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Dynamics and Determinants of Overlapping Borrowing from Microfinance Institutions

Atonu Rabbani
and
Baqi Khalily

Abstract

The overlapping of microfinance loans in the rural areas has become a highly contentious issue in Bangladesh and elsewhere. However, the extent of multiple borrowing over the lifetime of a loan and its determinants at both individual and household levels remains to be explored. We have used a novel dataset comprising of a census of all borrowers in a Bangladeshi union. We define overlapping as a borrower taking a loan before the repayment of the previous one in full. The probability that a loan will survive without overlapping by the end of twelfth month was 62 per cent with a uniform probability of overlapping during that time. We found that shocks, more specifically the ones that are unanticipated in nature and possible competition in the microfinance institutional market, were positively associated with overlapping. This could have important implications for repayment by and indebtedness among rural households and for the viability of the rural financial sector.

In development parlance micro-credit or microfinance has become the norm as a corrective measure to ensure access of financial services to the poor (Fisher and Sriram, 2002). Microfinance covers people, extensively and worldwide, who are mostly poor and probably would not have access to credit from the formal banking sector if it were not for these organizations (Yunus, 2000). While initially restricted to providing credit and savings products to their clients, many microfinance institutions (MFIs) now provide additional capacity building services such as training, awareness building, health care, and marketing; presently they emphasize enterprise building through larger loans. However, providing micro-credit has remained the mainstay of the MFIs and the viability of these organizations, with the advent of competition, has caused some concern among practitioners and researchers (Vogelgesang 2003).

One obvious outcome of competition among MFIs in the local and predominantly rural markets is that of multiple borrowing by the same individual from different credit organizations. This overlapping of financial services has caused some concern because loans are disbursed without requiring any collateral. The repayment of loans is tied to traditional group-lending methods where reputation is put forth as an intangible "collateral" and incentives are dynamic in nature as future loans (possibly bigger in size and lower in cost in terms of lower interest rate and more flexible repayment schedule) depend on repaying the existing debt. A direct implication of overlapping loans is the possible corrosion of this dynamic incentive (Hoff and Stiglitz 1997). Multiple borrowing can also lead to Ponzi-type schemes

through revolving debt and higher indebtedness and pauperization of the low-income households (Chaudhury and Matin 2002). With an increasing fraction of multiple borrowers, policy makers have become concerned with over-indebtedness and proper assessment of clients' loan absorption capacity (see Faruquee and Khalily, 2011).

Multiple borrowing can also take place when the total supply of credit cannot match its total demand for a given interest rate. This is known as "credit rationing" in the literature (Calomiris and Longhofer, 2008). A direct implication of this phenomenon is that the lenders will discriminate against borrowers who are otherwise seemingly identical and it is possible that many identical borrowers will receive a smaller amount than they desire at the equilibrium interest rate (Stiglitz and Weiss 1981); hence a larger supply of loans (through perhaps greater number of MFIs) leads to higher uptake of loans (or multiple borrowing). As a corollary, with a large number of players in the market, a borrower will use multiple sources to meet her credit demand at the onset of unanticipated shocks, while anticipated shocks will not interfere with smoothening consumption through other financial means, such as savings or storage, however inefficient they may be (Ljungqvist and Sargent 2004).

In this study, we use a unique data set collected precisely for the purpose of exploring the extent of multiple borrowing among participants in microfinance institutions. We first develop a simple algorithm to identify the loans that overlapped with additional loans afterwards. Rather than looking at multiple loans at a point in time and introducing

artificial truncation and inefficient use of data, we look at the lifetime loans for an individual. We then follow each loan over time to see if the individual receiving credit has taken an additional loan from another institution. If the individual has, then we consider the first loan to be overlapping. We compute the time it took for such overlapping and use time-to-event analysis to identify the factors that were associated with overlapping. More specifically we test what types of large expenditures were associated with overlapping (if at all). We also explore if competition in the local market played any role in the decision to borrow from multiple sources.

Method

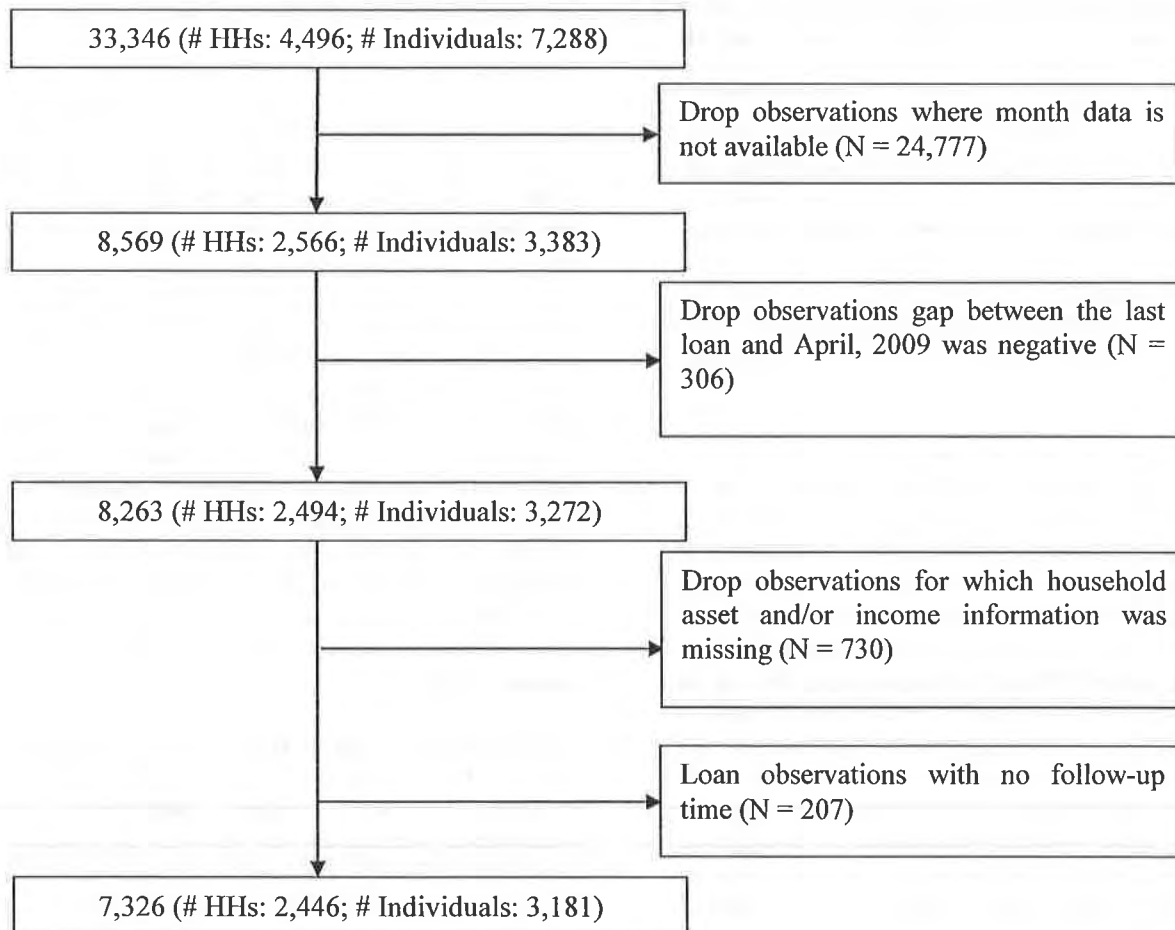
Data

This study uses data from a census of borrowers from Pathrail union in Delduar upazila in the district of Tangail. The union is about 110 kilometers north of Dhaka, the capital of the country. The census was

jointly undertaken and implemented by Palli Karma Sahayak Foundation (PKSF) and the Institute of Microfinance (InM). PKSF is the apex semi-autonomous government body serving as a wholesale loan provider to different microfinance institutions in the country and Institute of Microfinance (InM) is an independent research organization. The study area was especially important for studying overlapping loans from MFIs from the household's perspective because, historically, being the earliest adoptee of the microfinance experiment, this area has a particularly high penetration of MFIs (Counts 1996; Yunus 1998).

The survey consists of all households in the Pathrail union that reported having at least one individual who was a microcredit borrower at some point in time. At the time of the survey there were 4,496 such households in the union. The survey found a total of 7,288 individuals from these households who took loans from different MFIs indicating multiple borrowing across households. Field enumerators

Figure 1: Sample Selection



recorded detailed borrowing history using recall methods and information on 33,346 separate loan incidents was collected. However, for a majority of these loans, the exact month that the loan was taken was not recorded. Hence we can use information from only 8,569 loans (see Figure 1). For most of the loans with missing months, data were taken four years before the date of the interview so that the information used in the paper will provide overlapping information for the most recent time. This may be important from a policy point of view. We also dropped some additional observations for which information for other covariates was missing (e.g., asset or income) and for which there was no follow up time to observe the loan during the survey (e.g., if a loan taken during the same month when the survey was taking place). We ended up using 7,326 loan incidences for 3,181 individuals from 2,446 households.

Statistical Analysis

We use a number of statistical techniques to analyze the data, namely time-to-event analysis, to identify overlapping over a life time of a loan. One novelty of this paper is to introduce time-to-event analysis in the present context of studying overlapping or multiple borrowing. We believe simple OLS regression technique is not appropriate because the data we are using is essentially “censored” and the underlying probability distribution is non-normal. Hence, we summarize and describe the loan information data using non-parametric methods such as (Kaplan-Meier) survival curve and hazard rates¹ and means (and standard deviations where appropriate) of the parameters included in the model (Vittinghoff, et al. 2004). Importantly, these analyses allow us to identify overlapping of a loan over its lifetime. We also use bivariate tests to identify the difference(s) between observations with and without overlapping (both at the individual level for the time-invariant variables such as sex, education and main occupation) and the incidence of loan level (for the time variant variables such as asset and income). We also carried out multivariate analysis using a Cox proportionate hazard model. All the analyses were done using Stata™ (version 10.1, College Park, TX, USA).

Findings

Prevalence and Incidence of Overlapping Borrowing

We identify three different scenarios that can occur

over the lifetime of a loan (see Figure 2). First, a loan can reach its maturity and be repaid in full (with or without some grace period) and the borrower does not take any additional loan (Case 1 in Figure 2). Second, at the time of the survey the loan has not reached maturity, the borrower is still making repayments and during this time no additional loan is taken (Case 2 in Figure 2). Third, the borrower takes another loan from an MFI without fully repaying the previous loan (Case 3 in Figure 2). According to our definition there is no overlapping in the first two cases. However, we allow for the possibility that there may be overlapping in the second case if we had observed the loan to its maturity (the observation was right-truncated, rationalizing the need for using time-to-event analysis). While it is possible for the first loan to also be truncated to the right, we define the loan to be overlapping only in the third case as long as the overlapping occurs before the truncation. We also show two other cases which are simple extensions of the first three. Serially, it may be possible to find two loans where there is no overlap (Case 4). In the fifth case (Case 5), two consecutive events of loans can have overlaps.

Figure 3 shows the Kaplan-Meier survival function over time (measured in months) where the failure is defined as overlapping. This shows that overlapping may start within the first month of undertaking a loan from an MFI and reaches a probability of 8.1 per cent (95% confidence interval [CI]: 7.5 per cent to 8.8 per cent) by the end of first quarter and 38.1 per cent (95% CI: 36.8 per cent to 39.4 per cent) by the end of the year. When we look at the failure rate at each time point, conditional on survival up to that point, we find a somewhat flat curve for the first eleven months after borrowing (see Figure 3). This suggests overlapping takes place at a constant rate over the lifetime of a loan with a typical one year of maturity (in the data, 95% of the loans were found to be of this nature).

Table 1A and 1B present the summary statistics for the sample we selected for this study. For the time invariant attributes we look at characteristics that are at the individual level for 3,181 persons in the data set (see Table 1A). Not surprisingly, women dominate our sample as most of the MFIs primarily target women as their beneficiaries and we have women as 71 per cent of the borrowers. Borrowers are also almost uniformly distributed between age 20 and 49 and they are predominantly married (about 87 per cent). Most of the individuals report not having

Figure 2: A Schematic Design for Different Cases of Overlapping.

Case	Time-period															Overlapping?	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
1			█	█	█	█	█	█	█	█	█	█	█	█	█		No
2										█	█	█	█	█	█		No
3			█	█	█	█	█	█	█	█	█	█	█	█	█		Yes
										█	█	█	█	█	█		No
4	█	█	█	█	█	█											No
										█	█	█	█	█	█		No
5	█	█	█	█	█												Yes
			█	█	█	█	█	█	█	█	█	█	█	█	█		Yes
										█	█	█	█	█	█		No

Summary Statistics

any education, leading us to assume that this group does not have any formal schooling. Since most of the borrowers are women, it is not surprising to see that more than half of the borrowers are homemakers (about 53 per cent) and about 20 per cent of them are involved with small household enterprises such as petty trading, cattle rearing etc. We use the algorithm suggested in the previous section to identify the persons who had at least one overlapping loan in the data. We find that 41 per cent of the individuals had multiple borrowing from MFIs in the course of their borrowing history.

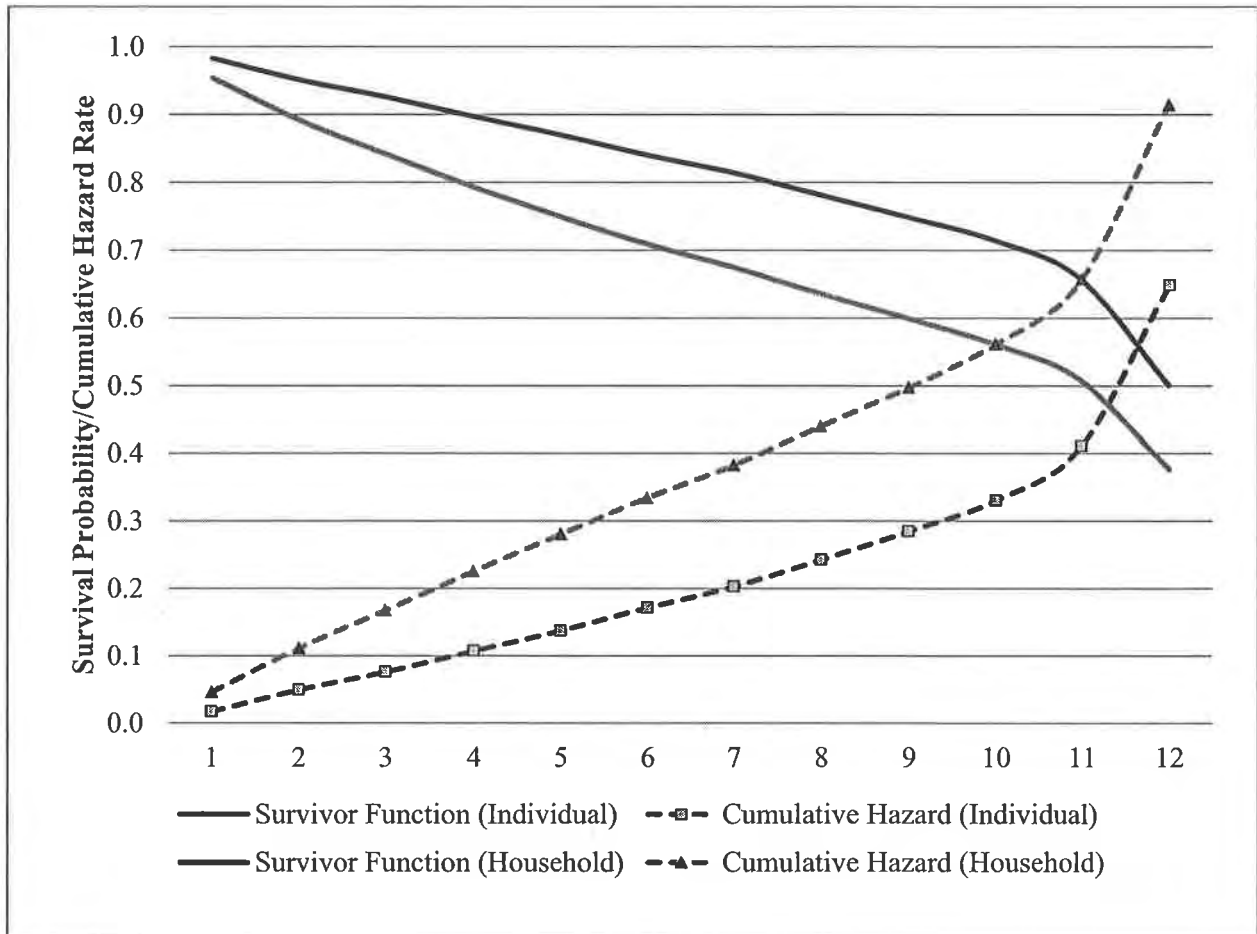
Table 1B presents the summary of the covariates that can vary at the time of borrowing in the dataset. We find that about 17 per cent of the loans were taken in years when there were lumpy expenditures. The data also let us stratify “lumpy” expenditures by different categories and most of the lumpy expenditures were associated with illness in the family (about nine per

cent) while marriage came second with seven per cent of the borrowing cases. Such ‘lumpy’ expenditure can have long-term implications for a household’s income dynamics and associated poverty status. Asset depletion and loss of income generating factors (such as land) can have real impacts on a household’s welfare (see Davis and Baulch, 2011). Interestingly the demand for loans seldom exceeded actual loan received, occurring for only six per cent of the cases. Average household assets were about 12,000 takas and annual household income was 76,000 takas. These figures were above the national average.

Bivariate Analysis

We compare different individual and household characteristics by status of overlapping loans (or lack thereof). We present the results in Tables 2A and 2B. As before, we divide the characteristics (household and individual) into two types: the ones that are

Figure 3: Survival Function for a Loan without “overlapping” before its Maturity and Cumulative Hazard Rate of “overlapping”



Source: Authors’ calculation from primary data.

invariant over time and those that can vary over time. The results show that individuals who had any overlapping borrowing in their loan history are observationally different from individuals who did not have any overlapping borrowing. Among the group on which bivariate analysis was performed, borrowers with any history of overlapping borrowing are more likely to be women compared with the borrowers who did not have any overlapping borrowing. Such individuals are also more likely to be married. Both of these results are statistically significant. The individual with overlapping borrowing is also more likely to be a homemaker (or housewife). In general the occupational distribution differs between non-overlapping and overlapping borrowers, which is also statistically significant (see Table 2A).

Next we look at household characteristics that can vary over time (see Table 2B). First, we compare whether any “lumpy” expenditure takes place at the household in the year when there is overlapping borrowing of an individual belonging to the same household. We find that 17 per cent of the non-overlapping loans are associated with some sort of lumpy expenditure while 19% of the overlapping loans are associated with similar expenditures and this difference was statistically significant (p-value = 0.016). However, when we separate the expenditures into four categories, we find that only those lumpy expenditures that are associated with marriages and illnesses lead to overlapping borrowing. In the bivariate analysis, no other time variant variables are associated with overlapping borrowing in any statistically significant way.

Table 1A: Summary Statistics for Selected Time-invariant Covariates (N = 3,181)

Variable	Mean (SD)
Ever overlapped, %	41.2 (49.2)
Demographic information	
Female, %	70.9 (45.4)
Age Group, %	
0-19	5.4
20-29	24.8
30-39	29.4
40-49	22.1
50-59	12.6
60+	5.7
Marital status, %	
Unmarried	6.4
Married	87.1
Other	6.5
Education, %	
less than 5	12.8
6 to 9	26.9
10 to 11	4.6
More than 12	2.0
Not reported	53.7
Main Occupation, %	
Farm	5.2
Service	2.4
Homemaker	53.4
Business	7.1
Artisan	19.5
Other	7.6
Not reported	4.8

Source: Authors' calculations using primary data.

Multivariate Analysis Using Proportional Hazard Model

We estimate a number of Cox proportional hazard, Cox proportional hazard model is also known as Cox regression model. It is very similar to the more familiar ordinary linear regression models with "hazard" as the dependent variable. A "hazard rate" is defined as the probability of an event (e.g. a loan experiencing an overlap) taking place over the period conditional on such an event (i.e., overlapping) not taking place up until that period. Such models can be written with many different specifications to check the sensitivity of the estimated coefficients, presented

in Table 3. The simplest model includes only dummy variables, indicating whether the household experiences any types of lumpy expenditures during the year a loan is taken by the individual belonging to the same household. The first specification reports the hazard ratio on lumpy expenditure to be 1.10 (95% CI, 1.00-1.21) suggesting a 10% higher odds of overlapping whenever there is any large expenditure in the household

In all other specifications we look at lumpy expenditures by different causes. We present the results in columns (2) to (6). We find that large expenditures caused by illness was associated with a

Table 1B: Summary Statistics for Selected Time-variant Covariates (N = 7,326)

Variable	Mean (SD)
Any lumpy expenditure (%)	17.3 (37.9)
Lumpy expenditure for... (%)	
...emigrating abroad	2.4 (15.2)
...education	0.4 (6.4)
...marriage	6.6 (24.8)
...illness	8.6 (28.1)
Demand for loan > loan received (%)	6.4 (24.5)
Number of NGO/MFIs in the village	17.3 (6.9)
Total Household Asset (Thousand Taka)	11.6 (30.2)
Total Household Income (Thousand Taka)	76.2 (76.3)

Source: Authors' calculations using primary data.

higher odds of an overlapping loan. An individual from a household experiencing a large expenditure owing to illness has 18 per cent higher odds of an overlapping loan (95% CI, 4 per cent to 34 percent). Among other causes, large expenditures related to marriage exhibit a "positive" hazard rate of 1.09, albeit failing to be statistically significant (95% CI, 0.95 to 1.25). Other causes of large or lumpy expenditure (migration and/or education) do not exhibit any statistically significant positive relationship with overlapping or multiple microcredits borrowing by individual. We find these results to be very robust across different specifications reported in Table 3.

In the next specification, we introduce the number of MFIs at the village level (over time) into our model. Empirically, we find this to be a very important determinant of overlapping borrowing. The hazard ratio on number of MFIs in the village is 1.02 (95% CI, 1.02 to 1.03) and this point estimate is very robust in all subsequent specifications. This suggested an additional five MFIs in the village would increase the probability of overlapping by 12 per cent (95% CI, 9 per cent to 15 per cent). In the results reported in column (3) through (6) we also included additional variables that we did not report because (a) they did not contribute to the variable of immediate interest; and (b) they did not reveal any significant pattern, statistical or otherwise.

One major concern was whether borrowing from

MFIs leads to a secondary land mortgage market. We included an indicator variable to show whether the household received any land in the calendar year. We found the hazard ratio for the dummy to be 0.96 (95% CI, 0.80 to 1.16) in the model specified in reported in column (3) (the estimated coefficient was not reported in Table 3). In column (4) we include asset and income at the household level. However, the coefficients are not statistically significant. We include a number of demographic variables in column (5) (and later in (6)). Except for the sex of the individual, none of the variables showed any significance and other variables of interest (e.g. lumpy expenditure) are robust to inclusion of these variables. We also expected, a priori, seasonality may play an important role in multiple MFI borrowing. We therefore included dummies for each month (except January to use it as base month) in column (6). However, coefficients of the month dummies did not reveal any systemic pattern and we found estimated coefficients of other variables are also robust to inclusion of these month dummies.

Discussion

Competition among MFIs and multiple borrowing by microcredit participants have gained more attention lately and have become a central issue regarding viability of the MF sector as an effective mean to alleviate global poverty (Christen 2000). Bangladesh already has a very mature rural micro-credit sector. However, reaching out to the ultra poor has remained

Table 3: Regression coefficients for Cox Regression Survival Models for Individual Overlapping

Variables	(1)	(2)	(3)	(4)	(5)	(6)
Any lumpy expenditure	1.10**					
	(1.00 - 1.21)					
Lumpy expenditure for...						
...migrating abroad		0.91	0.89	0.90	0.90	0.92
		(0.70 - 1.18)	(0.69 - 1.16)	(0.69 - 1.18)	(0.69 - 1.18)	(0.70 - 1.20)
...education		0.73	0.76	0.77	0.94	0.98
		(0.38 - 1.41)	(0.40 - 1.47)	(0.40 - 1.48)	(0.49 - 1.82)	(0.51 - 1.89)
...marriage		1.09	1.08	1.08	1.12	1.12
		(0.95 - 1.25)	(0.94 - 1.24)	(0.94 - 1.24)	(0.97 - 1.29)	(0.97 - 1.29)
...illness		1.18**	1.15**	1.15**	1.13*	1.14**
		(1.04 - 1.34)	(1.01 - 1.30)	(1.01 - 1.30)	(0.99 - 1.28)	(1.00 - 1.30)
Number of MFIs in the village						
			1.02***	1.02***	1.02***	1.03***
			(1.02 - 1.03)	(1.02 - 1.03)	(1.02 - 1.03)	(1.02 - 1.03)
Observations	7,326	7,326	7,326	7,326	7,326	7,326

Note: Confidence intervals are in parentheses. *** p<0.01, ** p<0.05, * p<0.1. The following controls were included in specification (3): land received; specification (4): (3) + household assets and income; specification (5): (4) + sex, age group, marital status, education (in years) and main occupation of the borrower; specification (6): (5) + month dummies.

**Table 2A: Bivariate Analysis between Non-Overlapping and Overlapping Borrowers:
Time-invariant Variables**

Variable	Individuals with no overlapping borrowing (N = 1,871)	Individuals with overlapping borrowing (N = 1,310)	p-value
Female, %	67.8	75.3	< 0.001
Age Group, %			
0-19	7.7	2.2	< 0.001
20-29	25.4	24.0	
30-39	27.8	31.6	
40-49	21.3	23.4	
50-59	12.5	12.7	
60+	5.3	6.2	
Marital status, %			
Unmarried	8.7	3.1	< 0.001
Married	83.9	91.8	
Other	7.4	5.1	
Education, %			
Less than 5	13.3	12.1	= 0.068
6 to 9	27.1	26.7	
10 to 11	5.3	3.6	
More than 12	2.1	1.7	
Not reported	52.2	56.0	
Main Occupation, %			
Farm	6.1	4.0	< 0.001
Service	3.1	1.3	
Homemaker	48.8	59.9	
Business	7.1	7.1	
Artisan	20.4	18.1	
Other	7.6	7.6	
Not reported	6.8	2.1	

Source: Authors' calculations using primary data.

an issue in this sector while scaling up to address bigger loan demand is also another contentious issue. accompanied the growing competition have drawn attention to multiple borrowing, the erosion of dynamic incentives behind healthy repayment behavior, and the overall sustainability of the efficient working of supply of credit to the poor. These are among the many issues that are yet to be addressed in this industry.

A number of studies (Chaudhury and Matin 2002; Zeller and Sharma 1998; Matin 2000) have shown that multiple memberships of household in different

Many microfinance institutions have come into the market and multiple memberships that have MFIs are associated with lower repayment rates and higher indebtedness. While the earlier paradigm (The World Bank 1989) would suggest that competition intensifies rivalry among financial institution such as commercial banks and should lead to better financial services and repayment behavior (as imposed by the banks), the recent reports suggested that overall efficiency and financial sustainability of the system may well be adversely affected by more intense competition. It should be noted that the earlier literature (The World Bank

**Table 2B: Bivariate Analysis between Non-Overlapping and Overlapping Borrowers:
Time-Variant Variables**

Variable	Loans that were not overlapping (N = 4,559)	Loans that were overlapping (N = 2,786)	p-value
Any lumpy expenditure (%)	16.5%	18.7%	= 0.016
Lumpy expenditure for... (%)			
...emigrating abroad	2.6%	2.0%	= 0.155
...education	0.5%	0.3%	= 0.398
...marriage	6.0%	7.5%	= 0.010
...illness	8.1%	9.6%	= 0.025
Demand for loan > loan received (%)	6.6%	6.1%	= 0.362
Number of NGO/MFIs in the village	17.3	17.3	= 0.954
Total Household Asset (Thousand Taka)	11.7	11.6	= 0.950
Total Household Income (Thousand Taka)	78.1	73.1	= 0.001

Source: Authors' calculations using primary data.

1989) identified more traditional commercial banks as the vehicle of financial services to the poor without giving much attention to the later innovation as embodied by MFIs in their current format through more intense monitoring of the clients and joint liability (Ghatak 1999). Collateral-free financial contracts based on joint-liability and weak monitoring can become non-binding, leading to multiple borrowing if MFIs compete more heavily among themselves (Hoff and Stiglitz 1997). While our data do not allow addressing this concern explicitly we did not find any association of overlapping with the default rate (or delay of repayment). This mimics some of the recent findings from a household survey explicitly addressing the issue of multiple borrowing (Khalily and Faridi 2011).

Empirical results on repayment behavior are somewhat mixed. Even during crises the competitive

MF sector reported high repayment rates compared to the corporate sector (see e.g. Patten, Rosengard and Johnston 2001) while it has also reported high repayment rates for multiple borrowers with given characteristics such as high previous arrears (average or maximum) and high growth rates (Vogelgesang 2003). A recent study in India also showed that borrowing with multiple funds was repaid at a rate

that is similar to the rate paid by individuals with a single loan (Krishnaswamy 2007).

In this paper, we have taken a step back and estimated the predictors associated with multiple borrowing. We impose a time-to-event analysis so that we can use all loan information for a given individual. This also helps avoid the problem of artificial right-hand side truncation usual in cross-sectional analysis (Vittinghoff, et al. 2004). We have also analyzed the probability of overlapping over the life-time of a loan using the time-to-event analysis. This results in a rich dynamic model for analyzing the instance of multiple borrowing.

Our analysis reveals that "lumpy" expenditures are indeed associated with multiple borrowing. Individuals take additional loans for households that experience a need for additional cash. Interestingly, our results suggest not all types of cash needs led to multiple borrowing. Rather, the ones that are more unanticipated in nature such as illness were more robustly associated with overlapping. The association is very weak if the expenditure appears to be more predictable such as those for education or migration. However, this suggests that the households are using micro-credit as a mean to insure themselves from unexpected spending and that they are financing these expenditures by paying them off after the

contingency has occurred, implying an inefficient way to self-insure (Ljungqvist and Sargent 2004).

Our analyses also reveal that competition enhanced multiple borrowing by individuals. We measure competition by examining the number of MFIs working at the village level. The data specifically comes from an area in Bangladesh where the micro-credit intervention had been high for historical reasons, suggesting a behavior that is more likely to be replicated in areas in future (Counts 1996; Yunus, 1998). Our results revealed that as the number of MFIs increase in a village, it is more likely that individuals will take an additional loan. These results are robust to inclusion of village level fixed effects, suggesting these findings are not due of unobserved non-time varying factors that might lead firms to move into a particular village. We include village specific dummies in the Cox regression models to control for the time-invariant village characteristics. It is possible that such local characteristics may lead the MFI branches to cluster locally. Econometric methods should control for such fixed effects.

Among other factors, being female is strongly associated with multiple borrowing. This is expected as micro-credit programs are typically targeted toward women (Yunus, 1998). This also explains the married persons are also more likely to take additional loans. Interestingly, neither household income nor asset is associated with multiple borrowing. We also do not find multiple borrowing to be associated with acquisition of land suggesting no evidence for the claim of these loans leading to any secondary credit market through land transfer or mortgage.

Our study suffers from a number of limitations. Firstly, the data are from a specific area of Bangladesh and it is possible that it could be non-representative, although it was deliberately chosen from an area where micro-credit programs are more mature and it was more likely to show incidences of overlapping borrowing. While it could be non-representative for the entire nation, the results of this study suggest an upper-limit on overlapping or multiple borrowing. Secondly, many loans are missing information on the exact month in which the loan was initially disbursed. This is likely to result in an underestimation of overlapping loans. However, the first limitation would lead to an overestimate of multiple borrowing and it is not possible to discern which one would dominate. Thirdly, we measure the

number of MFIs in the village from the total number of loans taken from MFI and we do have not information on whether loan products are available from MFIs from which no loans were disbursed. However, MFIs with no clients are not very likely to exert influence on loan taking behavior.

Concluding Remarks

Competition among MFIs and the provision of financial services to the poor has become a very contentious issue among MFIs, borrowers, and policy makers in the recent time. The last two decades have seen an unprecedented growth of micro-credit organizations and we have shown in this study that multiple memberships in different MFIs and overlapping borrowing without repaying the previous loans in full has become rampant. However, the availability of these loans has also provided the poor households with means to insure against unanticipated fund needs. Such mechanisms can be invaluable as they essentially provide household the ability to cope with unanticipated shocks through self-insurance. Hence, there is scope for designing better products such as insurance targeted for the poor that can enhance their welfare. In addition there is a scope for a credit bureau to keep track of borrowers and provide information that can reduce adverse selection and moral hazard so that the overall stability and sustainability of the microcredit sector is maintained.

Endnote

1. In our context, survival function reveals the probability of a loan without any overlapping (i.e. taking an additional loan before the first loan is completely paid-off). Kaplan-Meier allows estimating such curve without assuming any underlying probability distribution. This method exploits a simple idea that probability of a loan to survive without an overlap for t or more after the borrowing took place is a product of t survival probabilities of each period (the "conditional hazard rates"). Hence, the observed survival rates are given by $S(t) = p_1 \times p_2 \times p_3 \times \dots \times p_t$, where the proportion of loans surviving period (without any overlap) i is given by, $p_i = \frac{r_i - d_i}{r_i}$, where r_i is the number of loans without overlap at the beginning of the period and d_i is the number of loans that experiences a overlap within the period. See Bewick, Cheek and Ball (2004) for details.

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Atonu Rabbani
Department of Economics
University of Dhaka
Dhaka 1000, Bangladesh

E-mail: atonu.rabbani@gmail.com

Baqi Khalily
Department of Finance
University of Dhaka
Dhaka, Bangladesh

E-mail: bkhalily@bangla.net

Appendix Table 1: Survival Function for a loan without “overlapping” before its maturity and Cumulative Hazard Rate of “overlapping”

Time (in months)	Survivor Function	Cumulative Hazard
1	0.9814	0.0186
2	0.9467	0.054
3	0.9187	0.0835
4	0.8867	0.1184
5	0.8572	0.1517
6	0.8246	0.1897
7	0.7967	0.2235
8	0.7608	0.2685
9	0.724	0.317
10	0.6842	0.3719
11	0.6189	0.4673
12	0.4752	0.6995