

Predicting Multiple-Borrowing Default among Microfinance Clients

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Abstract

In order to control over-indebtedness that often leads to capacity failure, the Reserve Bank of India recently issued directives for Micro Finance Institutions to restrict multiple loans to borrowers. These institutions are also required to regularly share their current borrowers' loan records with a Credit Information Company. We argue here that ex-post loan record verification is inefficient and inadequate considering the socio-economic and informational asymmetries in micro-credit markets. Instead, we reason, household characteristics can predict multiple-borrowing behaviour. Our empirical analysis shows that this is true to some extent. We dwell on policy implications and ways to improve our model.

Keywords

Microfinance, Multiple-Borrowing, Credit Default, Regulation

1. Introduction

Development experts around the world consider financial inclusion of low-income households, as one of the potent ways to bring them out of poverty on to the path of prosperity. Among bank regulators in 143 jurisdictions, a World Bank report found 67 percent to have directives for promoting financial inclusion [1]. Currently, more than 50 nations have joined hands in setting up formal targets for financial inclusion [2]. However, translating financial inclusion into household wellbeing is not easy to achieve. For example, though the World Bank's Global Financial Inclusion (Global Findex) database shows that between 2011 and 2014, 700 million adults became account holders and the number of those without an account—the unbanked—dropped by 20 percent to 2 billion from 2.5 billion, it also notes in the same context that as high as 40 per-

cent of these bank accounts still lie dormant [3]. India too experienced a major exercise in “banking the unbanked” when the Indian Prime Minister announced the Pradhan Mantri Jan-Dhan Yojana (PMJDY) in 2014. The scheme allows any household with a valid identity proof to open a zero-balance account at any Public and most Private banks. A Guinness world record was made when 18,096,130 bank accounts were opened in a single week [4]. The real benefit of this drive is yet to be seen.

The World Bank report also poignantly note that previous financial inclusion efforts such as the promotion of credit without consideration of financial stability were a recipe for crisis, as observed in the United States in 2000 and in India in 2010 [1]. In similar vein, the report by the Committee chaired by Dr Nachiket Mor remark that even after Indian regulators and policy makers tried to bring in cooperative banks, bank nationalisation, self-help groups, regional rural banks, joint liability groups and business correspondent models to improve access to finance, on both financial inclusion and financial depth, the overall situation still remain very grim and on a regional and sectoral basis, very uneven [5]. The two preceding reports by the “Committee on Financial Inclusion” chaired by Dr C. Rangarajan in 2008 [6], and the “Committee on Financial Sector Reforms” chaired by Dr Raghuram G. Rajan in 2009 [7], also lament on similar state of financial exclusion.

Paradoxically, even though there is no dearth of Indian and worldwide research on low-income households, there seems to be no clear Pareto optimal solution towards financial inclusion. Any efforts are also marred by a lack of clear consensus on the actionable items to achieve that end. Quite evidently, though the three aforementioned Indian government reports agree on the need for financial inclusion, they conceptualise it differently and forward different recommendations in their own rationale. Sadly, many of them have not yet seen the light of the day. However, one commonality between all reports is the importance placed on improving access to formal credit at affordable interest rates.

In imperceptible contrast to the above reports, the report of the “Sub-Committee of the Central Board of Directors of Reserve Bank of India to Study Issues and Concerns in the MFI Sector” chaired by Mr Y. H. Malegam [8] note that “mere extension of micro-credit unaccompanied by other social measures will not be an adequate anti-poverty tool”. This is because high levels of heterogeneity exist and therefore microfinance can be both successful and failed attempts at fighting poverty depending on the types of clients, environment and combination of services [8]. One of the major problems associated with improved access of credit is creation of moral hazards. With multiple credit agencies competing in the same geographical area, over-lending and even ghost lending becomes rampant. As a consequence of over-borrowing without the capacity to repay, increased credit dependency and cyclical debt leading to higher default rates occur. Since the Malegam committee was formed by the RBI in the wake of microfinance crisis in the erstwhile Indian state of Andhra Pradesh, the report made several recommendations for the regulation of Microfinance Insti-

tutions (MFIs) and protection of borrowers ([8], page 48-53). These recommendations were accepted by RBI and issued to all Non-Banking Financial Companies—Micro Finance Institutions (NBFC-MFIs) with modifications in December 2011 [9] and with further modifications in August 2012 [10]. Notably, these recommendations are similar to the self-regulations imposed by Microfinance Institutions Network [11].

Though the above directives are a welcome move in the previously unregulated microfinance sector, the adequacy of mandates on “Multiple-lending, Over-borrowing and Ghost-borrowers” in tackling the problem has not yet been investigated. Multiple-lending depicts the scenario wherein a borrower takes loans from multiple sources. Over-borrowing occurs when a borrower gets indebted above her repaying capacity. Ghost borrowers generally arise in three circumstances—(a) when the borrower on record is a substitute for the real borrower, (b) when fictitious loans are recorded in the books, and (c) when actual loans are given to fly-by-night borrowers without proper verification. Since the adequacy of the mandate is being questioned, a sampling location is purposively selected to satisfy two important conditions—(a) over-borrowing was observably rampant before the directive, and (b) the directive has been implemented for more than 1 year. As this mandate is universally applicable to the entire nation, if it is sufficiently found inadequate for a region, it will necessarily remain so for other regions as well. This paper is therefore an attempt to first explore the context of over-indebtedness and the ramifications of this current mandate in the slums of Pune, a city in the Western state of Maharashtra. The selection of this region according to the given criteria was made possible due to our close association with one of the leading MFIs in Pune for more than a period of three years. Our study shows that RBI’s mandate is indeed inadequate to control multiple-borrowing and must be amended to let MFI’s take their own decisions.

The rest of the paper is organised as follows. Section 2 surveys the extant literature on multiple borrowing and over-indebtedness. Section 3 discusses the mandate and presents our arguments on its weaknesses. Section 4 outlays the research questions that are to be pursued within this paper. Section 5 describes the sample collected and methodology followed for analysing the data. Section 6 presents and discusses the results of our analysis. Finally, Section 7 concludes this paper with some recommendations for both policy and MFI practice.

2. Literature Review

Informal credit from moneylenders and landlords was fairly commonplace in India for many decades but often at exploitative interest rates and with coercive recovery mechanisms. In order to bring normalcy into the realm of microfinance, the foundation of formal microcredit was laid by the National Bank for Agriculture and Rural Development (NABARD), in consultation with the Reserve Bank of India (RBI), in the year 1992 through the Self Help Group (SHG)—Bank Linkage program [12]. Till date, this program has been successful in bringing together many women from poor households and in the creation of a

few million SHGs. However, the improvements in SHGs were slow, as groups are required to save some amount of money with banks before applying for a loan. Many SHGs could not achieve the financial stability to get bank loans. To ease the impasse, these restrictions were removed for the newer Joint Liability Group (JLG) scheme wherein a group of individuals could avail a bank loan either singly or through the group against mutual guarantee. However, for both SHGs and JLGs, two major issues that still remain are (a) usage of loans for consumption purposes [13] and (b) the inability to repay loans on time [14].

There is a common belief that loans to borrowers will be solely used for investment into productive purposes such as equipment (e.g. a tractor), or materials (e.g. inventory for a shop). However, money being fungible, loans are often utilized for self-consumption such as in paying medical bills, renovating one's house or other expenses (see appendix, **Table A1**). Households soon face the burden of debt and being unable to cope, resort to three basic strategies—(a) borrow from other sources to repay earlier loans and therefore get entrapped in a cyclical dependency on debt [8], (b) start making sacrifices such as cutting down on eating, take children out of school, sell off assets, among many others [15] and ultimately fall back into poverty [16], and (c) declare bankruptcy to the MFI forcing the MFI to write off the debt from their account books and often falling into a crisis themselves [13]. Even though repayment behavior among microfinance clients has been widely studied (e.g. [17]), a glimmer of hope for microcredit still lingers through benefits of woman empowerment [18], women training [19], and house improvement [20]. In order to achieve better results, micro-creditors and policy makers need to first tackle the reasons that create incentives for clients to engage in risky behavior.

Over-borrowing leading to over-indebtedness is pervasive to disparate regions and even unrelated lending contexts. Schicks define an over-indebted customer as one who “is continuously struggling to meet repayment deadlines and structurally has to make unduly high sacrifices related to his/her loan obligations” [21]. Though Schicks define customer as a household, it can be extended to any economic entity such as an individual, group of individuals or firms. For example, Farinha and Santos find that firms are likely to have relationships with multiple banks over the duration of the firm's existence [22]. Their data showed that this situation is more likely for firms with more growth opportunities and also for firms with poor performance facing unwillingness of banks to increase its exposure to the firm. Similarly, Carletti, Cerasi, and Daltung analyze the optimality of multiple-bank lending when firms and banks are subject to moral hazard and monitoring is essential, and find a greater use of multiple-bank lending when banks have lower equity, firms are less profitable and monitoring costs are high [23]. Therefore, quite evidently, opportunistic tendencies can exist from both parties to a loan contract.

Though over-indebtedness arising from multiple-loans between firms and banks are analogic to households and MFIs, there are some additional peculiarities. For instance, microfinance involves loans of much lower amount, often do

not require a collateral, and may face higher heterogeneity among clients. Further, the low number of loans, coupled with a low fund base for absorbing risks of delayed payments and increasing competition often drive MFIs to supply a higher amount of loans into the market than that can be naturally supported through demand [17]. Working with a survey from Ghana, Schicks find significant associations of cases of over-indebtedness with the male gender, adversities faced, low returns on loans and none for numeracy and financial literacy [15]. However still, not much is known about the effective demand that can match the supply and also of effective supply of loans at affordable rates to attain financial inclusion.

Since both parties have profit incentives to deviate from the norm, and can further benefit from information asymmetries [24], regulation of microfinance markets to bring in more transparency and accountability is required. In order to tackle this mismatch between supply and demand, Luoto, McIntosh, and Wydick study the competition among micro-lenders and note that if information of clients is shared between MFIs through credit information systems (or credit bureaus), then microcredit market performance can improve [25]. Through a logical model of credit markets capturing the corresponding equilibrium between multiple banks and borrowers, Bennardo, Pagano, and Piccolo observe that if banks share information between them through credit reporting systems, multiple-lending and over-borrowing will decrease, which may improve access to credit, lower interest rates and reduce default rates [26]. The mandate on “Multiple-lending, Over-borrowing and Ghost-borrowers” by the Reserve Bank of India seeks to achieve a similar objective.

3. The RBI’s Mandate and Its Inherent Weaknesses

In order to put a plug on the rising Non-Performing Assets (NPA) in the micro-finance sector, the Reserve Bank of India (RBI), based on the recommendations of the report of the committee chaired by Mr. Y. H. Malegam [8], created a new category of Non Banking Financial Company (NBFC)—NBFC-MFIs in addition to the existing NBFCs, and issued new directives for all NBFCs in December 2011 [9] and with further clarifications in August 2012 [10]. On the issue of “Multiple-lending, Over-borrowing and Ghost-borrowers”, the RBI has directed that (in excerpts)—

a) A borrower can be the member of only one SHG or one JLG or borrow as an individual.

b) A SHG or JLG or individual cannot borrow from more than 2 MFIs. Lending NBFC-MFIs will have to ensure that the above conditions are strictly complied with.

c) Lending MFIs will have to ensure compliance with, among others, conditionalities relating to annual household income levels (INR 60,000/- for rural and INR 120,000/- for urban and semi urban households), total indebtedness (not to exceed INR 50,000/-), membership of SHG/JLG, borrowing sources as well as percentage of qualifying assets (as stipulated in point d) and percentage

of income generating asset (as stipulated in point e)

d) NBFC-MFIs are required to maintain not less than 85 per cent of their net assets as Qualifying Assets. However only the assets originated on or after January 1, 2012 will have to comply with the Qualifying Assets criteria. As a special dispensation, the existing assets as on January 1, 2012 will be reckoned towards meeting both the Qualifying Assets criteria as well as the Total Net Assets criteria. These assets will be allowed to run off on maturity and cannot be renewed.

e) NBFC-MFIs have to ensure that the aggregate amount of loans given for income generation should constitute at least 70 per cent of the total loans of the MFI so that the remaining 30 per cent can be for other purposes such as housing repairs, education, medical and other emergencies.

f) Every NBFC-MFI has to be a member of at least one Credit Information Company (CIC) established under the CIC Regulation Act 2005, provide timely and accurate data to the CICs and use the data available with them to ensure compliance with the conditions regarding membership of SHG/JLG, level of indebtedness and sources of borrowing. While the quality and coverage of data with CICs will take some time to become robust, the NBFC-MFIs may rely on self-certification from the borrowers and their own local enquiries on these aspects as well as the annual household income.

The above instructions are self-explanatory and are a welcome move in the previously unregulated microfinance sector. These tackle both the demand and supply side of multiple-borrowing by first restricting customers (points a, b and c) and then laying down the ground rules for MFI (in points d, e and f). It is therefore quite evident that, if the above points are followed reasonably well, these can be instrumental in bringing down over-indebtedness and reduce the need for any government arbitration.

However, there are some inherent weaknesses. For example, instead of having a ratio of total indebtedness to total family income to calculate for repayment capacity, the mandate proposes some fixed income and total indebtedness figures in point (c). If a household is capable for repaying a higher amount of loan, then there is no point in excluding MFIs from serving them. In fact, households with better income sources can reduce the MFIs' risk portfolios. Therefore, a ratio of indebtedness can serve better purpose than fixed income restrictions. The Malegam Committee report had earlier specified—"a borrower...is a member of a household whose annual income does not exceed INR 50,000" without giving any adequate reasons [8]. Though the RBI extends this limit, but not to any logical end. Similarly, the percentages in points (d) and (e) appear without good rationale.

We, being more considerate of the fate of borrowers than MFIs, find the restrictions in points (a) and (b) more disturbing. Again these decisions seem to be random choice. We guess that the Malegam committee report [8] and subsequently the RBI directives wanted to promote competition and hence the allowance of two MFIs instead of just one. However, this can be a big problem in urban and semi-urban areas, where multiple MFIs operate. Three reasons are for-

warded against points (a) and (b) in the following paragraphs.

First, people who are prone to defect will try to under-report borrowings and may even register with multiple MFIs with different identity proofs such as Ration card, Driving Licence, UID card, Voter card or Passport. The name and address details may not match across the various identity proofs leaving the CIC no way of assessing the number of loans taken by the person or the household. Our concern was validated when we saw a private report generated by one such CIC for an MFI known to us. The CIC had matched the persons based on some calculated estimates, leaving a wide margin for error.

Second, some MFIs may start taking advantage of the situation. Acquiring a new client entails significant costs involving visit to client's home, estimating potential income, formation of a joint liability group (optional), among others, whereas client retention is cheaper. However, other MFIs through offers of easy loans may poach these members. Often new loans are required for health expenses, home repairs or other utilities. Now, if the household unwarily takes loans from two other MFIs, the oldest MFI have to let go of its hard-earned client. Hence, for well-meaning MFIs, the cost of client retention also escalates through monitoring costs.

Thirdly, most MFIs do not offer another loan to its customer when the repayment of the older loan is pending. Additionally, for a new customer, most MFIs restrict the loan amount to INR 10,000 or below. Once credit-worthiness is established, bigger loans are approved. Hence the household becomes restricted to have only two loans outstanding with often their new loan being of a very small amount. However, loan usages are many. In case of medical emergencies such as accidents and major illnesses, which is a common occurrence among low-income households, not only is the family forced to take recourse to informal sources but also if the loan amount is inadequate for treatment, the household may lose a family member. If the illness is prolonged, it may also lose the capacity to repay. In such contingencies, the households have no option but to borrow, often from multiple sources (appendix, [Figure A1](#)) or fall back into a downward spiral of poverty.

4. Research Questions

The RBI's limitation on the borrower to avail loans only from two MFIs and be a part of either a single group or none, not only raises the transaction costs for the borrowers but also for well-meaning MFIs. For borrowers because most are unaware of these new stipulations, and for MFIs too as it translates to higher costs in getting customers (around 30 percent are rejected) and also for retaining them for repeat loans. Higher transaction costs may ultimately lead to driving out of good MFIs by rogue MFIs and create a big societal loss. Therefore, it is evident from sections 2 and 3 that though the mandate wishes to curb willful and wasteful over-borrowing among low-income households, it will remain inadequate in solving the problem unless it is improvised through (a) targeting of

causes leading to non-productive loan usage, and/or (b) targeting of select households that require further assistance. Further, it is observed that even with easy availability of collateral-free loans and in the absence of loan-use monitoring, there are many households that desist from multiple-borrowing behaviour.

It therefore becomes pertinent to understand the systematic differences between these two groups of households—one engaging in risky borrowing behaviour and the other desisting from it. This leads us to our first question:

- 1) Do households having three or more loans differ from those with less, on -
 - a) Total indebtedness
 - b) Access to loans per requirement
 - c) Financial behaviour
 - d) Financial product portfolio
 - e) Informal support systems

Finally, given our improved understanding of the differences in household characteristics between households that lie on different sides of the new loan restrictions made by RBI mandate in point (b), that is those who have two or less (and are therefore complying) and those who have three or more (and are considered over-exposed), we arrive at our second research question:

- 2) Can household characteristics predict multiple-borrowing behaviour?

We estimate null hypotheses of no differences present for question (1) and of no predictive power for question (2). If these null hypotheses are significantly rejected, we can then deduce pathways for meeting the needs for the multiple-borrowing households and thereby solve the issues of over-indebtedness among low-income households.

5. Sample Data and Research Methodology

We partnered with a well-known MFI, which is majorly based out of Pune for the purpose of collecting our data. By collating the reports generated by a Credit Information Company (CIC) for the MFI for months of February and March in year 2015, we achieved a population of 575 unique households based out of Pune—375 households having two or less active loans and 200 households that have three or more active loans (**Table 1**). From each set, we chose a random sample of 100 households respectively. We also denote these samples as “LESS” and “MORE” respectively for ease of identification during discussion of our results.

We also restricted the samples to include only those households that had a valid phone number and a complete address. We then hired four field surveyors to get the survey responses from these 200 households in total, with 100 in each group. If any of the households were inaccessible or not willing to participate, a new household was randomly drawn from the remaining sets of households in the relevant group. To answer the above questions, a questionnaire for the same was designed in English and translated to Hindi and Marathi. To ensure accuracy of translation, these questionnaires were discussed with the MFI’s staff over multiple rounds. This led to all errors being corrected and some difficult Marathi

Table 1. Descriptive statistics of population 1 (for LESS) and population 2 (for MORE).

Variable Description	N_1	N_2	Mean (μ_1)	Mean (μ_2)
Number of active loans	375	200	1.2	3.8
Total outstanding amount (INR)	375	200	17675.82	49037.01
Borrowers Age (Years)	375	200	36.45	37.68

words being replaced with simpler alternatives that were common in the regional dialect. These questions were then thoroughly explained to field investigators who were also trained on requirements of the survey for two days. They then filled these questionnaires over the span of three weeks in April-May 2015. After all the data were fed into spreadsheets, we had to drop 3 observations from LESS (with two or less loans) and 5 observations from MORE (with three or more loans) due to incompleteness.

In question 1, we assess the difference in means of the two samples for several variables indicating the sub-criteria. Most of these variables are constructed from aggregates of household assets, expenses or conditions and are explained in **Table 2**.

Apart from these above variables, we also constructed five composite variables—(a) Household condition, (b) Household environmental condition, (c) Health related conditions, (d) Education related conditions and (e) Improvement in social dynamics. Each of these indices is the sum of several ordinal variables as shown in **Table 3**. Thereafter for making use of these composite variables in our logistic regression exercise, we make two simplifying assumptions—the sum of values, howsoever arrived at, represents the same condition and the values of the sum are equally spaced. In short, we assume all indices are interval variables. Since even with dummy variables, an indicator is seldom accurately assessed¹, we use this simplification to help us avoid the tedious task of having multiple dummy variables.

The purpose of having these composite variables is to find which conditions impact households' multiple-borrowing behaviour in a significant manner. Here we also made a conscious decision not to include any of the established composite indices such as the Wealth Index², Standard of Living Index², Progress out of Poverty Index³ and similar others in our study because the indicators within each composite are often selected and weighted depending upon different theoretical considerations and underlying population distributions that are not exact matches for our sampling frame (*i.e.* MFI clients).

¹For Example, even if “the number of rooms” appear as a good indicator, there is no way to accurately measure and compare the sizes of each room, their age and state (some maybe constructed later), number of persons staying per room, and the usage of the room. Therefore, every socio-economic survey in the world resorts to some meaningful approximations.

²Part of National Family Health Surveys 2 and 3 administered by the International Institute for Population Sciences [30].

³The Progress out of Poverty Index[®] (PPI[®]) is a poverty measurement tool. The latest version for India was created in March 2012 by Mark Schreiner of Microfinance Risk Management, L.L.C. Indicators in the PPI for India are based on data from the Household Consumer Expenditure Survey—Round 66 (July 2009 to June 2010) conducted by National Sample Survey Office (NSSO).

Table 2. Explanation of all aggregated variables calculated for each household.

Variable Description	Explanation
Number of active loans	Count of the number of loans not fully repaid
Total outstanding amount	Sum of entire loan amounts to be repaid over time
Difference between requirement and loan	Average of the difference between the required loan amount and the sanctioned amount for each loan case
Household size	Count of living members in the household
Kind of identity cards	Count of the variants of identity cards ⁴ possessed
Number of identity cards	Sum of all identity cards ⁴ possessed
Number of earning members	Count of members in household who earn an income
Number of females earning	Count of female members in household who earn an income
Total annual income	Sum of income of all members computed annually
Total annual expenses	Sum of all expenses of household computed annually
Different financial products availed	Count of the variants of financial products ⁵ availed by the household apart from credit
Health problems faced in past 2 years	Count of all household members who faced health problems in the past 2 years including maternity and death
Healthcare costs in past 2 years	Sum of all household expenses on health problems in the past 2 years including maternity and death (leaves out preventive costs)
Household members currently studying	Count of all household members who are currently studying in either school or college
Annual cost of education	Sum of all household expenses on members who are currently studying in either school or college (leaves out hobby classes)
Members who left education mid-way	Count of all household members who had left their education mid-way (did not complete till standard 12)
Total social support expected	Sum of loan money expected from neighbours, parents, relatives and friends, if each were requested for Rs.10,000 (\$150)

In question 2, we perform binary LOGIT regression analysis to understand which characteristics have a significant contribution for the households' multiple-borrowing behaviour. For performing the regression analysis, we convert the variable—number of active loans to a binary variable (Y) where either the household is meeting the RBI mandate of not having more than two loans ($Y = 1$) or is overexposed ($Y = 0$). For this conversion, we do not rely on our collected active loan information but on the information we got from the Credit Information Company (CIC) through the MFI. We do this for three reasons. First, our sampling frames for samples LESS and MORE are based on the same criteria and contrary to our expectations, the numbers of active loans reported are higher in the CIC reports than our surveyed data (Table 1). Second, we want to remove household response biases that might have occurred where households being aware of the consequences may have reported lower active loans and amount

⁴The different Identity Cards asked for were Election Card, Ration Card, BPL Card, Passport, Pan Card, Shop License, Aadhar Card, Bank ATM Card, Driving License, NREGA Card, Kisan Credit Card, Company ID card, Jan Dhan Yojana Card, RSBY Card, and Others

⁵The different Financial Products that could be availed by the household apart from Loans were Savings, Insurance, Investments (in Business), and Pensions.

Table 3. Construction of composite variables.

(a)			
Household condition —sum of values given for below indicators			
Floor	Mud (0) Brick (1) Cement (2) Tiles (3)	Roof	Plastic (0) Tin (1) Asbestos (2) Cement (3)
Walls	Plastic (0) Tin (1) Brick (2) Brick and plaster (3)	Rooms	One (1) Two (2) Three (3) > Three (4)
(b)			
Household environmental condition —sum of values given for below indicators			
Locality	Dirty (0) Average (1) Clean (2)	Plants	None (0) Few (1) Many (2)
Drains	Bad (0) Average (1) Good (2)	Playground	None (0) Small (1) Big (2)
Roads	Mud (0) Tar (1) Cement (2)		
(c)			
Health related conditions —sum of values given for below indicators			
Own Private Toilet	Yes (1) No (0)	Tap providing clean water	Yes (1) No (0)
Regular Garbage Clearance	Yes (1) No (0)	Mosquito nets for sleeping	Yes (1) No (0)
Filtered drinking water	Yes (1) No (0)	Always eat fresh cooked food	Yes (1) No (0)
After a heavy shower, rain water stays for	Few hours (1) > 1 day (0)		
(d)			
Education related conditions —sum of values given for below indicators			
Study table and chair	Yes (1) No (0)	Tube light in study area	Yes (1) No (0)
(e)			
Improvement in social dynamics —sum of values given for below indicators			
Sharing each other's experiences	Yes (1) No (0)	Reducing conflicts within home	Yes (1) No (0)
Participation in occasions, festivals	Yes (1) No (0)	Mosquito nets for sleeping	Yes (1) No (0)
Can save more from earnings	Yes (1) No (0)	Always eat fresh cooked food	Yes (1) No (0)
Sense of security of family future	Yes (1) No (0)	Knowledge about recent news	Yes (1) No (0)

Source: Author's own creation.

outstanding (known as the Hawthorne Effect). We expect the chance of misreporting for other indicators to be less, as households cannot gauge the relation between their household characteristics and multiple-borrowing. Third, the only information source available to any MFI and also to the RBI is the data collected and monitored by the CICs, therefore we use the same to make our model rep-

licable and comparable with other sample surveys without the need to make any major adjustments.

For binary response models, where X is a vector of explanatory variables, if we suppose that $\pi = Pr(Y = 0|X)$, then the linear logistic model has the form—

$$\text{logit}(\pi) \equiv \log\left[\frac{\pi}{1-\pi}\right] = \alpha + \beta'X$$

where, α is the intercept parameter and β is the vector of s slope parameters. The LOGIT distribution is therefore a cumulative distribution of the LOGIT function. We performed the logistic (or LOGIT) regression analysis multiple times and the best-fit model was chosen that minimised the Akaike's Information Criterion (AIC) [27]. For the same model, we also run an ordered logistic regression. Multicollinearity among variables was tried to be best minimised as possible through our judgement.

6. Results and Discussions

The data collected from a total of 192 households with 97 households in LESS (with two or less loans) and 95 observations from MORE (with three or more loans) reveal that LESS households could recollect taking 130 loans (both active and inactive) in the past 2 years and during the same time MORE households took 298 loans (Table 4). Among them a majority of the loans (>95 percent) were from different MFIs. Since the data was collected from the city of Pune, loans were also availed from banks—some of them being controlled by cooperatives. None reported loans from informal sources such as local lenders, relatives and friends in excess of INR 2000. There could be two possibilities—one that these loans might be small, and two that households did not reveal them to the surveyors, which is very unlikely given the decent sample size. Small field-based interviews with a few clients indicate that even if they take loans from informal sources, it is mainly for very short durations such as 1 - 6 months, whereas from most MFIs loans are taken for a period of 1 - 2 years.

Notably in an effort to control adverse selection, most MFIs have a loan provision structure that is quite similar to a credit scoring mechanism. While a credit score takes into account an individuals' income and assets, MFIs instead depend on a households' loan repayment history with their organization (called as loan cycles) by rewarding good borrowers with access to higher loans. When a new borrower approaches an MFI, even with a proof of income, she can only manage the starting loan size (around INR 10,000). Once after she moves up higher loan cycles, she can get other benefits such as higher loan sizes and some repayment flexibilities. Given that loans from MFIs are taken for a period of 1 - 2 years, Table 5 shows an interesting aspect between the two samples—more than 54 percent households in LESS have loan cycles of 3 or higher compared to only around 34 percent households in MORE. This means that households in LESS had retained their relationships with the MFIs for longer duration and therefore had access to higher loan amounts.

We now arrive at a position to start answering our research questions. For our

Table 4. Frequency and percentage of loans borrowed from different sources for the two samples^a.

Loan Source	LESS (Loans = 130)		MORE (Loans = 298)	
	Frequency	Percent	Frequency	Percent
Banks	3	2.31	11	3.69
Cooperatives	1	0.77		
MFI's	126	96.92	287	96.31

a. Samples were denoted as LESS and MORE. LESS had 97 borrowers and MORE had 95 borrowers.

Table 5. Frequency and percentage of loan cycles (for repeat loans).

Loan Cycle	LESS (Loans = 130)			MORE (Loans = 298)		
	Frequency	Percent	Average	Frequency	Percent	Average
1	11	8.8	18000.0	75	25.4	13813.3
2	44	35.2	19681.8	119	40.3	22159.6
3	29	23.2	28965.5	55	18.6	27400.0
4	23	18.4	33260.8	23	7.8	33521.7
5	13	10.4	33846.2	18	6.1	35000.0
>5	5	4.0	47000.0	5	1.7	34800.0

question on differences among households (in samples LESS and MORE), we draw our insights from the results presented in **Table 6** and by considering significant difference only at 5 percent levels or less. Thus, we find little support for difference on (a) total indebtedness, as even though numbers of active loans are significantly different, the total outstanding amount is not so and in fact higher in the reverse order. Similarly, for (b) access to loans per requirement, we note that the means of variable—difference between requirement and loan, is high but there are no significant differences in means. For (c) financial behavior, there are some significant differences on food and education expenses but not on other expenses. Then in (d) financial product portfolio, we find significant differences in variable—different financial products availed. Finally, on (e) informal support systems, significant difference is found between the groups through variables—total social support expected, and improvement in social dynamics.

Even after answering the first research question, we see that **Table 6** has still to offer other insights. Firstly, it is important to highlight here that even though the household size is significantly different between the groups, we did not resort to comparisons at a per-capita level because the RBI mandate considers the household as one entity irrespective of the number of members. But even with significant differences in household size, we do not see any major difference in household expenses barring food (at 5 percent) and education (at 10 percent).

Secondly, we observe a difference in consumption patterns with households in MORE spending more on education, whereas those in LESS spending more on

Table 6. Results of t-tests for mean differences between LESS (L) and MORE (M).

Variable Description	Mean (L)	Mean (M)	<i>P</i> > t
Number of active loans	1.23	1.81	<0.0001
Total outstanding amount	28715.34	23668.84	0.1850
Difference between requirement and loan	3345.36	3684.47	0.5330
Household size	4.15	4.58	0.0216
Kind of identity cards	5.84	5.69	0.3751
Number of identity cards	7.47	13.13	<0.0001
Household condition	8.47	8.74	0.4558
Household environmental condition	4.64	4.33	0.2771
Health related conditions	4.54	4.40	0.5047
Education related conditions	0.86	1.11	0.0142
Number of earning members	2.19	2.27	0.4805
Number of female earning members	0.87	0.91	0.6085
Total annual income of household	255587.63	269747.37	0.5505
Total annual expenses of household	168968.09	182267.02	0.2865
Annual food expenses	66779.38	74153.68	0.0497
Annual education expenses	14419.15	21269.15	0.0738
Annual healthcare expenses	21569.89	17607.53	0.4000
Annual house-related expenses	13386.70	12875.74	0.6303
Annual loan repayment expenses	28619.38	33282.69	0.2336
Annual other expenses	21148.94	21136.56	0.9949
Different financial products availed	2.11	2.38	0.0295
Health problems faced in past 2 years	1.47	1.57	0.6614
Healthcare costs in past 2 years	13212.37	11192.63	0.6231
Household members currently studying	1.27	1.71	0.0041
Annual cost of education	14674.23	22193.68	0.0349
Members who left education mid-way	0.35	0.19	0.0567
Total social support expected	17520.62	20905.26	0.0181
Improvement in social dynamics	5.35	6.80	0.0014

Note: Only the 2-tailed t-test significance results of less than 5 percent are highlighted.

healthcare. This is contrary to our expectations. It is further supported by the fact that the outstanding amount of households in LESS is higher. This implies that these households have systematically been facing illnesses and therefore prefer to stick to a particular MFI to get the benefits of higher loans with repeated loan cycles (as shown earlier in **Table 5**).

Finally, we see that both groups of households are at par on—kind of identity cards, household condition, household environmental conditions, and health

related conditions but not on number of identity cards and educational conditions. This result favors us in showing that these sets of households are not entirely different in their endowments but vary on their social participation, thereby allowing us to aggregate them for regressing their household characteristics for addressing our final question—Can household characteristics predict multiple-borrowing behavior, which according to RBI’s mandate is more than two loans.

The results of the likelihood ratio test, Wald test and the efficient score test for testing the joint significance of explanatory variables of the LOGIT and ordered LOGIT models are displayed in **Table 7**. The extremely small p-values in the results of **Table 7** therefore reject the hypothesis that all slope parameters are equal to zero. This straightaway answers the question (4) by saying—yes, some household characteristics do influence multiple-borrowing.

The regression coefficient estimates for the LOGIT and ordered LOGIT models with average marginal effects for the LOGIT model are in **Table 8**. We also ran a PROBIT model to check our results. Since the results were similar, we don’t report them. To check for the robustness of our LOGIT model, we performed 5-fold cross validation procedure and observed that the direction and significance our parameter estimates do not change. We do not present these results here.

Since, we are trying to look at which household characteristics are more likely to influence the household’s decision to multiple-borrow as per RBI guidelines (*i.e.* have more than two loans), we discuss only the LOGIT model from **Table 8**. Our sampling plan was also designed to look at the differences between these two. First, we notice that household size is negatively associated with multiple-borrowing and has a strong marginal effect. This means that younger households engage in thrifty behaviour. Second, the number of identity cards possessed by households is positively associated with multiple-borrowing. This is in line with our expectation that the household may take loans through different identifications (thus exploiting information asymmetries). However, it still cannot be said with certainty whether having multiple identity cards creates the tendency to multiple-borrow or whether the tendency itself creates the necessity to possess multiple cards. Third, the different financial products availed, though not significant, has a deterring effect on multiple loan uptake. This is an important result for us, which we will discuss in the next section. Fourth, the composite variable of household environmental conditions shows a clear negative impact on multiple-borrowing behavior suggesting that poorer households have lesser access. However, the composite variable of household condition does not have any clear effect and neither does healthcare and education conditions within households. Fifth, when compared to other expenses of the household⁶, the annual food expenses and household expenses have positive impacts, albeit in different directions. Finally, though we expect improvement in social dynamics as an outcome of microfinance, it also predicts tendencies to over-indulge in

⁶Other items include clothing, transport, addictions and rentals.

Table 7. Testing global null hypothesis.

Test	Degrees of Freedom	Chi-Square (Logit)	Chi-Square (Ordered Logit)
Likelihood Ratio	18	109.41***	115.86***
Efficient Score test	18	81.17***	84.79***
Wald test	18	50.14***	82.28***

Source: Authors' own computation. Note: ***, ** and * indicates significance at 1%, 5% and 10% respectively.

Table 8. Maximum Likelihood Estimates (MLE) and Average Marginal Effects (AME).

Independent Variables	LOGIT		Ordered LOGIT
	MLE	AME	MLE
Household size	-0.7894*** (0.306)	0.108	-0.0498 (0.188)
Number of identity cards possessed	0.4629*** (0.079)	-0.059	0.1374*** (0.039)
Different financial products availed	-0.2989 (0.286)	0.041	-0.1205 (0.206)
Household condition	0.0295 (0.116)	-0.003	-0.1567* (0.087)
Household environmental condition	-0.3307** (0.157)	0.043	-0.0177 (0.11)
Health related conditions	0.2085 (0.181)	-0.027	-0.0948 (0.136)
Education related conditions	0.0168 (0.34)	-0.006	-0.1423 (0.259)
Total annual income of household ^a	0.0014 (0.002)	< -0.001	0.0029** (0.001)
Annual food expenses ^a	0.0231* (0.012)	-0.003	0.0082 (0.008)
Annual education expenses ^a	-0.0072 (0.01)	0.001	0.0115* (0.007)
Annual healthcare expenses ^a	0.0071 (0.011)	-0.001	-0.0133* (0.008)
Annual house-related expenses ^a	-0.2013*** (0.064)	0.026	-0.2179*** (0.041)
Annual loan repayment expenses ^a	0.0101 (0.013)	-0.001	0.0824*** (0.011)
Health problems faced in past 2 years	-0.0992 (0.2)	0.014	-0.0334 (0.135)
Household members currently studying	1.0411*** (0.353)	-0.139	0.2575 (0.22)
Members who left education mid-way	-0.477 (0.442)	0.046	-0.2355 (0.313)
Total social support expected	0.0001** (<0.001)	< -0.001	<0.0001 (<0.001)
Improvement in social dynamics	0.1048 (0.089)	-0.013	0.1543** (0.062)
Intercept	-3.0212** (1.416)		
Intercept 4			-7.5781*** (1.369)
Intercept 3			-4.3151*** (1.089)
Intercept 2			-1.3692 (1.024)
Intercept 1			2.7842*** (1.072)

a. Variable scaled into per thousand INR. Source: Authors' own computation. Note: ***, ** and * indicates significance at 1%, 5% and 10% respectively.

loan seeking behavior.

The sign of the coefficients of the ordered LOGIT model also fall in line with our expectations. The number of loans varies between 0 to 4 and the probabili-

ties modeled are cumulated over the lower ordered values. For example, the Intercept 3 is the estimated log odds for 4 and 3 loans versus 2 and 1 and 0 loans. While both models best answers that household characteristics are important predictors for multiple-borrowing, but they also lack variables on unobservable characteristics such as risk-aversion, bounded rationality and transaction costs. In hindsight, we also feel that interactions and relationships with MFIs, which are not a part of this model, may also significantly affect multiple-borrowing. In many instances we noticed households had taken multiple loans from the same MFIs that were carefully disguised as “top-up” loans and not separate loans. MFIs can also resort to many tricks to fool both their customers and their competitors. While “top-up” loans are a good ploy to never lose the client to other MFIs, since CICs take the information passed on by MFIs at face-value and without verification (that is costly and time-consuming), MFIs can very well show their customers with completed loan repayments as still “active”, so as to deter other MFIs from swooping down on these clients. In a quick comparison of the descriptive statistics of our sample against the details in the overall populations, we note disparity. Though borrowers may have divulged lower numbers, there is no way to exempt moral hazard by MFIs either in contributing to this disparity.

This study has shown that there are discrepancies in households’ loan purpose and loan usage, most of this owing to their household characteristics and endowments. Households that have two or less loans do differ (though not entirely) from households with more than two loans. As a result, some household characteristic variables are found to be significant predictors of multiple-borrowing behavior. We also suggest in hindsight that this study be complemented with other studies looking at MFI and client interactions.

7. Conclusions

This study was an effort at understanding the adequacy of the RBI’s multi-borrowing mandate through a study of households lying on either sides of the divide. In the process, we looked at households’ loan purposes and uses and also differences between the averages from both groups and lastly we tried to find predictors for multiple-borrowing. We found that the major consumption purposes of loans were health and education. The major expenses for both arise from availing private services, which can boast of better service quality than the government. Even the poor households do aspire for these services [28] and therefore often engage in thrifty borrowing. We envisage that if other financial products such as savings, insurance, support to needy students, pensions, and remittances are extended to these communities, then the real need for over-borrowing would be met.

Some of the antecedents of over-borrowing are information asymmetries leading to moral hazards from both MFIs and borrowers and the consequence is often over-indebtedness leading to a crisis state. The recent RBI mandate is therefore directed at averting such a crisis. However, we found many inherent

weaknesses in the restrictions—the major ones being the restrictions to borrowing households to be a part of only a single group or none and further have at a time only two active loans. Consequently, there could be several borrower and MFI strategies that can only lead to societal loss by pre-empting good MFI and good borrowers.

We conclude here by saying that with the absence of proper monitoring of both households and MFIs by an independent authority, the intended objective of the RBI mandate will be seldom achieved. We propose therefore that aforementioned restrictions must be suitably amended towards creation of conditions that promote free and fair competition between MFIs. With more information sharing by the CICs, MFIs can afford to take their own decisions. This would also enable households to maintain client relationships with MFIs without being hassled over number of active loans.

8. Postscript

At the time of completion of this study, the RBI made a few changes to the NBFC-MFI directives on July 01, 2015 [29] as follows (in reference to section 3):

- 1) [c] Annual household income not to exceed INR 100,000 (rural) or INR 160,000 (urban)—an increase of loan limit by INR 40,000 for all households.
- 2) [c] Indebtedness not to exceed INR 100,000 after excluding loans availed towards meeting education and medical expenses—not only total indebtedness limit raised by INR 50,000 (or doubled) but exclusion of two major loan purposes have effectively raised indebtedness limits further.
- 3) [e] Loans given for income generation should constitute at least 50% of the total loans given by the MFI—a decrease by 20% of loans for income generating purposes.

However, the policy implications of this study still remain.

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Appendix

1. Usage of Loan Money by Lender Type and Purpose

From a glance at Table A1 below, it can be easily observed that loans from less formal sources have a higher chance of being diverted to non-productive (e.g. home improvement) and emergency uses (e.g. healthcare and lifecycle events).

Table A1. Usage of loan money source-wise.

Aggregates	Particulars	BANK	MFI	SHG	INFORMAL
Income Generation	New Business	2%	3%	2%	1%
	Agri. inputs	58%	13%	19%	20%
	Purchase stock	3%	10%	4%	3%
	Purchase land	1%	1%	1%	1%
	Buy livestock	3%	6%	6%	2%
Repay old debt	Repay old debt	15%	25%	20%	7%
Healthcare	Health	11%	11%	19%	25%
	Marriage	4%	5%	2%	12%
Life Cycle Events	Funeral	0.1%	0.2%	0.5%	2%
	Other festivals	1%	4%	4%	5%
Home Improvement	Home improvement	10%	22%	13%	14%
Education	Unemployment	0.0%	0.0%	0.1%	0.8%
	Education	4%	4%	6%	5%
Consumption	Purchase of jewelry	1%	1%	2%	0.40%
	Consumption	27%	32%	50%	25%

Source: [32].

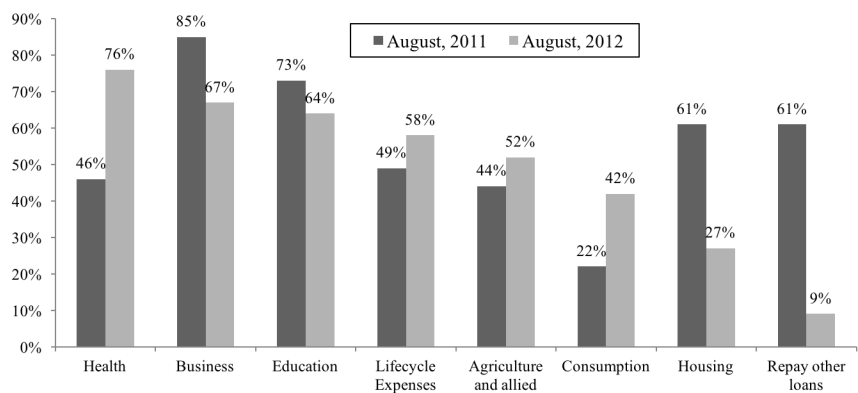


Figure A1. Purposes of obtaining credit in Andhra Pradesh (Sample = 343). Source: [33].