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Microfinance Competition and Multiple Borrowing: Evidence using Panel Data from Bangladesh

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Minhaj Mahmud[*], Yasuyuki Sawada[†] and Mari Tanaka[‡]

Abstract

This paper examines the causes and consequences of multiple borrowing in rural Bangladesh using long-term household and village panel data covering the years 2000 to 2014. Our empirical analysis reveals that sharply growing number of microfinance institutions (MFIs) in a wider set of villages over time, coincides with corresponding increase in household borrowing from multiple MFIs as well as households accessing loans generally. The climbing number of MFIs also explains the significant rises in the total values of household assets especially in the form of agricultural equipment. Although the increasing number of MFIs resulted in some households borrowing for the purposes of repaying previous loans, the fraction of such households is still relatively small. Overall, our results suggest that the majority of the cases of multiple borrowing are "healthy" or "solvent" overlapping loans that meet the large demand for credit for productive purposes.

Keywords: Microfinance Institutions, Household Borrowing, Micro Business, Bangladesh

JEL Codes: G21, D14, O12, O16

[*] Corresponding author: Bangladesh Institute of Development Studies and JICA Ogata Research Institute, Tokyo. (minhaj@bids.org.bd)

[†] University of Tokyo and Asian Development Bank. (sawada@e.u-tokyo.ac.jp)

[‡] Hitotsubashi University, Tokyo. (mari.tanaka@r.hit-u.ac.jp)

1. Introduction

Microcredit, small-scale loans, has emerged as one of the most powerful policy tools for providing financial assistance to the poor. The number of poor households with access to microcredit programs has increased globally, more than 18 times over the past twenty years, from 7.6 million in 1997 to 139.9 million in 2018 (Microfinance Barometer 2019). There has been rapid expansion of the microfinance sector with increasing numbers of both microfinance institutions (MFIs) and the number of borrowers. Bangladesh has been the global center of this trend, witnessing rapid expansion of MFIs and their branches.[1] Despite the 2006 Nobel Peace prize being awarded to both the Grameen Bank and its founder Professor Muhammad Yunus jointly, there has still been little consensus on the impact of microcredit programs. While there has been some discussion in literature about the positive role of microcredit on household welfare, including its cost effectiveness,[2] recent evidence based on randomized control trials (RCTs) provides rather weak evidence of their positive impact (e.g. Banerjee, Karlan, and Zinman 2015).

The overall impact of improved access to credit on the welfare of borrowers ultimately rests on whether the microcredit programs relax the binding credit constraints on borrowers (i.e., mitigating credit market imperfections) or merely induce over borrowing (i.e., borrowing more than the borrower has the capacity to repay). It may also depend on the complementarity or substitutability between a loan from microfinance institutions (MFI) and other credit sources due to the nature of liquidity constraints, risk-sharing, borrower production functions, and mechanisms producing downstream outcomes (Banerjee, Karlan and Zinman 2015).

Notwithstanding the fact that major MFI lenders had agreed not to work with the same clients, in the absence of effective credit bureaus, their rapid expansion can inevitably result in borrowers borrowing from multiple lenders including MFIs - a phenomenon widely known as

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[1] The percentage of households accessing credit from MFIs (over 30 percent) as opposed to other formal sources in rural Bangladesh substantially increased over the past decades, reducing their dependence on informal lenders (e.g. money lenders, friends, and relatives). For a review of the rural credit market *vis a vis* MFI loans, see Hossain and Bayes (2018)

[2] For a review of the role of microfinance on household welfare see Khandker and Samad (2018).

"overlapping borrowing" or "multiple borrowing." There is evidence of increasing competition among MFI lenders resulting in an increase in their presence over time (Macintosh and Wydick 2005; Salim 2013; Sawada, Miyauchi and Yamasaki 2018). This raises the important question of whether intensifying competition among MFIs is a predictor of increasing overlapping borrowing[3], and if so, what are the consequences of this on household welfare. However, to the best of our knowledge there has not yet been any rigorous empirical research looking into the causes and consequences of overlapping borrowing, and in particular, the role of competition between MFIs on borrowing behavior and household welfare.

In this paper, we aim to at least partially bridge this gap in the literature by analyzing the effects of the increasing number of MFIs on borrowing behavior, i.e., the number and total amount of loans, the purpose of and use of loans, and household asset accumulation, by using four waves of a unique household survey and a retrospective survey on village-level information covering the period from 2000 to 2014. Overall, we find that an increase in the number of MFIs in a village predicts a higher likelihood that households will borrow from multiple MFIs and a higher chance of them borrowing from at least one MFI; however, there is no change in the likelihood of borrowing from other sources. We also find that increasing MFI competition in the village predicts larger household assets that are mostly used for productive purposes rather than only for repayment or consumption. This result is consistent with the hypothesis that combining small and inflexible loans from multiple MFIs serves to satisfy the high demand for borrowing for the purpose of purchasing productive assets.

In the case of shared information about borrowers, between credit bureaus for example, multiple borrowings may be desirable for meeting the growing demand for credit. Several models, however, predict negative outcomes in settings where information sharing is not practiced; if information on borrowers is not shared among lenders, an increase in lenders could

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[3] In this paper, we use the terms "multiple borrowing" and "overlapping borrowing" interchangeably.

lead to higher default rates or a limited access to credit (Stiglitz and Weiss 1981; Pagano and Jappelli 1993; Hoff and Stiglitz 1990; McIntosh and Wydick 2005). Hence, there are reasons for concern about whether multiple borrowing induces over-indebtedness or insolvency among borrowers.[4]

Generally, overlapping borrowing may happen for two opposite reasons with differing consequences. Firstly, a borrower may borrow from multiple sources in order to continue to make repayments on existing loans. This repayment cycle could potentially violate a non-Ponzi game (NPG) condition and lead to over-indebtedness and insolvency, thus prolonging a so-called "debt trap." Alternatively, an MFI client who has a growing productive project, may not find a single inflexible loan from an MFI enough to meet their needs. Similarly, an MFI's specialization in a particular type of credit may not fully support financing of such a project. Again, a client may need to borrow additional funds from other sources in order to cope with any unexpected events. These factors, especially increased demand for investment financing that cannot be met by a single inflexible MFI loan, may lead to borrowing from multiple sources (Karlan and Appel 2011).[5] According to Mallick (2012), while moneylender interest rates increase with MFI coverage, borrowers turn to moneylenders for additional funds not only to meet seasonal capital investment demand but also to comply with the tight repayment schedules that MFIs set. In contrast, Berg, Emran, and Shilpi (2020) show that MFIs draw better borrowers away from the moneylenders, although competition between MFIs does not reduce moneylender interest rates. Using program-level data from Bangladesh, Khandker, Koolwal, and Badruddoza (2013) show that increased borrowing among households resulting from competition between MFIs has not necessarily lowered recovery rates.

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[4] There is some evidence that the mere presence of "overlapping borrowing" does not necessarily generate over-indebtedness (Khandker, Faruqee, and Samad 2013; Faruqee and Khalily 2011).
[5] There is some support for this view in the case of Bangladesh (Khalily and Faridi 2011; Osmani, Khalily and Hasan 2016; Sawada, Tanaka and Mahmud 2018).

In relation to countries other than Bangladesh, Vogelgsang (2003) analyzes repayment determinants for loans in the case MFIs in Bolivia and finds that overlapping borrowers are more likely to default than others, although overall repayment performance has improved amid increased MFI competition. McIntosh, de Janvry, and Sadoulet (2005) document rising competition among microfinance lenders in Uganda that led to a decline in repayment performance. Using experimental findings from Guatemala, de Janvry, McIntosh, and Sadoulet (2010) discuss the importance of credit bureaus being present in order to address the potential challenges of overlapping borrowing, whereby credit bureaus generated large efficiency gains for lenders and also rewarded good borrowers. Additionally, in a randomized field experiment in Malawi, Giné, Goldberg and Yang (2012) found that while fingerprinting during loan applications led to substantially higher repayment rates among borrowers with the highest ex-ante default risk, it had no effect for the rest of the borrowers. These latter two studies indicate the importance of information sharing and proper screening of potential borrowers. Notably, even in the absence of credit bureaus or strict credit screening, expansion of MFI loans is not necessarily associated with overlapping borrowing (Banerjee, Karlan, and Zinman 2015).

The remainder of this paper is organized as follows: Section 2 sets out the data. This is followed by a description of our empirical strategy in Section 3 and the results of our analysis in Section 4. The final section makes the concluding remarks.

2. Data

In this paper, we combine two datasets: The first dataset comes from panel household surveys carried out in Bangladesh (the Livelihood System of Rural Households Panel Data) that randomly sampled 62 nationally-representative villages and surveyed randomly sampled households within these villages in 2000, 2004, 2008, and 2014.[6] The sample is nationally representative as shown

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[6] The original household panel data collection was led by Dr. Mahabub Hossain (late). The repeat surveys were conducted during 2000–2001 by the International Rice Research Institute (IRRI). The same households were revisited in 2004 and 2008 for the purposes of poverty mapping in Bangladesh and assessing the impact of the rise in food prices on rural livelihoods. The latest wave of data collection

by the comparison of the estimates of variables for which data are available from official statistics (Hossain and Bayes 2009). For the benchmark survey carried out in 1988, a multi-stage random sampling method was used for the sample selection of 62 villages in 57 districts (out of 64 districts in Bangladesh). In each wave, the household survey asked households to list all loans taken in the previous year, and for each loan, to note down the types of lender[7], and the amount and purpose of the loan. The survey also elicited the amount of household asset holdings by types of asset. In the unbalanced panel data, we observe 1883 households in 2000, 1861 households in 2004, 1832 households in 2008 and finally 1703 households in 2014. Since our data does not allow us to identify individual borrowers within the household, we define multiple borrowing at the household level. We maintain the assumption of a unitary household model where multiple borrowing is well defined at the household level. The second dataset comes from our own 2014 survey of key informants in the 62 villages, which retrospectively asked about village characteristics including the number of MFIs, banks, retail shops, and electrification conditions in the past 14 years.

Table 1 summarizes the descriptive statistics of relevant variables derived from the two datasets. We observe that rural households in Bangladesh intensively utilize microcredit facilities. Moreover, over the years there has been an increase in the number of households that borrow from multiple sources (defining multiple borrowing households). For the purpose of comparison, we define four different types of multiple borrowing: whether the household is taking loans from more than one source (multiple borrowing); whether the loans are from more than one MFI (multiple borrowing from MFIs); at least one loan has been taken from an MFI and another from a non-MFI (multiple borrowing from MFI and non-MFI); and, more than one loan from a

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was made by BRAC Research and Evaluation Division in 2014-15. The household data consists of four waves of a household survey: 1883 observations in 2000, 2036 observations in 2004, 2011 observations in 2008, and finally 2846 observations in 2014.

[7] For the types of lenders, the respondents were asked to choose from Grameen bank, ASA, BRAC, Proshika, other NGOs, agricultural banks, other banks, money lenders, businessman, share-cropping land owner, or relative.

non-MFI source (multiple borrowing from non-MFIs). As shown in the table, on average (pooling four waves of the data) multiple borrowing from MFIs represents the highest share (7%), followed by multiple borrowing (11%). Looking across the survey years, the share of multiple borrowing from MFIs increased over the years. Figure 1 shows the distribution of the number of loans that a household borrowed from any lender. We observe that the number of loans from any source has increased over the years; in particular, the fraction of households having multiple (more than one) loans increased every year between 2000 and 2014.

Table 1: Summary Statistics (N=7269)

Variable	Pooling year: 2000,2004, 2008, 2014					2000	2004	2008	2014
	Mean	SD	Median	Min	Max		Mean by Year		
Number of MFIs in the village	3.78	1.36	4	0	7	3.16	3.61	4.08	4.34
Number of banks in the village	0.33	1.03	0	0	5	0.22	0.32	0.38	0.39
Number of retail shops in the village	18	30	5	0	150	10.92	14.58	18.77	28.72
Access to electricity in the village (dummy)	0.80	0.40	1	0	1	0.63	0.76	0.83	0.99
Household size	5.42	2.70	5	1	34	5.25	5.29	5.41	5.77
Number of active loans	0.61	0.89	0	0	12	0.45	0.49	0.60	0.94
Borrowing (dummy)	0.44	0.50	0	0	1	0.36	0.41	0.47	0.54
Borrowing from an MFI (dummy)	0.29	0.45	0	0	1	0.19	0.22	0.36	0.41
Borrowing from a bank (dummy)	0.07	0.26	0	0	1	0.08	0.10	0.05	0.05
Borrowing from an informal lender (dummy)	0.12	0.32	0	0	1	0.12	0.10	0.09	0.17
Multiple borrowing (dummy)	0.11	0.31	0	0	1	0.07	0.06	0.10	0.23
Multiple borrowing from multiple MFIs (dummy)	0.07	0.25	0	0	1	0.02	0.02	0.07	0.16
Multiple borrowing from an MFI and a bank (dummy)	0.01	0.10	0	0	1	0.01	0.01	0.01	0.01
Multiple borrowing from an MFI and an informal lender (dummy)	0.03	0.16	0	0	1	0.02	0.01	0.02	0.06
Multiple borrowing from multiple non-MFIs (dummy)	0.03	0.16	0	0	1	0.03	0.02	0.02	0.04
Asset (Tk)	29073	97930	7670	0	3009000	28158	26699	28566	33248
Total amount of active loans (Tk)	15638	158372	0	0	12500000	5051	5696	12605	41625
Total amount of active loans from MFIs	6269	26469	0	0	1030000	1263	1868	4715	18354
Total amount of active loans from banks	4607	152259	0	0	12500000	2171	1852	2643	12469
Total amount of active loans from informal lenders	4763	32684	0	0	3009000	1617	1976	5246	10803
Asset: livestock or poultry (Tk)	9471	18104	1000	0	400000	8035	9368	18132	1808
Asset: business capital (Tk)	14354	80355	0	0	2100570	15320	12890	3944	26154
Asset: agricultural equipment (Tk)	5248	28449	400	0	1500100	4802	4441	6490	5286
Asset: land (hectare)	0.00	0.004	8E-04	0	0	0.002	0.002	0.002	0.002
Borrowing for agriculture (dummy)	0.179	0.383	0	0	1	0.124	0.181	0.175	0.242
Borrowing for business (dummy)	0.122	0.327	0	0	1	0.112	0.120	0.105	0.155
Borrowing for consumption (dummy)	0.098	0.297	0	0	1	0.090	0.067	0.109	0.130
Borrowing for paying back previous loans (dummy)	0.020	0.140	0	0	1	0.013	0.005	0.016	0.048
Borrowing for other purposes (dummy)	0.072	0.259	0	0	1	0.047	0.052	0.100	0.093
Multiple borrowing for agriculture/business (dummy)	0.060	0.238	0	0	1	0.032	0.033	0.051	0.132
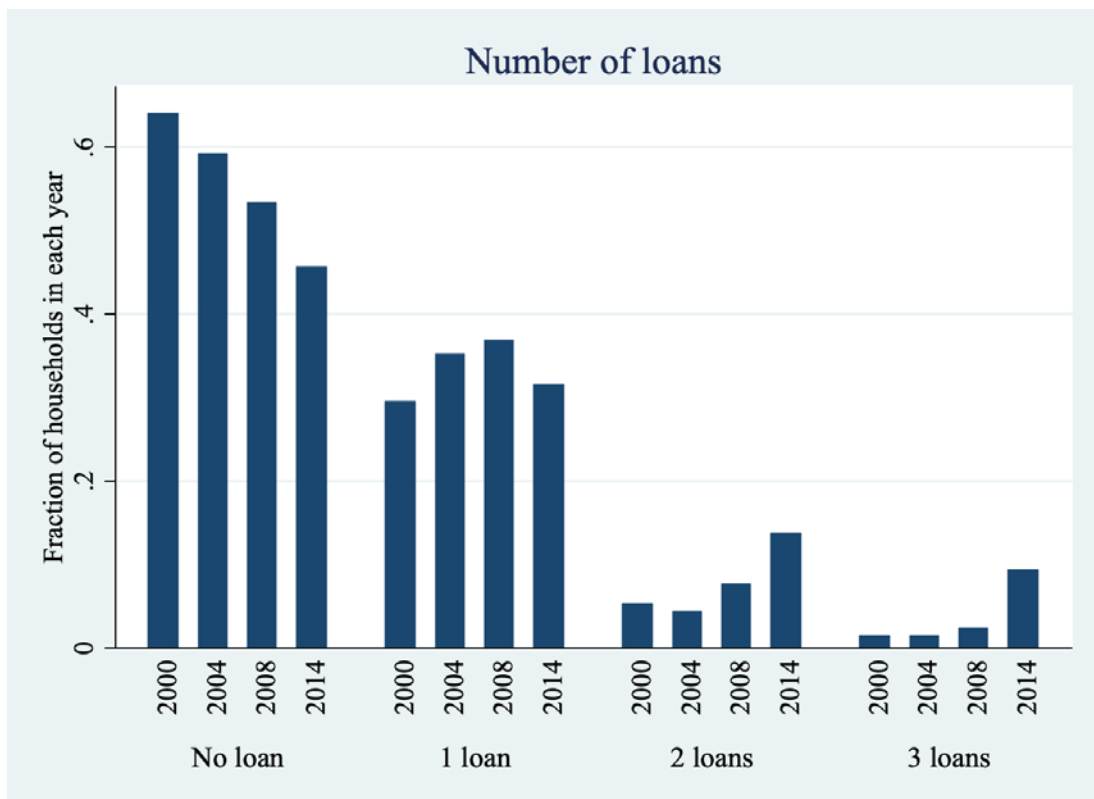
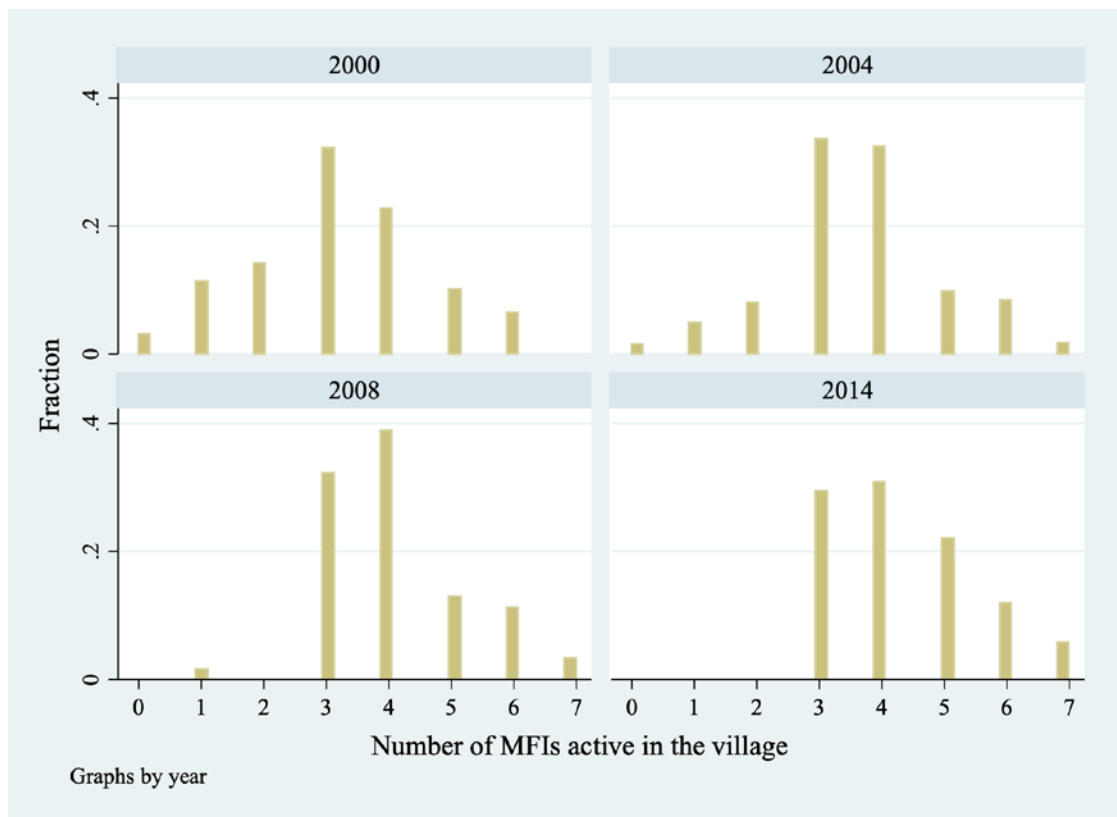*Notes*: This figure shows the histogram of the number of loans that a household borrowed from any lender. Source: BISD 2000, 2004, 2008, and 2014.

From Table 1, we also find that in the surveyed villages, the average number of MFIs, banks, retail shops, and access to electricity has been on an increasing trend over time. While the average number of active loans is still less than 1, this has increased over the years from 0.45 to 0.94. The total amount of active loans has also been on the rise over the years. Looking across borrowing sources, the amount of active loans from all sources increased over time, but the rate of increase is larger for loans from MFIs than those from other sources. With regards to the purposes for which borrowing was undertaken, on average the share of households borrowing for agriculture remains the highest (around 18% on average). While the share of households borrowing for repayment has increased over the years, the average share across years is only 2%, and the highest share was 4.8% in 2014. Interestingly, the share of households borrowing multiple loans for business and/or agriculture increased rapidly from 3% in 2000 to 13% in 2014.

9

Figure 2: Distribution of the Number of MFIs in the Village

Notes: This figure shows histograms of the number of active MFIs in a village by year, using village-year level data from a retrospective survey of the 62 villages in the BIDS data.

As observed in Table 1, loans from formal sources (MFIs or other financial institutions) account for most incidences of multiple borrowing, and the rise in multiple borrowing appears to be largely attributed to multiple borrowing from MFIs. It is likely that the increase in multiple borrowing results from penetration of new MFIs into the villages. Figure 2 shows the distribution of the number of MFIs offering credit in the sampled villages over the years, clearly highlighting the increase over time. We next look into the relationship between the increasing number of MFIs and household borrowing behavior, first in descriptive figures and later by regression analysis.

The presence of many MFI lenders in a village is associated with the higher likelihood of borrowing and multiple-borrowing. The dotted points in Figure 3 show the fractions of households that borrow from at least one MFI (round dots) and at least one non-MFI (triangle dots) by the number of MFIs active in a village. Similarly, Figure 4 shows the shares of households that borrow from multiple MFIs (round dots) and multiple non-MFIs (triangle dots) by the number of MFIs active in a village. As expected, the share of households borrowing from an MFI and multiple MFIs clearly increases with the number of MFIs in a village. The linear fitted lines also confirm this relationship.

Figure 3: Number of MFIs and Borrowing
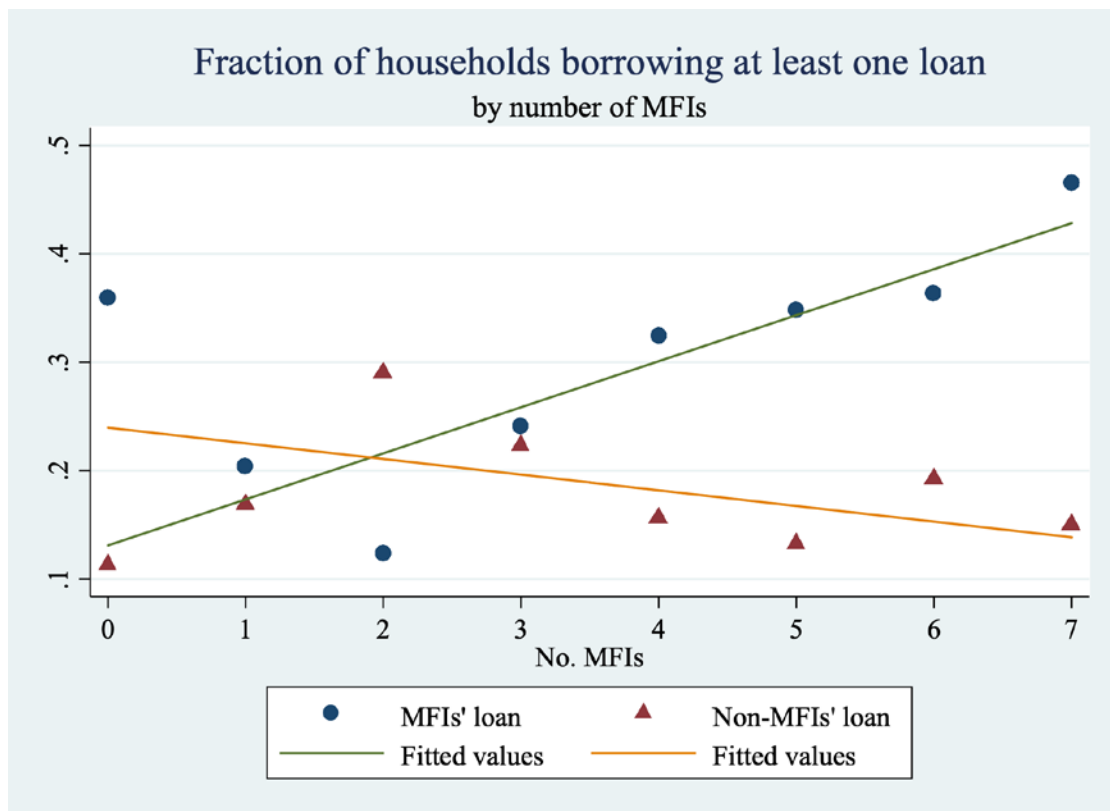
Notes: The horizontal axis relates to the number of MFIs in the village. The vertical axis shows the fraction of households who borrowed at least one loan from an MFI (round dot) or a non-MFI source (triangular dot). Source: BISD 2000, 2004, 2008, and 2014, combined with the retrospective village survey.

11

Figure 4: Number of MFIs and Multiple Borrowing
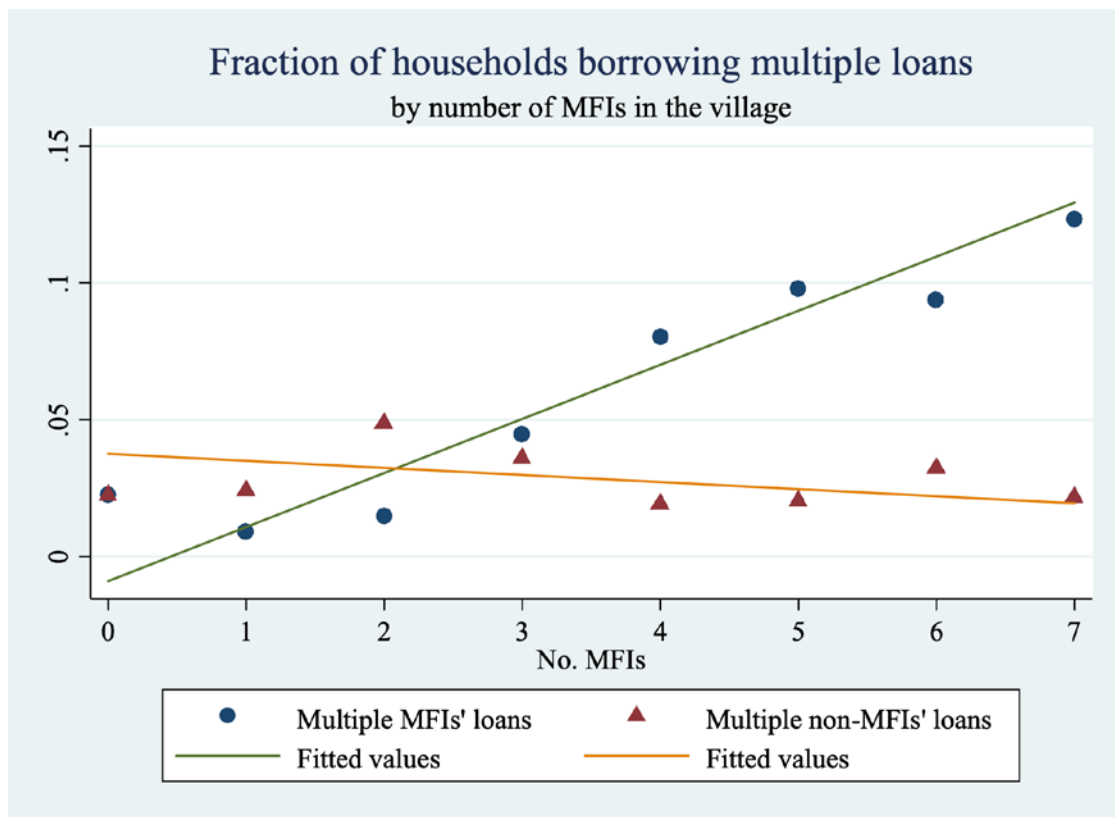
Notes: The horizontal axis is the number of MFIs in the village. The vertical axis shows the fraction of households who took out at least two loans from MFIs (round dot) or at least two loans from non-MFI sources (triangular dot). Source: BISD 2000, 2004, 2008, and 2014, combined with the retrospective village survey.

However, when the number of MFIs increased, the households did not borrow more from other sources at the same time. Figure 3 implies that improved access to MFIs did not result in additional borrowing from informal or bank sources. This also suggests that increases in the number of MFIs do not seem to be driven by unobserved factors that affect demand for loans, which should also influence the likelihood of taking loans from other sources. As shown in Figure 4, in a village with many MFIs, more households borrow from multiple MFIs; however, households in these villages are not more likely to take out multiple loans from informal lenders. Again, this evidence supports the hypothesis that increases in MFI borrowing and multiple borrowing are solely induced by an increase in MFIs.

Figure 5: Purpose of Borrowing
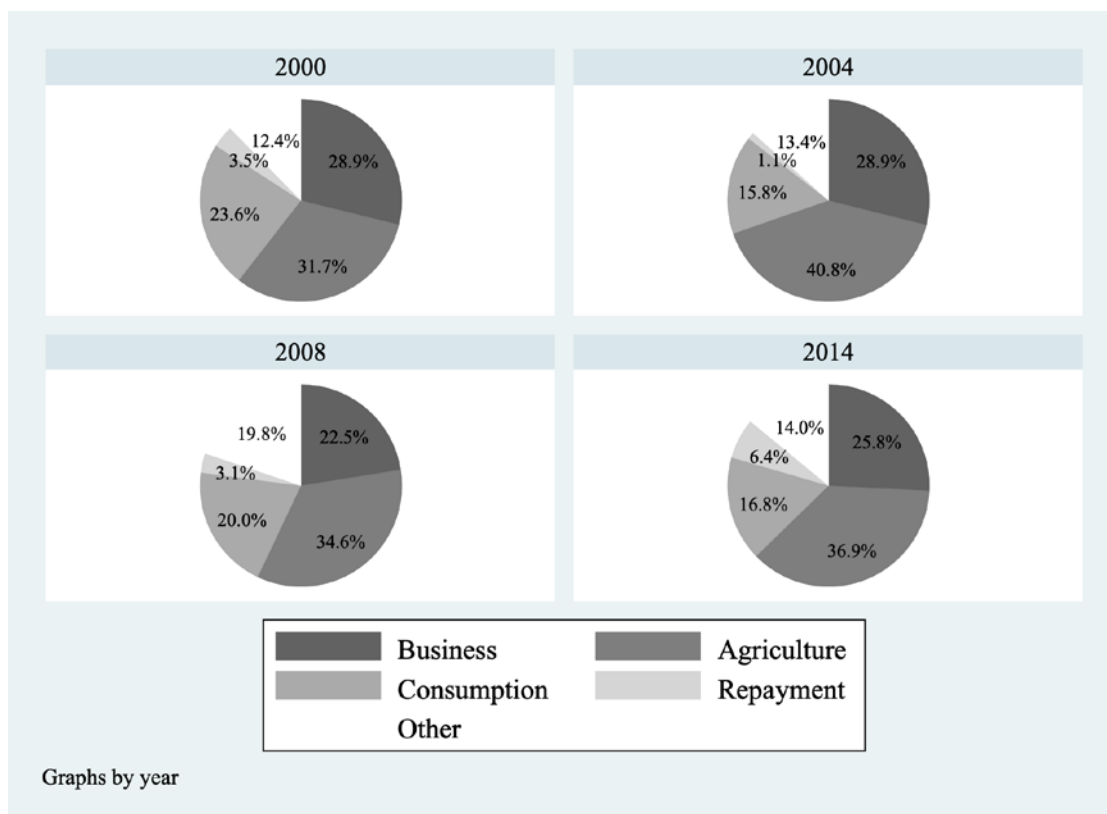
Notes: This graph shows the percentage of the number of loans for each purpose among entire number of loans taken by the households in the BISD data in each year. "Consumption" includes food, housing, education, health, and social events.

We further look at the changes in purposes of borrowing over this period of increasing multiple borrowing. Figure 5 shows the percentage of the number of loans taken out for each purpose from the entire number of loans taken by households for each year of the survey.[8] Overall, we observe that the share of loans taken out to pay back previous loans has slightly increased, although the total remained at a low level in 2014. We also observe that loans taken out for the purposes of business and agriculture have increased in recent years, while the number of loans taken out for the purpose of consumption has decreased.

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[8] As we define multiple borrowing as borrowing from multiple lenders in the previous year, it is quite possible that these additional loans were made to pay back previous loans that were also listed in household data for the year.

3. Empirical Strategy

In order to investigate the relationship between the presence of MFIs in the villages and household borrowing behavior and outcomes, we adopt a linear regression approach with village or household fixed effects. In the baseline specifications, we control for village fixed effects but also provide robustness analysis controlling for household fixed effects (in the Appendix) showing that the qualitative results are the same. Broadly speaking, the focus of our analysis is to explore how household borrowing behavior, asset holdings, and the purposes of borrowing are associated with the number of MFIs in the village.

In particular, we postulate the following linear regression model:

$$Y_{it} = \alpha + \beta NMFI_{jt} + X_{ijt}\gamma + f_j + f_t + u_{it} \qquad (1)$$

where Y_{it} is household i's outcome measure related to borrowing and assets, $NMFI_{jt}$ is the number of MFIs[9] in a village j. X_{ijt} is a set of control variables including the number of other financial institutions (e.g. banks), the number of retail shops, and an indicator of electrification in the village and the household size. f_j and f_t represent village and year fixed effects, by which we control for unobserved fixed characteristics of the villages and unobserved time-specific shocks common across the villages (e.g. inflation rates).

4. Empirical Results

We begin by examining the relationship between the presence of MFIs and household borrowing. Table 2 shows the results of regressing borrowing outcomes, such as number of loans, overall borrowing, and multiple borrowing, on the number of MFIs in the village, controlling for village fixed effects and other control variables as in equation (1) (for the results controlling for household fixed effects, see Table A1-A2 in the Appendix). In panel A, we find that the number of loans per household increases with the number of MFIs in the village. The

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[9] In our analysis, Grameen Bank is categorized as an MFI rather than a special bank.

likelihood of borrowing from any source is also positively and statistically significantly associated with the number of MFIs in the village. According to the results in columns 3-5, this is explained by borrowing from MFIs but not by borrowing from banks and informal sources such as traditional money lenders, relatives, and friends.

Columns 1 and 2 of panel B show that multiple borrowing (taking loans from more than one source) as well as multiple borrowing from MFIs (taking loans from more than one MFI) are also positively and statistically significantly associated with the number of MFIs in the village. The magnitudes of the coefficients are sizable. In particular, the results imply that the addition of one MFI in a village is associated with a 2.6 percentage points increase in the likelihood of household multiple borrowing from MFIs. This is sizeable given that 7% of the households in our sample borrow from multiple MFIs.

In contrast, as shown in columns 3-5, the likelihood of borrowing from an MFI and a bank, from an MFI and an informal lender, or from multiple non-MFIs (including banks and informal lenders) is not associated with the number of MFIs in a village. This result can be explained if additional borrowing from an MFI does not induce households to take additional loans from other sources such as informal money lenders or relatives. These are also consistent with a hypothesis that unobserved shocks to the villages are not driving either the entry of MFIs into these villages or general demand for loans.

Table 2: Borrowing behavior

Panel A

	(1)	(2)	(3)	(4)	(5)
	No. loans	Borrowing	Borrowing (MFI)	Borrowing (bank)	Borrowing (informal)
No. MFIs	0.070***	0.031**	0.027***	-0.001	0.008
	(0.022)	(0.012)	(0.009)	(0.006)	(0.007)
Village FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
N	7,263	7,263	7,263	7,263	7,263

Panel B

	(1)	(2)	(3)	(4)	(5)
	Multi-borrowing	Multi-borrowing (MFIs)	Multi-borrowing (MFI, bank)	Multi-borrowing (MFI, informal)	Multi-borrowing (Non-MFI, Non-MFI)
No. MFIs	0.027***	0.026***	-0.001	0.005	-0.002
	(0.008)	(0.008)	(0.002)	(0.004)	(0.003)
Village FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
N	7,263	7,263	7,263	7,263	7,263

Notes: All regressions control for electrification, number of banks, number of shops, household size, village fixed effects, and year fixed effects. Standard errors are clustered at the village level. Data: 2000, 2004, 2008, and 2014. Superscripts ***, ** and * respectively denote the statistical significance at the 1 percent, 5 percent, and 10 percent level.

Table 3: Total Amount of Loans

	(1)	(2)	(3)	(4)
	Log(1+Total Loan)	Log (1+MFI Loan)	Log(1+Bank Loan)	Log (1+Informal Loan)
No. MFIs	0.325***	0.305***	-0.0142	0.0601
	(0.116)	(0.0899)	(0.0522)	(0.0728)
Village FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
N	7,263	7,263	7,263	7,263

Notes: All regressions control for electrification, number of banks, number of shops, household size, village fixed effects, and year fixed effects. The outcome variables are defined by Log (variable + 1). Standard errors are clustered at the village level. Data: 2000, 2004, 2008, and 2014. Superscripts ***, ** and * respectively denote the statistical significance at the 1 percent, 5 percent, and 10 percent level.

Table 3 shows the results of regressing the total amount of loans by source on the number of MFIs.[10] The coefficient for the log of the total asset is positive and significant as in column 1. Overall, the results are consistent with the earlier findings. An increase in the number of MFIs is positively and statistically associated with an increasing total amount of loans, particularly the total amount from MFIs, and only weakly insignificantly associated with total amount of loans from other sources – banks and informal sources. The results imply that an additional MFI in a village is associated with an average increase of 32.5% of a household's total loans, mainly though MFI financing.

Table 4 shows the results of regressing the value of household assets on the number of MFIs in the village.[11] The results suggest that households with an increasing number of MFIs in the villages are accumulating more assets, in particular assets in the form of agricultural equipment.[12] The magnitude is substantial; one additional MFI in a village increases total assets and the value of agricultural equipment by 12.9% and 22.9%, respectively.

Table 4: Asset

	(1)	(2)	(3)	(4)
	Log (1+Total asset)	Log (1+Livestock and poultry)	Log (1+Business capital)	Log (1+Agricultural equipment)
No. MFIs	0.129*	0.122	0.113	0.229**
	(0.0669)	(0.0742)	(0.0912)	(0.101)
Village FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
N	7,263	7,263	7,263	7,263

Notes: All regressions control for electrification, number of banks, number of shops, household size, village fixed effects, and year fixed effects. The outcome variables are defined by Log (variable + 1). Standard errors are clustered at the village level. Data: 2000, 2004, 2008, and 2014. Superscripts ***, ** and * respectively denote the statistical significance at the 1 percent, 5 percent, and 10 percent level.

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[10] Since the distribution of loan amounts is highly skewed with sparse right tail and large outliers, we take the log of the value after adding 1 for the baseline specification. We find that using inverse hyperbolic sine transformation does not change the qualitative results (results are shown in Appendix Table 3).

[11] Since the distributions of asset values are also skewed, we use the log of asset after adding 1. Again, using inverse hyperbolic sine transformation provides similar results (results are shown in Appendix Table 4).

[12] It may be noted that such non-land fixed asset works as capital to generating more income. For example, Hossain and Bayes (2018) show that agricultural capital (equipment) significantly contributed (in addition to factors such as remittance and other non-agricultural sources) to household income over the years 1988 to 2014.

We also investigate the relationship between the number of MFIs and the purpose for household borrowing.   In Table 5, the dependent variables in columns 1-4 are binary variables which take one if a household took out at least one loan for a purpose related to agriculture, business, consumption, or repayment of a previous loan. While the coefficients are positive for all purposes, only the coefficient for borrowing for repayment is statistically significant. The size of the coefficient (0.008) is small in level but non-negligible compared to the mean of the dependent variable (0.02).

Column 6 shows the results for an indicator of borrowing multiple loans (from any sources) for the purpose of business and/or agriculture. The coefficient is positive and significant at the 10% level. The result implies that an additional MFI in a village is associated with a 1.5 percentage points increase in the share of households borrowing more than one loan for business and/or agriculture, which is also sizable relative to the mean of this variable (0.06).

Although the percentage of households borrowing for repayment of other debts is only 2% of the sample, the findings relating to increasing borrowing for repayment may nonetheless be alarming. Therefore, we lastly explore the characteristics of those households who borrow for repayment. In Table 6, we show a comparison between households who have borrowed for repayment at any stage and those who have never borrowed for the purposes of repayment but have borrowed during the years of the study in terms of some of the descriptive characteristics of households presented earlier in Table 1. We find that "those who have borrowed for repayment of a previous loan at any time", exhibited higher borrowing behavior on average in terms of the number of active loans, borrowing, multiple borrowing, multiple borrowing from MFIs, multiple borrowing from non-MFIs, and the total amount of active loans from MFIs. This group of households had on average less assets and lower income compared to the majority of other households. This group also tends to be located in regions near to Dhaka, the capital.

Table 5: Purpose of borrowing

	(1)	(2)	(3)	(4)	(5)	(6)
	Borrowing for agriculture	Borrowing for Business	Borrowing for consumption	Borrowing for repayment	Borrowing for other reasons	Multiple borrowing for agriculture/business
No. MFIs	0.017	0.005	0.008	0.008***	0.009	0.015*
	(0.012)	(0.007)	(0.007)	(0.003)	(0.007)	(0.008)
Village FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
N	7,263	7,263	7,263	7,263	7,263	7,263

Notes: Dependent variables in columns 1-5 take 1 if the household has a loan for the specified purpose, and 0 otherwise. The dependent variable in column 6 takes 1 if the household borrows from multiple sources for the purpose of either agriculture or business or both. All regressions control for electrification, number of banks, number of shops, household size, village fixed effects, and year fixed effects. Standard errors are clustered at the village level.
Data: 2000, 2004, 2008, and 2014. Superscripts ***, ** and * respectively denote the statistical significance at the 1 percent, 5 percent, and 10 percent level.

Table 6: Comparison of households by borrowing for repayment

	Sample A (Never borrowed for repayment, but have borrowed during the study years)		Sample B (Has borrowed for repayment)		Difference (B-A)	
	Mean	N	Mean	N	Mean of difference	Standard error of difference
Number of active loans	0.74	5142	1.18	549	0.45	0.07***
Borrowing (dummy)	0.55	5142	0.68	549	0.12	0.02***
Multiple borrowing (dummy)	0.13	5142	0.27	549	0.15	0.02***
Multiple borrowing from multiple MFIs (dummy)	0.07	5142	0.18	549	0.11	0.02***
Multiple borrowing from an MFI and a non-MFI (dummy)	0.04	5142	0.10	549	0.06	0.01***
Multiple borrowing from multiple non-MFIs (dummy)	0.03	5142	0.06	549	0.03	0.01**
Total amount of active loans (Tk)	19730	5142	22266	549	2536	4,273
Total amount of active loans from MFIs	7349	5142	14170	549	6822	2,144***
Total amount of active loans from banks	6355	5142	1476	549	-4879	3,123
Total amount of active loans from informal lenders	6026	5142	6619	549	593	1,493
Asset (Tk)	30534	5142	18743	549	-11791	2,920***
Fraction of educated household members	0.60	5103	0.57	549	-0.04	0.02*
Household size	5.90	5142	6.43	549	0.53	0.40
Income	40835	5142	32748	549	-8087	3,905**
Distance to Dhaka (km)	211.34	5065	195.28	549	-16.06	8.33*

Notes: Sample A relates to households that have borrowed but never for the purpose of repayment during the years of the study, namely 2000, 2004, 2008, and 2014. Sample B represents households that have at some stage borrowed for repayment during the study years. In both samples, data in years 2000, 2004, 2008, and 2014 is pooled. The standard error of the mean difference is estimated by using the sample of borrowers and regressing the variable on an indicator variable for sample B, clustering standard errors at household level. Superscripts ***, ** and * respectively denote the statistical significance at the 1 percent, 5 percent and 10 percent level.

5. Conclusion

With rapid expansion of the microcredit sector, MFI lenders have increased their presence in rural areas as a way of achieving sustainability in the face of competition. While the expansion of MFI's portfolios has provided financial services to a larger number of borrowers, the increasing competition among them also resulted in overlapping borrowing by households in many countries, including Bangladesh. Using unique panel data from Bangladesh, we find that in villages where the number of MFIs increased during the period 2000-2014, the share of households borrowing from multiple MFIs increased more than the in other villages. We do not find such differential trends across villages for borrowing from other sources (banks and informal lenders). We also find that an increase in the number of MFIs in a village predicts a higher availability of credit used for productive purposes, suggesting effective selection of high-return borrowers by MFIs. We also find that there is a significant relationship between the number of MFIs in a village and improved welfare in the form of higher agricultural and total assets. Overall, the average features of MFI competition and borrowing appear to suggest that MFI competition results in an increase in "healthy or solvent overlapping borrowing", whereas small and inflexible loans from multiple MFIs seem to satisfy large borrowing demand for productive purposes. However, our results also indicate a small but significant increase in borrowing for the purpose of repaying previous loans in those villages where the number of MFIs is increasing. Although the share of such borrowers was still relatively small, this result is somewhat alarming and requires further research.

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Appendix

Appendix. Table 1: Number of Loans. Household Fixed Effects

Panel A

	(1)	(2)	(3)	(4)	(5)
	No. loans	Borrowing	Borrowing (MFI)	Borrowing (bank)	Borrowing (informal)
No. MFIs	0.071***	0.032**	0.028**	-0.002	0.009
	(0.026)	(0.015)	(0.011)	(0.007)	(0.009)
Household FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
N	7,263	7,263	7,263	7,263	7,263

Panel B

	(1)	(2)	(3)	(4)	(5)
	Multi-borrowing	Multi-borrowing (MFIs)	Multi-borrowing (MFI, bank)	Multi-borrowing (MFI, informal)	Multi-borrowing (Non-MFI, Non-MFI)
No. MFIs	0.027***	0.027***	-0.001	0.005	-0.002
	(0.009)	(0.009)	(0.002)	(0.005)	(0.004)
Household FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
N	7,263	7,263	7,263	7,263	7,263

Notes: All regressions control for electrification, number of banks, number of shops, household size, household fixed effects, and year fixed effects. Standard errors are clustered at the village level. Data: 2000, 2004, 2008, and 2014. Superscripts ***, ** and * respectively denote the statistical significance at the 1 percent, 5 percent, and 10 percent level.

Appendix. Table 2: Number of Loans. Household and Village Fixed Effects

Panel A

	(1)	(2)	(3)	(4)	(5)
	No. loans	Borrowing	Borrowing (MFI)	Borrowing (bank)	Borrowing (informal)
No. MFIs	0.071***	0.032**	0.029***	-0.002	0.009
	(0.026)	(0.015)	(0.011)	(0.007)	(0.009)
Household FE	Yes	Yes	Yes	Yes	Yes
Village FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
N	7,263	7,263	7,263	7,263	7,263

Panel B

	(1)	(2)	(3)	(4)	(5)
	Multi-borrowing	Multi-borrowing (MFIs)	Multi-borrowing (MFI, bank)	Multi-borrowing (MFI, informal)	Multi-borrowing (Non-MFI, Non-MFI)
No. MFIs	0.027***	0.027***	-0.001	0.005	-0.003
	(0.009)	(0.009)	(0.002)	(0.005)	(0.004)
Household FE	Yes	Yes	Yes	Yes	Yes
Village FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
N	7,263	7,263	7,263	7,263	7,263

Notes: All regressions control for electrification, number of banks, number of shops, household size, household fixed effects, household fixed effects, and year fixed effects. Standard errors are clustered at the village level. Data: 2000, 2004, 2008, and 2014. $p<0.1$; ** $p<0.05$; *** $p<0.01$.

Appendix. Table 3: Total Amount of Loans (Inverse Hyperbolic Sine Transformation)

	(1)	(2)	(3)	(4)
	Total Loan (IHS)	MFI Loan (IHS)	Bank Loan (IHS)	Informal Loan (HIS)
No. MFIs	0.347***	0.324***	-0.0147	0.0659
	(0.124)	(0.0962)	(0.0561)	(0.0776)
Village FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
N	7,263	7,263	7,263	7,263

Notes: All regressions control for electrification, number of banks, number of shops, household size, village fixed effects, and year fixed effects. The outcome variables are defined by the inverse hyperbolic sine transformation of the original variable. Standard errors are clustered at the village level. Data: 2000, 2004, 2008, and 2014. Superscripts ***, ** and * respectively denote the statistical significance at the 1 percent, 5 percent, and 10 percent level.

Appendix. Table 4: Asset (Inverse Hyperbolic Sine Transformation)

	(1)	(2)	(3)	(4)
	Total asset (IHS)	Livestock and poultry (IHS)	Business capital (IHS)	Agricultural equipment (HIS)
No. MFIs	0.134*	0.124	0.123	0.255**
	(0.0705)	(0.0791)	(0.0975)	(0.110)
Village FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
N	7,263	7,263	7,263	7,263

Notes: All regressions include village fixed effects and year fixed effects. Standard errors are clustered at the village level. The outcome variables are defined by the inverse hyperbolic sine transformation of the original variable. Standard errors are clustered at village level. Data: 2000, 2004, 2008, and 2014. Superscripts ***, ** and * respectively denote the statistical significance at the 1 percent, 5 percent, and 10 percent level.

Abstract (in Japanese)

要約

　本稿では、2000 年から 2014 年にわたる長期間の家計と農村パネルデータを使用し、バングラデシュ農村部における多重借り入れの原因と結果について分析を行った。我々の実証研究は、広範囲の農村においてマイクロファイナンス機関が急速に成長を続けていること、また同時にこれらの農村において、一般的にローンを利用する家計だけでなく、複数のマイクロファイナンス機関から借り入れをする家計が増加していることを明らかにした。また、急激にマイクロファイナンス機関が増加している農村では、特に農機具という形で家計資産の総価値が上昇していることも示している。マイクロファイナンス機関の増加は、以前に借り入れているローンの返済目的の為の家計債務につながってしまうケースもデータで見受けられるが、そのような家計の比率は比較的小さい。全体的に見れば、我々の結果は、多重債務の事例のほとんどが、生産的な目的の為のクレジットに対する大きな需要を満たす「持続可能な」もしくは、「支払い能力がある」重複したローンであることを示した。

キーワード: マイクロファイナンス機関、家計債務、マクロビジネス、バングラデシュ

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