0290)	-0.107**	(0.0386)	-0.110	(0.0814)	-0.0955	(0.173)
Both	0.0190	(0.0378)	-0.00360	(0.0450)	-0.186**	(0.0633)	0.0469	(0.177)		
Loan										

	(1)		(2)		(3)		(4)		(5)	
Loan amount (TND 1,000)	0.200***	(0.0245)	0.0514***	(0.0155)	0.113***	(0.0160)	0.0935**	(0.0285)	-0.134	(0.0786)
Loan term (months)	-0.0202***	(0.00335)	-0.0148***	(0.00401)	0.0790***	(0.00535)	0.100***	(0.0116)	0.0723*	(0.0334)
Interest rate	0.00637	(0.00360)	-0.0254***	(0.00201)	-0.0162***	(0.00216)	-0.0117*	(0.00467)	-0.00778	(0.0225)
Collateral (vs. personal network)		(.)	0	(.)	0	(.)	0	(.)	-0.0199	(0.168)
Clients network	-0.129***	(0.0175)	-0.0479**	(0.0185)	-0.00403	(0.0235)	0.0696	(0.0568)	0	(.)
Physical guarantee	-0.105***	(0.0174)	-0.0532**	(0.0182)	-0.0105	(0.0238)	0.0379	(0.0587)		
Credit use (vs. working capital)		(.)	0	(.)	0	(.)	0	(.)	-0.0834	(0.160)
Investment	0.0766***	(0.0196)	0.0437*	(0.0220)	0.0345	(0.0302)	-0.0162	(0.0694)	0	(.)
Creation	-0.246***	(0.0643)	-0.0259	(0.0651)	-0.156	(0.0863)	0.0238	(0.239)		
Other	0.0127	(0.0167)	0.00995	(0.0194)	0.0139	(0.0269)	0.00191	(0.0622)		
Days overdue	-0.449***	(0.00451)	-0.376***	(0.00499)	-0.304***	(0.00614)	-0.268***	(0.0145)	-0.146**	(0.0448)
Officer and branch										
New officer			-0.0732***	(0.0153)	-0.0353	(0.0208)	-0.0820	(0.0456)	-0.184	(0.154)
Officer's gender	-0.0279*	(0.0130)	-0.0431**	(0.0148)	-0.0442*	(0.0195)	-0.0869*	(0.0425)	-0.0137	(0.163)
Repaid the last week of the month	-0.260***	(0.0140)	-0.339***	(0.0158)	-0.612***	(0.0232)	-1.044***	(0.0623)	-0.760**	(0.239)
Branch's mean amount (TND 1,000)	-0.0258	(0.0147)	-0.121***	(0.0160)	-0.0142	(0.0199)	-0.0415	(0.0424)	-0.0254	(0.144)
Branch's age	-0.0200***	(0.00173)	-0.0135***	(0.00191)	-0.000996	(0.00245)	-0.0111*	(0.00502)	0.0149	(0.0206)
Constant	1.320***	(0.141)	2.363***	(0.106)	0.967***	(0.141)	1.012**	(0.311)	1.100	(1.002)
Observations	*66,086*		*51,511*		*38,853*		*18,204*		*2,807*	

Source: Authors' calculations.

First, almost no variable is significant at the end of the fifth cycle, which concerns only 2,807 observations. As a consequence, the discussion of results will mainly concern the first four cycles. It is interesting that the client's socio-demographic characteristics do not appear as determining in the probability of renewing their loan at the end of a cycle, especially as the descriptive statistics suggest that the proportion of men was higher among dropouts than the average. The results of the sequential probit model show that, all other things being equal, gender has no statistically significant effect on the probability of renewing a loan. The only significant household characteristics are matrimonial status, as single clients are less likely to renew their loans, and the economic composition of the household, as being a client from a household where at least one other member is active increases the probability of renewing a loan by 8 or 9 percentage points, at least after the first two cycles.

The characteristics of the project and especially the loan seem to be much more determining. Leading an agricultural activity increases the probability of renewing the loan from the third cycle compared to other activity sectors. This could be due to the fact that the agricultural credits offered by Enda are tailored particularly to agricultural activity as they take seasonality into account. As a consequence, the clients leading such projects may be more dependent on Enda than the others. Furthermore, running a bigger project, with higher fixed assets, also increases the probability of renewing the loan after the first credit cycle. As most dropouts leave the MFI after the first cycle, it is possible that clients running smaller projects are less able to manage their credit and do not renew their loan after the first one. However, clients who receive a first loan to create their activity are less likely to renew it. This could indicate either failure of their project, as creations are riskier, or success, which enabled them to turn to traditional banks.

Second, having a higher loan amount increases the probability of renewal, unlike higher interest rates. Indeed, previous satisfaction studies achieved by the MFI revealed that some clients complain about loan amounts being too low and/or interest rates being too high, which can be reasons for leaving the MFI. Interestingly, having someone from their personal network acting as a guarantor increases the probability of a client renewing the loan compared to having someone from the network of clients as a guarantor or to having physical collateral as a guarantee—at least after the first two loans. This could indicate that people supported by their relatives or people close to them, especially those having this kind of guarantee at the first credit cycle, are more likely to run a project and/or to need funding from an MFI in the longer term. However, others, especially those offering physical guarantees and having bigger projects in terms of assets, could be either less dependent on an MFI's funding or less able to make their project survive. Finally, the probability of renewing the loan decreases with the number of days overdue. In this case, the MFI itself may become reluctant to grant another loan to a client who displays risky repayment behaviour or the client may decide not to renew the loan as they have realized they would not be able to repay another loan.

Third, we also notice that some organizational features have a significant effect on the probability of leaving the MFI. Thus, if the final repayment of the loan occurred during the last week of the month, this decreases the probability of the client renewing their loan. The internal administration of the MFI results in a far heavier workload for credit officers during the last week of the month as they are supposed to recall and/or visit all clients who are a few days overdue in their repayments in order to make sure these clients will eventually repay. Indeed, the objective for officers is to minimize the default and late rates of their portfolios at the end of the month in order to maximize their bonuses. As a consequence, credit officers tend to spend less time during this period renewing the loans of clients who just fulfilled their last payment obligation as other actions become a priority. Usually, the renewal of the loan is anticipated and officers make sure to start the procedure just before the last instalment. If the loan has not been renewed at that

point, then renewal is far less likely to occur. It is then understandable that loans repaid in total at the end of a month are less likely to be renewed.

Coming back to the gender perspective, as we do not find any clear gender effect on client loyalty, these results contradict the commonly held view in microfinance that women are more loyal customers than men. More precisely, if women do appear as more loyal, meaning they are less likely, on average, to leave the MFI, this is likely to be due to the characteristics of their projects and/or households.

Overall, the results of this preliminary analysis show that the probability of having a loan renewed is affected by observable characteristics and not randomly distributed in our dataset. It confirms that a correction for selection should be added in order to properly analyse the conditions for loan renewals.

5.2 The conditions of loan renewals from a gender perspective

We now focus on the progressive lending policy itself. In particular, we aim to check whether loan amounts increase over credit cycles in a similar way for men and women given the evolution of their respective projects and situations.

Our variable of interest is then the growth rate of the loan amount rather than the loan amount itself. However, the growth rate can be understood as the evolution from one credit to the next one or as the overall evolution from the first loan.

Whatever the type of growth rate considered, the selection bias should be corrected. In order to do that, we follow Wooldridge's procedure (Wooldridge 1995; Semykina and Wooldridge 2010) to correct selection bias in panel data models. Indeed, first of all in our case, we only observe whether a client has renewed their loan or not, meaning that we do not directly observe a variable explicitly determining selection but only a selection indicator. Second, we suspect that unobservable variable(s) could have an effect on both the probability of renewing a loan and the growth rate of the loan amount. These characteristics could be tenacity or perseverance which could push the client to renew their loan to keep their activity running, as well as insisting that the loan officer should increase loan amounts more significantly; they could also be better entrepreneurial skills in general. These unobservable variable(s) could also be correlated to the client's or project's observable characteristics, particularly the project's financial indicators such as fixed assets, current assets, or profits for non-agricultural projects. This possible correlation is an allowed hypothesis in Wooldridge's procedure.

This procedure is composed of three steps: the first consists in estimating the probability of being selected for each t, which means in our case the probability of renewing a loan at each credit cycle taken separately. Therefore, the first step corresponds to equation (1) described previously.

After estimating equation (1) with T standard probit models, the second step consists in computing T inverse Mills ratios for s_{it}=1. We will afterwards include these ratios in subsequent equations to correct the selection bias. Moreover, this implies that an exclusion variable, highly correlated with the probability of renewing a loan but not to the granted amount in terms of ratio, is included in equation (1). This exclusion variable is the fact that the last repayment of the previous loan was made during the last week of the month, as we found in the previous model that, in this case, the probability of a loan being renewed is much lower. However, if the loan is renewed, the fact that the last instalment was paid during the last week of the month has no effect on the newly granted amount in terms of ratio.

The evolution from one credit cycle to the next one

We first focus on the evolution of the loan amount from one credit cycle to the next, implying that the dependent variable will be the ratio of the on-going credit amount to the previous amount received.

Logically, the magnitude of the ratio should depend on the previous amount: we expect the ratio to be higher if the previous amount was low, as the MFI would have more leeway to increase the amount. Therefore, we also expect these ratios to decrease over credit cycles, as the previous amounts granted increase. This is why we include the credit cycle in explicative variables to isolate this mechanical effect.

Following Wooldridge's procedure, the third step consists in estimating equation (2) using a pooled ordinary least squares estimator with bootstrapped standard errors:

$$y_{it} = \psi \bar{x}_i + \beta X_{it} + \gamma Amount_{it-1} + \alpha Install_{it-1} + \delta Nbdelay_{it-1} + \rho \lambda_{it} + \varepsilon_{it} \quad (3)$$

with y_{it} the ratio of the on-going loan amount to previous loan amount observed for each individual i at a time t, t being a credit cycle;

$\bar{x}_i$ the matrix of average values of X_{it} by individual;

X_{it} the matrix of time-varying independent variables;

$Amount_{it-1}$ the amount received at the previous credit cycle;

$Install_{it-1}$ the duration in months of the previous credit cycle;

$Nbdelay_{it-1}$ the number of days of delay of the previous credit cycle;

λ_{it} the inverse Mills ratios;

ε_{it} the idiosyncratic error term.

The matrix of independent variables consists of constant socio-demographic characteristics (age, marital status, household size, education), and the loan's time-varying characteristics (credit cycle, time interval between two loans, collateral), the project's time-varying characteristics (activity sector, age, employees), financial time-varying characteristics (household expenses, the logarithms of fixed assets, of current assets, and of their respective evolutions in ratios), and organizational time-varying features (new officer compared to the previous loan or not, officer's gender, branch's rurality rate, branch's age, and branch's average granted amount).

Model 1 defined by equation (2) is estimated by adding an interaction term between the client's gender and the credit cycle, as we are especially interested in the effect of gender on the growth ratio over credit cycles. The model is then estimated by separating the non-agricultural loans (model 2), and the agricultural ones (model 3). Indeed, we have additional information (in particular, monthly benefit, location of the activity, and official registration or not for non-agricultural projects, and useful area and project size for agricultural projects) about the projects for these specific types of loans and consider that such information is relevant as it could have an impact on the growth rate of the amount of loan and should be included. Furthermore, separating loans enables us to check whether the observed effects are similar for all types of loans

or not. The results of the three models are presented in Table 10. The coefficients of average values of X_{it} by individual have been dropped from the table for more clarity.

Finally, in order to check if the observed effects are the same all along the distribution of our dependent variable, we run a simultaneous quantile regression and present only the results of interest in Table 11.

Table 10: Growth rate of loan amount from one credit cycle to another (in ratio)

	All clients (1)		Non-agricultural loans (2)		Agricultural loans (3)	
Female	0.321***	(0.00930)	0.341***	(0.0115)	0.261***	(0.0163)
Credit cycle	0.424***	(0.0126)	0.394***	(0.0136)	0.532***	(0.0233)
Female # credit cycle	-0.107***	(0.00303)	-0.115***	(0.00394)	-0.0852***	(0.00539)
Loan						
Previous loan amount (TND 1,000)	-0.887***	(8.95e-03)	-0.823***	(1.08e-05)	-0.959***	(1.53e-05)
Previous loan term (months)	-0.0576***	(0.00158)	-0.0733***	(0.00190)	-0.0410***	(0.00277)
Previous number of days overdue (log)	-0.0809***	(0.00301)	-0.0749***	(0.00398)	-0.0901***	(0.00434)
Number of days between 2 cycles	2.76e-05	(4.26e-05)	-4.79e-05	(5.33e-05)	0.000196***	(6.16e-05)
Requested amount at cycle 1	-9.02e-06***	(1.83e-06)	-9.05e-06***	(1.99e-06)	-7.42e-06**	(3.26e-06)
Parallel personal or opportunity loan	0.0312	(0.0208)	0.0267	(0.0235)	0.0568	(0.0407)
Collateral (vs. personal network)						
Clients network	-0.0331***	(0.00592)	-0.0273***	(0.00781)	-0.0462***	(0.00951)
Physical guarantee	-0.00805	(0.00707)	-0.00950	(0.00750)	-0.00916	(0.0105)
Credit use (vs. working capital)						
Investment	0.198	(0.163)	0.108	(0.181)	0.601	(0.481)
Creation	0.240***	(0.0605)	0.267***	(0.0684)	0.251	(0.175)
Other	0.186	(0.223)	0.199	(0.269)	0.303	(0.464)
Project						
Activity sector (vs. agriculture)						
Trade	0.0360***	(0.00994)	0.0125	(0.0131)	NA	
Production	-0.00694	(0.0105)	-0.0214	(0.0135)	NA	
Services	0.0785***	(0.0143)	0.0555***	(0.0158)	NA	
Not documented	0.0164	(0.0141)	-		NA	
Age of project	-0.119***	(0.0137)	-0.0765***	(0.0125)	-0.254***	(0.0251)
Employees (vs. none)						
Seasonals only	0.0676***	(0.0158)	0.0466***	(0.0173)	0.0652***	(0.0219)
Regular workers only	0.0383***	(0.00811)	0.0343***	(0.00833)	0.0246	(0.0212)
Both	0.0315**	(0.0135)	0.0279**	(0.0141)	0.00517	(0.0276)
Fixed assets (log)	0.0137***	(0.000867)	0.00892***	(0.000960)	NA	
Current assets (log)	0.0290***	(0.00123)	0.0311***	(0.00143)	0.0223***	(0.00177)
Evolution of fixed assets (ratio)	0.00451***	(0.000889)	0.00317***	(0.00112)	NA	
Evolution of current assets (ratio)	0.00361***	(0.00136)	0.00339**	(0.00173)	0.00389*	(0.00209)
Monthly profit	NA		6.52e-05***	(4.62e-06)	NA	
Formal sector	NA		0.0566***	(0.00674)	NA	
Independent premises	NA		0.0550***	(0.00599)	NA	
Size of agricultural project (vs. IGA)						
Micro activity	NA		NA		0.145***	(0.00799)
Very small activity	NA		NA		0.353***	(0.0297)
Culture (vs. breeding)	NA		NA		0.0839***	(0.0146)

Socio-demographic profile						
Young (<35)	-0.0108	(0.00961)	-0.0255*	(0.0133)	0.00831	(0.0160)
Education (vs. illiterate)						
Primary	0.00361	(0.00380)	-0.00416	(0.00595)	0.00403	(0.00506)
Secondary	-0.00639	(0.00434)	-0.0138**	(0.00625)	-0.00477	(0.00648)
Higher	-0.0123*	(0.00652)	-0.0116	(0.00900)	-0.0286**	(0.0138)
Housing (vs. tenant)						
Free lodging	0.00901*	(0.00514)	0.00343	(0.00514)	0.0263**	(0.0128)
Owner	-0.01000***	(0.00367)	-0.0107***	(0.00407)	0.000666	(0.0118)
Other active member in household	0.00118	(0.00329)	-0.00567	(0.00424)	0.00848	(0.00526)
Household size	0.00188***	(0.000701)	0.00227**	(0.000956)	0.000773	(0.00117)
Single	0.00754**	(0.00309)	0.00539	(0.00427)	0.00559	(0.00579)
Household monthly expenses	5.57e-05***	(9.36e-06)	2.88e-05**	(1.13e-05)	-1.92e-05	(1.59e-05)
Evolution of expenses (ratio)	-0.00441	(0.00686)	-0.0111	(0.00717)	0.0288**	(0.0121)
Officer and branch						
Other agent than previous loan	0.0226***	(0.00367)	0.00962**	(0.00468)	0.0444***	(0.00672)
Officer's gender	0.0129**	(0.00582)	0.00829	(0.00641)	0.0202*	(0.0112)
Officer's years of experience	-0.000557	(0.000424)	-0.000198	(0.000561)	-0.000731	(0.000871)
Rurality of the branch (vs less than 0.07% of rural areas served)						
0,07-0,35%	0.0298***	(0.00301)	0.0226***	(0.00347)	0.0361***	(0.00652)
0,35-0,55%	0.0276***	(0.00347)	0.0371***	(0.00455)	0.0122*	(0.00622)
>0,55%	0.0211***	(0.00376)	0.0360***	(0.00537)	-0.00525	(0.00604)
New branch	0.0154**	(0.00771)	0.0344***	(0.00967)	-0.0119	(0.0117)
Branch's mean amount	2.86e-05***	(5.53e-06)	2.20e-05***	(6.62e-06)	4.34e-05***	(1.06e-05)
Inverse Mills Ratio	-0.0905***	(0.0145)	-0.134***	(0.0200)	-0.0127	(0.0205)
Constant	1.098***	(0.222)	1.108***	(0.273)	0.843*	(0.470)
All average Xi included	*Yes*		*Yes*		*Yes*	
Observations	*109,050*		*67,550*		*40,918*	
Adjusted R-squared	*0.496*		*0.504*		*0.506*	
Bootstrapped standard errors in parentheses						
*** p<0.01, ** p<0.05, * p<0.1						

Source: Authors' calculations.

Table 11. The gender effect on the growth rate of loan amount over credit cycles with a quantile regression

	q25		q50		q75		q90	
Female	0.214***	(0.0095)	0.262***	(0.0082)	0.289***	(0.00968)	0.325***	(0.0144)
Credit cycle	0.365***	(0.0086)	0.363***	(0.0099)	0.387***	(0.0189)	0.409***	(0.0177)
Female#cycle	-0.0723***	(0.00285)	-0.0855***	(0.00242)	-0.0921***	(0.00337)	-0.102***	(0.00509)
Other controls included	*Yes*		*Yes*		*Yes*		*Yes*	
All average Xi included	*Yes*		*Yes*		*Yes*		*Yes*	
Observations	*109,050*		*109,050*		*109,050*		*109,050*	
Pseudo R-squared	*0.3004*		*0.3103*		*0.3323*		*0.3403*	

Bootstrapped standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: Authors' calculations.

First and foremost, in accordance with what was expected, we observe that the effect of the amount previously received is statistically significant and negative in the three models: the higher the previous amount, the lower the ratio of the on-going amount to the previous one.

Having taken account of the effect of the previous amount, we observe significant and positive effects of the credit cycle in the three models. As there is an interaction term with female, it represents the effect for men only. However, if we consider this coefficient and add the one of the interaction term with female, the effect remains positive for women as well. This means that at equal amount previously received, the growth rate is higher between two higher credit cycles than between two lower ones, for both men and women. Descriptive statistics could not have suggested such an effect, as ratios directly depend on the previous amount. In some way, this positive effect of credit cycle could reflect the increasing trust of the MFI in its clients over time, especially as the ratio is estimated, all other things being equal, including financial characteristics. This means that the progressive lending policy is indeed applied to both men and women, not only on average but also all other things being equal.

However, considering only the coefficient of the interaction term between female and credit cycle, it reveals that if ratios increase over credit cycles for both men and women, this increase is less substantial for women, as the coefficient of the interaction term is statistically significant at 1 per cent and negative in the three models. As a consequence, this result would reveal that the progressive lending policy would be applied differently for men and women, and more precisely that it would be more favourable to men. Looking at models 2 and 3, the negative effect seems more substantial for non-agricultural loans than agricultural ones.

With regard to the other characteristics of the loan, the effect of the duration of the previous loan is also controlled for and is significantly negative, meaning that clients who receive longer previous loan terms also receive lower new amounts in terms of ratio. This is logical, as the duration is taken into account at equal previous amount: this means that a client with a previous longer loan but with the same amount benefited from a longer duration in order to enable him or her to repay. As a consequence his or her capacity for repayment, which is not directly observed, was most probably lower. Therefore, such a client is more likely to still show a lower capacity for repayment at the end of the previous credit period and then to get a lower new amount in terms of ratio. Regarding clients' repayment behaviour, in accordance with descriptive statistics, clients who accumulate more days of payment being overdue during the previous cycle see their credit amount growing less rapidly than the others, as the number of days overdue has a significant and negative impact on the ratio in the three models.

With regard to the financial characteristics, both current and fixed assets in value and in growth rate have a significant and positive effect on the ratio: the higher the current and fixed assets, and the higher their growth rate since the previous loan, the higher the growth rate of the loan amount. This is understandable as fixed and current assets are indicators of the project size and of financial needs. We expect that clients with bigger projects and/or higher needs at a given time get greater amounts in terms of ratios. For agricultural loans, there is a specific indicator of the project size and, as expected, micro and very small activities tend to increase the growth rate of the loan amount compared to income-generating activities. For non-agricultural loans, higher monthly benefits, a registered activity, and independent premises logically tend to increase the growth rate, as these variables also reflect bigger projects. For all types of loans, having some employees also increases the growth rate.

With regard to projects' other characteristics, the growth rate is significantly higher for activities in trade or services compared to agriculture, while for agricultural loans only, it is higher for culture compared to breeding. In terms of collateral, it seems that it is more reliable for the MFI to have a client with a member of their personal network acting as a guarantor than another client as the growth rate is significantly higher in this case, whereas there is no difference between personal network and physical guarantee, which is also considered as safe collateral.

A final interesting result is the positive coefficient of the loan officer's gender, which is significant at 10 per cent for all loans, meaning that female officers would tend to apply a more generous progressive lending policy than their male counterparts. Looking at the two types of loans separately, this would be mainly the case for agricultural loans. Such a result goes against the presupposition that women are more risk averse than men, as a more risk-averse officer would grant lower amounts. In the same way, being served by a different officer from the previous loan tends to increase the growth rate of the loan amount in all cases. This could be explained by the fact that a new officer will do his/her best to keep the client. Indeed, as seen in the previous model, being served by a new officer decreases the probability of renewing the loan as clients probably feel a less strong relationship with the MFI when the officer changes. As a consequence, a new officer is more likely to apply a more generous progressive lending policy in order to make sure the client will renew the loan at the end of the term.

Regarding the results of the quantile regression (Table 11), the interesting result is that the negative effect of the interaction term between female and credit cycles is more substantial in higher quantiles. T-tests between each possible pair of coefficients showed that they all significantly differ from each other. As a consequence, the gap between growth rates of loan amounts applied to male and female clients tends to be more substantial among clients benefiting from greater growth rates.

The evolution of the loan amount from the first credit cycle

We now consider the evolution of the loan amount in terms of the ratio of the on-going amount to the first one received by the client. We run exactly the same model as presented in equation (2), replacing only the dependent variable. The results are presented in Table 12 and differ slightly from the first ones.

With regard to our variable of interest, the growth rate of loan amounts, as defined with such a ratio, still increases over credit cycles for both men and women, which confirms that the MFI applies a progressive lending policy for all clients, all other things being equal. However, considering all loans together, the coefficient of the interaction term is still negative, but looking at the two kinds of loans separately, the negative effect concerns only non-agricultural loans. As a consequence, the progressive lending policy defined with this ratio seems to be more fairly

applied to men and women for agricultural loans. Furthermore, the negative coefficient of the interaction term is less substantial with this definition than with the previous one.

The main difference in relation to the other factors concerns the collateral. If the personal network still seems more reliable than the client network, a physical guarantee implies a more generous progressive lending policy defined with this ratio than the personal network, compared to the previous definition.

Finally, similar results are observed in the quantile regression (Table 13) as with the previous definition of growth rate. The gap between the progressive lending policy applied to men and women tends to be higher for clients benefiting from greater growth rates. However, the difference is significant only between the 25th quantile and all the others, whereas it is not significant between the 50th, 75th, and 90th quantiles.

Table 12: Growth rate of loan amount from the first credit cycle (in ratio)

	All clients (4)		Non-agri. loans (5)		Agricultural loans (6)	
Female	0.180***	(0.0296)	0.289***	(0.0334)	0.0240	(0.0495)
Credit cycle	1.283***	(0.0333)	1.315***	(0.0423)	1.190***	(0.0509)
Female # credit cycle	-0.0337***	(0.0123)	-0.0799***	(0.0134)	0.0207	(0.0205)
Loan						
Previous loan amount (TND 1,000)	-0.437***	(2.11e-02)	-0.390***	(2.39e-02)	-0.437***	(3.08e-02)
Previous loan term (months)	-0.00903**	(0.00360)	-0.0153***	(0.00457)	-0.0105*	(0.00579)
Previous number of days overdue (log)	-0.106***	(0.00979)	-0.103***	(0.0115)	-0.124***	(0.0186)
Number of days between 2 cycles	-3.34e-06	(9.10e-05)	0.000135	(0.000107)	-0.000284*	(0.000155)
Requested amount at cycle 1	4.18e-06	(5.46e-06)	-2.48e-05***	(5.81e-06)	5.61e-05***	(9.28e-06)
Parallel personal or opportunity loan	0.138*	(0.0756)	0.130	(0.0878)	0.158	(0.153)
Collateral (vs. personal network)						
Clients network	-0.0402***	(0.0149)	-0.0433*	(0.0236)	-0.0465*	(0.0260)
Physical guarantee	0.101***	(0.0170)	0.0510**	(0.0210)	0.165***	(0.0302)
Credit use (vs. working capital)						
Investment	-0.315	(0.524)	-0.317	(0.581)	-0.260	(0.849)
Creation	1.139***	(0.195)	1.097***	(0.189)	1.633***	(0.427)
Other	0.0787	(0.624)	0.167	(1.003)	0.0727	(0.806)
Project						
Activity sector (vs. agriculture)						
Trade	0.0309	(0.0274)	0.0319	(0.0292)	NA	
Production	-0.0975***	(0.0302)	-0.0574*	(0.0299)	NA	
Services	0.142***	(0.0391)	0.152***	(0.0384)	NA	
Not documented	-0.00706	(0.0355)	-		NA	
Age of project	-0.288***	(0.0326)	-0.279***	(0.0455)	-0.270***	(0.0503)
Employees (vs. none)						
Seasonals only	0.242***	(0.0439)	0.151***	(0.0462)	0.291***	(0.0696)
Regular workers only	0.0735***	(0.0201)	0.0766***	(0.0197)	-0.0407	(0.0466)
Both	0.112***	(0.0301)	0.115***	(0.0372)	-0.0286	(0.0626)
Fixed assets (log)	0.0328***	(0.00294)	0.0171***	(0.00263)	NA	
Current assets (log)	0.0503***	(0.00386)	0.0688***	(0.00371)	0.0513***	(0.00564)
Evolution of fixed assets (ratio)	0.0117**	(0.00516)	0.0197***	(0.00257)	NA	
Evolution of current assets (ratio)	0.0747***	(0.00923)	0.0258***	(0.00409)	0.0252***	(0.00615)

	(1) Coef	(1) SE	(2) Coef	(2) SE	(3) Coef	(3) SE
Monthly profit	NA		0.000199***	(1.41e-05)	NA	
Formal sector	NA		0.135***	(0.0194)	NA	
Independent premises	NA		0.126***	(0.0173)	NA	
Size of agricultural project (vs. IGA)						
Micro activity	NA		NA		0.369***	(0.0230)
Very small activity	NA		NA		0.972***	(0.0971)
Culture (vs. breeding)	NA		NA		0.273***	(0.0400)
Socio-demographic profile						
Young (<35)	-0.0373	(0.0304)	-0.106***	(0.0379)	0.0555	(0.0519)
Education (vs. illiterate)						
Primary	-0.00206	(0.0106)	-0.0437***	(0.0162)	0.0123	(0.0127)
Secondary	-0.0328***	(0.0114)	-0.0712***	(0.0168)	-0.0280*	(0.0157)
Higher	-0.105***	(0.0165)	-0.117***	(0.0219)	-0.152***	(0.0354)
Housing (vs. tenant)						
Free lodging	0.0196	(0.0128)	-0.0231*	(0.0132)	0.128***	(0.0383)
Owner	-0.0666***	(0.00965)	-0.0629***	(0.0108)	-0.0390	(0.0328)
Other active member in household	0.000541	(0.00846)	-0.0374***	(0.0110)	0.0330**	(0.0130)
Household size	0.00168	(0.00189)	0.00419*	(0.00243)	0.000359	(0.00300)
Single	0.0136	(0.00934)	-0.00402	(0.00994)	0.0261	(0.0174)
Household monthly expenses	0.000233***	(2.26e-05)	0.000149***	(3.32e-05)	2.68e-05	(4.28e-05)
Evolution of expenses (ratio)	-0.178***	(0.0210)	-0.114***	(0.0181)	-0.0612**	(0.0261)
Officer and branch						
Other agent than previous loan	0.0455***	(0.0105)	0.0302**	(0.0122)	0.0670***	(0.0199)
Officer's gender	0.0899***	(0.0169)	0.114***	(0.0189)	0.0400	(0.0335)
Officer's years of experience	-0.00289***	(0.00111)	-0.00253*	(0.00134)	-0.00328	(0.00218)
Rurality of the branch (vs less than 0.07% of rural areas served)						
0,07-0,35%	0.105***	(0.00847)	0.0959***	(0.00903)	0.135***	(0.0168)
0,35-0,55%	0.0574***	(0.00896)	0.0987***	(0.0116)	0.0276	(0.0184)
>0,55%	-0.00539	(0.0103)	0.110***	(0.0149)	-0.0911***	(0.0178)
New branch	-0.105***	(0.0208)	-0.0436	(0.0279)	-0.183***	(0.0311)
Branch's mean amount	9.95e-05***	(1.66e-05)	4.93e-06	(1.87e-05)	0.000256***	(3.33e-05)
Inverse Mills Ratio	-0.335***	(0.0444)	-0.432***	(0.0521)	-0.119	(0.0823)
Constant	-1.179*	(0.618)	-0.748	(0.997)	-1.625**	(0.813)
All average Xi included	Yes		Yes		Yes	
Observations	109,455		67,759		41,104	
Adjusted R-squared	0.415		0.450		0.396	

Bootstrapped standard errors in parentheses

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Source: Authors' calculations.

Table 13. The gender effect on the growth rate of loan amount over credit cycles with a quantile regression

	q25		q50		q75		q90	
Female	0.130***	(0.0135)	0.199***	(0.0146)	0.233***	(0.0280)	0.264***	(0.0442)
Credit cycle	1.067***	(0.0191)	1.389***	(0.0256)	1.623***	(0.0346)	1.879***	(0.0330)
Female#cycle	-0.0418***	(0.00582)	-0.0642***	(0.00626)	-0.0655***	(0.0128)	-0.0740***	(0.0190)
Other controls included	*Yes*		*Yes*		*Yes*		*Yes*	
All average Xi included	*Yes*		*Yes*		*Yes*		*Yes*	
Observations	*109,455*		*109,455*		*109,455*		*109,455*	
Pseudo R-squared	*0.1993*		*0.2699*		*0.3528*		*0.4045*	

Bootstrapped standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: Authors' calculations.

6   Conclusion

In the microfinance sector, progressive lending is a very commonly applied policy as it enables the burden of transaction costs to be reduced and favours client retention as it is a good dynamic incentive. It also helps MFIs to avoid large losses by testing clients' repayment behaviour before lending high amounts. However, the way such a progressive lending policy is applied has rarely been analysed and this paper has attempted to fill this gap. In particular, as some recent studies have revealed that women may face less favourable loan conditions than men while being favoured in terms of access to microcredit, the analysis has focused on the conditions of loan renewals from a gender perspective within the main Tunisian microfinance institution Enda inter-arabe.

First of all, it should be mentioned that even though client retention is a priority for Enda inter-arabe just as for other MFIs, some clients do eventually leave the MFI after one or several loans. These dropouts differ from continuing borrowers. Dropouts, in particular, repay their loans with more days overdue, even though only a tiny minority default. As a consequence, the decision for them to leave the MFI could be that of the clients or the MFI itself. The clients who receive lower amounts as well as those who pay higher interest rates are also more likely to leave the MFI. However, men are not more likely to leave the MFI than women, contradicting the common presupposition that women are more likely to be loyal clients than men. Client retention actually depends on projects, loan characteristics, and repayment behaviour rather than on gender.

Having taken account of this selection bias, the conditions of loan renewal were analysed taking account of using the ratios of on-going amount over the previous amount on the one hand, and the ratios of on-going amount over the first amount on the other hand. All things being equal, including the previous loan amount, the ratios tend to increase over credit cycles, reflecting an increasingly favourable progressive lending policy over credit cycles. This could be explained by an increasingly trusting relationship between the MFI and the client over cycles as MFIs tend to know their clients better from one contract to another. Logically, the ratios tend to be lower for clients who repaid their previous loans with more days overdue, confirming the importance of trust in the application of the progressive lending policy. However, the most striking result concerns our item of interest, as the progressive lending policy appears to be less favourable to women, all other things being equal. Indeed, if the ratios increase over cycles, they increase less quickly for women. As a result, the initial gap between the first loan amounts granted to men and women (Bauwin forthcoming) seems to persist over time: women benefit from a progressive

lending policy just as men do, but it is less favourable. Consequently, existing inequalities between men and women can only be reproduced: indeed, women already start from a lower position as they tend to run smaller projects in terms of assets and profits, and then tend to request lower first amounts. If Enda inter-arabe, as other MFIs, actually favour women in terms of access to credit in attempting to counterbalance these starting inequalities, they fail to do so entirely, as we still observe an initial gap in first amounts granted, which increases over time as the progressive lending policy is less favourable to women, all other things being equal. As a consequence, if women keep receiving lower amounts, their projects will evolve less quickly too, and catching up with men in terms of economic power will become almost impossible.

However, this unfair application of the progressive lending policy is probably involuntary and the consequences, in terms of reproduction of inequalities, unknown, as this kind of longitudinal analysis is not systematically achieved by credit officers. That is why we tend to support Oikocredit's initiative consisting in improving information systems in order to better manage, use, and analyse clients' data from a longitudinal perspective. We would recommend that MFIs carry out such longitudinal analyses in a more systematic way to get a better view of the evolution of clients and then to adapt their progressive lending policy accordingly. The inclusion of new indicators in rating agencies' tools would also encourage MFIs to adapt their progressive lending policies by making their granting procedures more objective over credit cycles. We would also recommend taking account of the characteristics of MFIs' progressive lending policies in future research works, particularly in impact assessment studies, as the growth rate of loan amounts could have a more significant impact than time alone.

References

Agier, I., and A. Szafarz (2013). 'Microfinance and Gender: Is There a Glass Ceiling on Loan Size?'. *World Development*, 42: 165–181.

Armendariz, B., and J. Morduch (2010). *The Economics of Microfinance*. (2nd ed). Cambridge, MA: MIT Press.

Banerjee, A.V., E. Duflo, R. Glennerster, and C. Kinnan (2009). 'The Miracle of Microfinance? Evidence from a Randomized Evaluation'. Working Paper, IFMR Research, Centre for Micro Finance. Retrieved from: https://pdfs.semanticscholar.org/689e/4c2e75a1ae6c2e8f2f8683e6e991a6d31901.pdf (accessed on 22 April 2017).

Banerjee, A., E. Duflo, R. Glennerster, and C. Kinnan, C. (2015). 'The Miracle of Microfinance? Evidence from a Randomized Evaluation'. *American Economic Journal: Applied Economics*, 7(1): 22–53. https://doi.org/10.1257/app.20130533

Bauwin, M. (forthcoming). 'Defeating the Purpose: Targeting versus Favoring Women in Microfinance'.

Chliova, M., J. Brinckmann, and N. Rosenbusch (2015). 'Is Microcredit a Blessing for the Poor? A Meta-analysis Examining Development Outcomes and Contextual Considerations'. *Journal of Business Venturing*, 30(3): 467–87.

Convergences (2015). 'Microfinance Barometer 2015'. Retrieved from: http://www.european-microfinance.org/docs/news/BMF-2015-ENG_web.pdf (accessed on 1 April 2017).

Convergences (2016). 'Microfinance Barometer 2016'. Retrieved from: http://www.convergences.org/wp-content/uploads/2016/09/BMF-EN-FINAL-2016-Version-web.pdf (accessed on 1 April 2017).

Epstein M.J., and K. Yuthas (2013). 'Rural Microfinance and Client Retention: Evidence from Malawi'. *Journal of Developmental Entrepreneurship*, 18(01): 1350006.

Khandker, S.R. (2005). 'Microfinance and Poverty: Evidence Using Panel Data from Bangladesh'. *The World Bank Economic Review*, 19(2): 263–86.

Khandker, S.R., M.A.B. Khalily, and Z.H. Khan (1995). *Grameen Bank: Performance and Sustainability*. Washington, DC: World Bank.

(MAFFEPA) (Ministère des Affaires de la Femme, de la Famille, des Enfance et des Personnes âgées) (2005). *Profil Genre Tunisie 2014*. Retrieved from: http://www.eeas.europa.eu/archives/delegations/tunisia/documents/page_content/profil_ge nretunisie_2014_longue_fr.pdf (accessed on 22 April 2017).

Morduch, J., and J. Bauchet (2010). 'Selective Knowledge: Reporting Biases in Microfinance Data' *Perspectives on Global Development and Technology*, 9(3–4), 240–69.

National Institute of Statistics, Tunisia (n.d.). 'Employment Data'. Retrieved from http://www.ins.tn/en/themes/emploi (accessed on 1 April 2017).

OECD (2007). *Effect of Microfinance Operations on Poor Rural Households and the Status of Women*. Special Evaluation Study No. SST: REG 2007-19. Paris: OECD.

Pearlman, S. (2014). 'Dropouts, Defaulters, and Continuing Borrowers: Client Exit from Microfinance: Dropouts, Defaulters, and Continuing Borrowers'. *The Developing Economies*, 52(4): 301–21. https://doi.org/10.1111/deve.12055

Roodman, D., and J. Morduch (2014). 'The Impact of Microcredit on the Poor in Bangladesh: Revisiting the Evidence'. *The Journal of Development Studies*, 50(4): 583–604.

Semykina, A., and J.M. Wooldridge (2010). 'Estimating Panel Data Models in the Presence of Endogeneity and Selection'. *Journal of Econometrics*, 157(2): 375–80.

Social Performance Task Force (2014). 'The Universal Standards for Social Performance Management'. Retrieved from: www.ada-microfinance.org/download/878/-universal-standards-guide.pdf (accessed on 1 April 2017).

Weber, O., and A. Ahmad (2014). 'Empowerment through Microfinance: The Relation between Loan Cycle and Level of Empowerment. *World Development*, 62: 75–87.

Wooldridge, J.M. (1995). 'Selection Corrections for Panel Data Models Under Conditional Mean Independence Assumptions'. *Journal of Econometrics*, 68(1):115–32.

World Bank Group (2014). 'The Global Findex Database 2014: Measuring Financial Inclusion around the World'. Policy Research Working Paper 7255. Washington, DC: World Bank.

World Bank (n.d.). 'Data: Countries and Economies'. Retrieved from: http://data.worldbank.org/country (accessed on 1 April 2017).