Impact of seasonality-adjusted flexible microcredit on repayment and food consumption : experimental evidence from rural Bangladesh

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Impact of Seasonality-adjusted Flexible Microcredit on Repayment and Food Consumption: Experimental Evidence from Rural Bangladesh

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March 2014

Abstract

The mismatch between credit repayments and income seasonality poses a challenge for microfinance institutions (MFIs) working in developing countries. For instance, in northern Bangladesh, income and consumption downfalls during the lean season after the transplanting of major paddy crops are a serious threat to a household's economy. Poor landless agricultural wage laborers suffer the most owing to this seasonality as they face difficulties in smoothing their consumption. However, in designing microcredit products, MFIs do not usually provide flexibility or seasonal adjustment during the lean season. This is mainly because MFIs are afraid that such flexibility might break the repayment discipline of borrowers, resulting in higher default rates. We thus conducted a randomized controlled trial in 2011–12 in northern Bangladesh to empirically test whether seasonality-adjusted flexible microcredit leads to an increase in repayment problems for MFIs as well as whether it can increase and stabilize consumption of borrower households. Our results suggest no statistically discernible difference among the treatment arms in case of default, overdue amount, or repayment frequency. On the other hand, we find no positive impact of repayment flexibility on immediate food consumption during the period of seasonality, except for in-kind full moratorium treatment group. After a year of initial intervention, however, we see positive changes in food intake during the lean season. Thus, our preliminary results are in favor of seasonality-adjusted flexible microcredit.

Keywords: Microcredit, Default, Seasonality, Consumption Smoothing, Bangladesh.

JEL classification: G21, O16, D12.

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1. Introduction

Given the current global move to fight poverty and hunger, it is important to understand the seasonal dimension of the poverty and hunger nexus, which regularly and repeatedly affects the poor in developing countries. Agriculture-dependent rural poverty can be linked to such distinct crop-cycle-based seasonality, and it becomes more severe with adverse periodic climatic conditions that might lead to poor-quality harvests or outright crop failure (Chambers et al. 1981). Moreover, inadequate access to formal credit and insurance products further traps people in chronic and inter-generational poverty, which is very difficult to tackle with general public-policy measures and social safety-net approaches.

For example, in Bangladesh, the term "seasonality" is associated with a seasonal food deprivation phenomenon known locally as *monga*; it is most common in northern Bangladesh (Khandker and Mahmud 2012). Rural life in Bangladesh revolves around the agricultural cycle, which is characterized by three crop seasons that are in turn based on three categories of rice: *aus* (April–August), *aman* (July/August–November/December; traditionally the most important paddy crop), and *boro* (December/January–April). Owing to this cycle, two major seasonal deficits occur: one from late September to early November and the other from late March to early May. With the widespread expansion of *boro* cultivation in recent years, the incidence of the lean period in March–May has significantly declined. However, the lean season in September–November, which follows the transplantation of the *aman* crop, still affects most parts of the country, especially northwest Bangladesh (Khandker and Mahmud 2012). Almost no alternative agricultural activity takes place in this period, and the nonagricultural sector cannot sufficiently absorb the seasonally unemployed labor.

During *monga*, drastic drops in employment-led income constitute the major reason for reduced food consumption; this phenomenon is well documented in the literature (e.g., Rahman and Hossain 1995). The lack of income and alternative means for earning limit the population's purchasing power, and this situation cannot be mitigated by the minuscule amounts of assets and savings that poor households typically carry. Anecdotal evidence suggests that, on average, the number of meals consumed drops significantly during *monga* and that families having young and elderly members suffer the most. The absence of a functional credit market prevents households from smoothing their consumption (Pitt and Khandker 2002). As a result, many individuals borrow from landlords or informal moneylenders—both of whom tend to charge very high interest rates—and subsequently fall into a debt trap.

Given this status quo, various coping strategies have emerged among the *monga*-affected people of northern Bangladesh. Other than borrowing from informal sources that charge high interest rates, common coping strategies include advance sales of labor (Khandker and Mahmud 2012), the purchase of household essentials on credit, skipping meals during the lean season

(Berg and Emran 2011), and seasonal migration (Shonchoy 2011). Of these, temporary seasonal migration to urban areas appears to be a relatively practical and rational strategy, as individuals can move from rural areas to nearby urban areas or cities for a short period to earn a livelihood during the lean season. However, such a migration strategy is not suitable for everyone, owing to, for example, family constraints (especially among households with female or disabled heads that may be unable to migrate during the lean season); additionally, credit and financing constraints, a lack of networking, and asymmetric information problems limit individuals' ability to migrate (Bryan et al. 2012).

One recent policy development in developing countries is the emergence of microfinance institutions (MFIs) that focus on poverty alleviation. It is argued that, given access to even small amounts of credit, entrepreneurs from poor households will find opportunities to engage in viable income-generating activities (IGA)—many of which will be secondary to their primary occupations—and thus ameliorate poverty themselves. According to the Microcredit Summit Campaign, as of 2011, there were 205 million microcredit clients[1], more than 110 million of whom were women. In 2006, Mohammad Yunus and the Grameen Bank were awarded the Nobel Prize for Peace for their contributions to poverty reduction, especially in Bangladesh. However, among academics, there is no consensus regarding the impact of microcredit on income improvement and poverty reduction (Banerjee et al. 2009). Various studies on the impact of microcredit in developing countries have found evidence of consumption smoothing, asset building (Pitt and Khandker 1998), and poverty reduction (Khandker 2005). Conversely, using the same data set as Pitt and Khandker (1998), Morduch (1999) finds that the average impact of microfinance is "nonexistent."

A major drawback of the microcredit framework is its rigid loan repayment rules (Karlan and Mullainathan 2007). Nearly all loan contracts include fixed repayment schedules, which involve equal weekly payments along with a high interest rate. However, MFIs work with poor, rural people who usually have uncertain and infrequent incomes; these circumstances make it very difficult for them to maintain such rigid weekly loan repayments. Especially during the lean period—when there are no jobs available in the rural agricultural sector—it can be very difficult for the poor to generate income, let alone comply with a loan repayment scheme; indeed, it is an understatement to say that rigid weekly repayments during the time of seasonal hardship exacerbates their misery. It was found that during *monga*, households take extreme measures—such as selling productive assets (Khandker and Mahmud 2012) or borrowing from loan sharks charging extraordinarily high interest rates—to maintain a clean record of repayment and ensure access to future microcredit loans from MFIs.

Using primary data from rural households in Bangladesh, Shonchoy (2009, 2011) shows

[1] http://www.microcreditsummit.org

that during the lean season, ceteris paribus, access to microcredit does not increase the income levels of individuals relative to those with no access to credit. In addition, at the time of survey, Shonchoy (2009, 2011) found no MFI that operated a well-targeted microfinance program solely dedicated to tackling seasonality issues such as *monga*. Given that seasonality in northern Bangladesh is historically well known, it is particularly puzzling that no leading microcredit product, save for PRIME intervention by PKSF[2], has been designed to mitigate the effects of seasonality by providing some form of moratorium of loan repayment during *monga*.

The mismatch between credit repayments and income can create serious distortions that deepen the debt trap for some people, especially if they adopt extreme measures to repay loans on a weekly basis during the lean period. In this study, we examine whether these distortions are inevitable. If MFIs allow flexibility in their microcredit repayment schedules in times of uncertain income during lean periods, this may improve the livelihood of the poor, provide them with greater flexibility and mobility, and in turn improve their capacity to repay the loan. Currently, MFIs are reluctant to relax their loan repayment rules; they seem to fear that allowing a moratorium on a weekly repayment scheme during the lean period may adversely affect debt repayment discipline. If given seasonal adjustment in repayment, borrowers might become behaviorally accustomed to making lower or no repayments, even when the payments are required, ultimately leading to lower recovery rates or higher default rates.

Given this trade-off, it appears that these issues can be appropriately addressed through a field experiment featuring a randomized controlled trial (RCT). Numerous RCT studies have been undertaken in microfinance-related research, which covers a wide range of topics including the impact of microfinance (Banerjee et al. 2009), weekly versus monthly repayments (Field and Pande 2008, Field et al. 2012), group versus individual liability (Giné and Karlan 2011), random variations in meeting frequency (Feigenberg et al. 2011), and variance in a loan's term structure (Field et al. 2013).

Despite this potential, rigorous evaluation of the impact of such seasonality-adjusted flexibility on microcredit design is lacking in the literature. Among the few existing studies, Shoji (2010) evaluates the effectiveness of Bangladeshi microfinance following the introduction of a contingent repayment system beginning in 2002; this system allowed affected members to reschedule savings and installments during times of natural disaster. Using evidence pertaining

[2] Programmed Initiatives for Monga Eradication (PRIME) was introduced in 2006 by Palli Karma–Sahayak Foundation (PKSF), a microcredit wholesaler and umbrella organization in Bangladesh. Under the PRIME scheme, individual nongovernment organizations (NGOs) receive credit facilities with "flexible" terms, under which the NGOs are free to negotiate credit amounts, repayment schedules, and frequency of meetings with the beneficiary as well as impose completely different sets of schemes upon various borrowing groups. While this is ideal for beneficiaries to some extent, it is not easy to evaluate flexibility in terms that improve the accessibility of beneficiaries to microfinance, performance in IGA, or the livelihoods of their families.

to flooding in 2004 and on the basis of an instrumental variable approach, Shoji finds that rescheduling serves as a safety net by substantially decreasing the probability of borrowers skipping meals in response to negative shocks, and this effect was even more pronounced on the landless and women. Furthermore, if we focus on studies in the context of *monga*-related seasonal deprivation in northern Bangladesh, we find a similar dearth of qualitative research. Khandker and Mahmud (2012) use nonexperimental data to analyze the correlates of seasonal deprivation while focusing on social protection programs and microcredit. In India, the neighboring country of Bangladesh, Czura et al. (2011) examine the impact of repayment flexibility by undertaking a randomized experiment with dairy farmers and show that repayment flexibility contributed to consumption smoothing as well as enhanced demand for credit. Apart from this study, we are unaware of any rigorous study on the impact of seasonality-adjusted repayment flexibility in South Asia based on an RCT design.

We thus initiated RCT experiments in northern Bangladesh in early 2011. This study elucidates the mismatch between seasonality and the terms of microcredit, and clarifies the impact of seasonality-adjusted microcredit. In our RCT design, our counterpart NGO first formed typical microfinance groups from randomly chosen villages. Borrowers were then provided with credit and began making weekly repayments after a short, two-week grace period. For a random subsample of these borrower groups, the repayment schedule was relaxed in two ways during the designated *monga* period. Under the first treatment, borrowers were given a temporary moratorium, while under the second treatment, the repayment scheme was changed to monthly repayments during *monga*.

We surveyed 1,440 households belonging to both borrower groups before (baseline) and after one year of intervention (endline). We also executed a short *monga* survey during the *monga* period in 2011 and 2012 to understand the severity of seasonal conditions. Using both survey and experimental methods, we empirically analyze the impact of the flexibility schemes on repayment and consumption. As a preview of the results, we find no statistically discernible difference between the treatment arms in case of default, overdue amount, or repayment frequency, while we find a strong positive impact of repayment flexibility on food consumption, among other seasonality-affected variables. We believe that our study contributes new insight into the consequences of flexible microcredit that is both geographically and seasonally adjusted to help the vulnerable and lean season-affected poor cope better with periods of hardship.

The rest of the study is organized as follows. Section 2 describes our RCT design and field surveys. Section 3 investigates the impact of repayment flexibility on borrowers' repayment behavior, while Section 4 investigates its impact on consumption by borrower households. Section 5 concludes.

2. Experimental Design for Flexible Microcredit Trials

2.1 RCT Strategy

(1) Inflexible Microcredit as the Control

A typical Grameen-style microcredit scheme proceeds as follows (Armendariz and Morduch 2010): individuals eligible for microcredit first form a group wherein members are expected to help each other in times of difficulty. Not all members can borrow immediately. Usually, only some members are offered credit after all members have saved a small amount of money on a regular basis; the rest are given credit after the first borrowers successfully repay several installments and all members have continued to save the same small amount on a regular basis. Weekly repayments begin without a long grace period. With typical Grameen-type microcredit, the first lent amount is small and is to be repaid in 50 weekly installments within 12 months.

Several rationales have been offered for this rigid repayment schedule (Armendariz and Morduch 2010). The success of frequent repayment in minimizing default and delay could be attributed to the early warning mechanism, the lender's capture of information vis-à-vis the income flow of the borrower, and the borrower's commitment to save regularly. Repayment in group meetings in front of others also drives regular repayment by borrowers who prefer to maintain their reputation within the village.

Probably because of these mechanisms, classic Grameen-type microcredit has been successful in maintaining high repayment rates.[3] However, regularly attending weekly meetings puts a high burden on the borrowers in terms of the opportunity costs of their time and financial stress (Field et al. 2012). Borrowers are thus demanding the relaxation of several classic Grameen-type features. Academic research has responded to this request by attempting to identify the key element in guaranteeing high repayment rates. For example, using a field experiment approach, Giné and Karlan (2011) evaluate the impact of removing group liability in the Philippines; they find no adverse impact on repayment as long as public and frequent repayment systems were maintained. On the other hand, recent studies based on RCT studies that compare weekly versus monthly installments show mixed results. In India, Field and Pande (2008) show no difference between microfinance schemes with weekly and monthly repayment frequencies as long as repayments were made in public meetings. The same RCT also shows that a change from weekly to monthly repayment greatly reduced borrowers' financial stress (Field et al. 2012). In contrast, in Indonesia, Feigenberg et al. (2011) find that repayment performance was better with weekly rather than monthly repayments.

Given this background, we adopt the following borrowing and repayment scheme as the

[3] See Kurosaki and Khan (2012) for an exceptional case wherein an MFI suffered from high default rates despite adopting a Grameen-type credit scheme. In their case, strategic default prevailed among borrowers owing to weak enforcement of the contingent renewal rule.

control. Borrowers obtain individual credit contract of BDT 3,000[4] in a group setting with individual liability and begin repayment after a short, two-week grace period. Repayments are made in 45 installments, each for BDT 75 (except for the last one, which is BDT 60), implying a gross interest payment of BDT 360 spread throughout the borrowing period of approximately one year. Each weekly installment is to be repaid by the borrower at a group level weekly meeting. The borrower is obliged to attend the weekly meeting, even during the *monga* period. This design of traditional or inflexible microcredit scheme is denoted as the "Control."

(2) Flexible Microcredit as the Treatment

During the *monga* period, microcredit borrowers may face difficulties in obtaining the money needed for regular repayment. To facilitate the demand for repayment flexibility within this context, the treatment relaxes the repayment schedule in two ways during the *monga* period, which in this study is designated as September 20–December 20.

Under the first treatment, "Flexible 1," a temporary moratorium is applied to repayments during the designated *monga* period. During this moratorium, households within the Flexible 1 groups do not make any payment. After the *monga* period, borrowers begin paying BDT 100 per week, making their total repayment amount and repayment period identical to those of the Control group.

As a variant of the first treatment, one-third of those treated with Flexible 1 also receive IGA support. We refer to this treatment as "Flexible 1 + IGA." Under IGA support, instead of providing cash, we provide microcredit borrowers with a productive asset of their choice, within the credit amount, along with advice for utilizing the asset; no further subsidy is provided.

Under the second flexibility treatment, the repayment schedule is changed to feature three monthly installments of BDT 300 each during the designated *monga* period, instead of 12 weekly repayments of BDT 75 each. After the *monga* period, borrowers resume paying BDT 75 per week, ensuring that their total repayment amount and repayment period is the same as those of the control group. We refer to this treatment as "Flexible 2." This treatment arm provides less flexibility (in terms of loan repayment obligation) and better loan collection discipline than does Flexible 1.

(3) Randomization of Treatment Arms

To preclude unequal treatment among members within a group, we randomized the four treatment statuses at the borrower–group level. Since our counterpart NGO usually forms one group in one village, our randomization took place at the village level.

[4] BDT 100 is equivalent to approximately JPY 99 or USD 1.22; BDT 3,000 therefore equals approximately USD 37.

Of the 90 villages under potential treatment by the counterpart NGO, we randomly selected 12 for Control, 24 for Flexible 1, 12 for Flexible 1 + IGA, and 24 for Flexible 2. In the randomization, we stratified the villages on the basis of their distance from the closest bus station and the location type of the village (see the next subsection).

The reason for the larger number of villages under Flexible 1 and Flexible 2 than under Flexible 1 + IGA and Control was that our initial design had another experiment dimension, distinguished by the timing of when borrower groups would be delivered the information about the repayment schedule being relaxed. The intention was to create exogenous variation in the information structure, as implemented by Karlan and Zinman (2009) in the context of consumer credit in South Africa. However, owing to delays in group formation and loan disbursement (our schedule of experiment unfortunately overlapped with the holy month of Ramadan), the exact timing of the announcement became similar across all groupings. Therefore, in analyzing the impact of our experiment, we eventually merged the two types of treatments (initially designed as "surprise" and "pre-announced flexibility").

In each village, our counterpart NGO formed a borrower group known as *samity*, comprising 20 members who satisfied the NGO's microcredit criteria and who had voiced interest in receiving microcredit. Loan officers then recorded member names in the *samity* formation book. In the book, each *samity* member was assigned a number in ascending order; members assigned 1–15 were to be offered credit, while those assigned 16–20 were kept in the group as observers. This randomization design was not known to *samity* members nor to the loan officers prior announcement of the treatments, and it thus implies the following sample distribution: there are 72 sample villages and 1,440 sample households, one-sixth or one-third of which fall into one of the four treatment arm categories; three-fourths of the sample households (1,080 households) were actual borrowers of microcredit.

2.2 Implementation of Surveys and RCT Interventions

(1) Counterpart NGO and Study Area

Our counterpart NGO is Gono Unnayan Kendra (GUK), which operates in the greater Gaibandha area, comprising five districts in northern Bangladesh: Gaibandha, Kurigram, Rangpur, Lalmonirhat, and Nilphamari. It has offices in all 32 *upazillas* (subdistricts) in Gaibandha district and five offices in the Kurigram district. Prior to this study, GUK had limited experience in running traditional microfinance; on the other hand, it had already been a promoter of flexible microfinance in combination with its reportedly successful "asset transfer" program, which was financed by international donors. However, since its asset transfer program contains a large subsidy component, it is not clear how much of its success vis-à-vis outreach to the ultrapoor can be attributed to their flexibility in repayment design *per se*. For instance, under

one of GUK's programs, ultrapoor beneficiaries were provided with a livestock animal and were required to return the offspring or an equivalent monetary value. This design also implies a significantly longer grace period than that in traditional microcredit.

In the study area, poverty is concentrated in so-called *char* areas. *Char* literally means "river island" and is an area of land regularly formed from river bed sediment eroded by major rivers in Bangladesh. People living on *char* islands tend to be poorer and more vulnerable to various types of natural disasters (Khandker and Mahmud 2012). Therefore, our experiments distinguished between *char*, river basin, and river adjacent inland areas (hereafter "Inlands") where our target group—i.e., the poor and vulnerable—live. More concretely, in our randomization, we stratified villages on the basis of their distance from the closest bus station and the village location types (*char*, river basin, or inland areas). Table 1 shows the distribution of our final sample villages. Forty-five of the 72 sample villages (62.5% of the sample) were in Gaibandha district; the rest (37.5%) were in the Kurigram district. Eighteen of the 72 sample villages (25.0% of the sample) were in *char* areas, 42 (58.3%) were in river adjacent inland areas, and the remaining 12 (16.7%) were in river basin areas.

(2) Schedule of Surveys and Experiments in the Field

Figure 1 shows the timeline of our surveys and experiments. In the first half of 2011, we visited Gaibandha and GUK to undertake preparatory investigations and make logistical arrangements. After our agreement with GUK regarding the research design, village-level randomization was implemented, followed by the formation of a *samity*. The baseline survey (Panel 1) of 1,440 households was executed in July–September 2011; it captured detailed information on factors such as household composition; education; health, including the weights of the children; occupation; assets; income; migration experiences; agricultural production; nonagricultural enterprises; saving; credit; debt; and *monga* coping.

[Figure 1 about here]

In the first three weeks of September 2011, microcredit of BDT 3,000 was issued to three-fourths of our sample households. Our initial plan was to issue the microcredit earlier. However, due to the holy month of Ramadan and the subsequent festival of Eid-ul-Fitr, disbursement was delayed. As a result, households who received flexible microcredit entered the designated *monga* period before the due date of their first repayment installment. Nevertheless, GUK was able to collect monthly installments (Flexible 2) and larger weekly installments in the post-*monga* period (Flexible 1) without experiencing serious delays or nonrepayment problems. As designed, in all villages, 15 *samity* members were issued credit (i.e., three-fourths of *samity* members).

After the RCT experiments began, three additional surveys were executed: the first *monga*

survey (Panel 2) in November 2011, the follow-up survey (Panel 3) in July–August 2012, and the second *monga* survey (Panel 4) in November–December 2012. Panel 1 (the baseline survey) and Panel 3 were based on the long questionnaire, which covers all aspects of the household economy; Panel 2 and Panel 4 were based on the short questionnaire, which focused on how the household was coping with ongoing *monga* difficulties. Panel 1 captured the state of affairs *before* our interventions, Panel 2 described the household economy *during* our interventions, and Panels 3 and 4 collected information *after* our RCT experiments. In Panels 1 and 2, 1,440 households were surveyed. In Panels 3 and 4, 1,422 of the initial 1,440 households were resurveyed, implying an attrition rate of 1.25%.

In addition, administrative data for all non-attrited borrowers (i.e., 1,068 borrowers) were obtained from GUK. This data set provides detailed and precise information on repayment behavior.

Table 1 shows the distribution of our final sample households. Data for the full set of 1,440 household observations surveyed in Panel 1 are utilized as the baseline information. Data for the subset of 1,080 borrowers are utilized in Section 3, in which the impact of flexibility on repayment behavior is investigated. Data for the subset of 1,422 Panel 3 households are utilized in Section 4, in which the impact of flexibility on food consumption is investigated.

[Table 1 about here]

2.3 Validity of Randomization

As our randomization was properly implemented, we expect no systematic difference in pre-intervention characteristics at the village level across treatment arms. To test this, we estimated the following village-level regression model using the baseline survey data:

$$X_v = b_0 + b_1 D_{1v} + b_2 D_{2v} + b_3 D_{3v} + u_v, \quad (1)$$

where X_v is a pre-intervention variable for village v, D_{jv} is a dummy variable for treatment j (j = 1, 2, 3; i.e., Flexible 1, Flexible 1 + IGA, and Flexible 2, respectively), and u_v is a zero mean error term. If the null hypothesis that $b_1 = b_2 = b_3 = 0$ is not rejected, the balance test is passed.

Similarly, we expect no systematic difference in pre-intervention characteristics at the household level across treatment arms.[5] To test this, we estimated the following household-level regression model using the baseline survey data:

[5] A difference might exist at the household level across treatment arms, as treatments were randomized at the village level. For example, Czura et al. (2011) state that "Differences in client characteristics are due to the fact that randomization occurred at the group level and groups form according to socioeconomic characteristics" (p.10).

$$X_h = b_0 + b_1 D_{1h} + b_2 D_{2h} + b_3 D_{3h} + b_4 D_{4h} + u_h, \quad (2)$$

where X_h is a pre-intervention variable for household h, D_{jh} (j = 1, 2, 3) is a dummy variable indicating that household h was provided with flexible microcredit under treatment arm j (j = 1, 2, 3; i.e., Flexible 1, Flexible 1 + IGA, and Flexible 2, respectively), D_{4h} is a dummy for nonborrower households, and u_h is a zero mean error term. If the null hypothesis that $b_1 = b_2 = b_3 = 0$ is not rejected, the balance test is passed. If no selection bias occurred in assigning borrower versus non-borrower households within each *samity*, we expect b_4 to be zero as well. Because randomization was implemented at the village level, and sample households were drawn using the village as the primary sampling unit, we used robust standard errors for b's clustered at the village level in order to test the null hypotheses using Equation (2).

Appendix Table 1 shows the results for village-level variables. At the village level, the distance from the closest bus station to the village, the dummy for a *char* village, and the dummy for an inland village were perfectly orthogonal to the treatment, confirming our randomization strategy. For all six variables that represent village-level public facilities (bazar, college, Hindu temple, town, bus stand,[6] and railway station), the null hypothesis that $b_1 = b_2 = b_3 = 0$ was not rejected even at the 10% level. In this sense, the balance test at the village level was passed, suggesting that our randomization strategy at the village level was properly implemented.

Appendix Table 2 shows the regression results for household-level variables using four variables characterizing the household head, six variables characterizing household members, five variables characterizing land holdings, and five variables characterizing liquid asset ownership. All variables were compiled from the baseline survey data.[7] Of the 20 variables analyzed in Appendix Table 2, in only two cases (i.e., ratio of adults in the household roster and literacy rate of adult females) was the null hypothesis that $b_1 = b_2 = b_3 = 0$ rejected at the 5% level; in only three cases (i.e., household size, average age of members, and ratio of adults) was the null hypothesis that $b_1 = b_2 = b_3 = b_4 = 0$ rejected at the 5% level. If we individually assess the significance of b_1, b_2, and b_3, again we find that only one case (i.e., b_3 for ratio of adults in the household roster) was statistically significant at the 5% level. At most, the balance check only marginally failed for the four variables of household size, average age, adult ratio, and adult female literacy rate. We can therefore safely conclude that these rejections occurred by chance and that randomization was properly implemented. As shown in Section 4, the

[6] The "bus stand" here refers to the availability of any bus stand in the village, while the "bus station" used in our randomization strata refers to the distance from the closest bus station where medium- and long- distance bus services are available.

[7] To be more precise, owing to data entry problems, we used Panel 3 data for the household demography variables (age was adjusted by one year), supplemented by Panel 1 data for the 22 attrition households. For land and assets, we used Panel 1 data.

nonrandom components at the household level do not affect our impact analysis (see the robustness check undertaken by controlling for these baseline household-level variables).

2.3 Issues with Attirition

For the impact analysis, we use the GUK administrative data as well as microdata collected in the resurvey (Panel 3, July–August 2012) and the second *monga* survey (Panel 4, November–December 2012) of the 1,440 households included in the baseline survey. The resurvey covered 1,422 households, implying an attrition rate of 1.25%. Although this rate is low, we need to consider the possibility of attrition bias, if the attrition happened in a nonrandom manner. In the third panel of Table 1, we show the distribution of resurveyed households across treatment arms. As shown in the table, attrition occurred among households in villages under Flexible 1, Flexible 1 + IGA, and Flexible 2, while attrition did not occur among households in the Control villages. According to chi-squared tests, the dropout dummy and treatment status were independent.[8] Furthermore, the village and household characteristics found to be marginally correlated with the treatment did not have any explanatory power when we regressed the dropout dummy on these variables (see Appendix Table 3). Therefore, it is safe to assume that the analysis used in this paper using resurvey data and administrative data does not pose any concern of attrition bias.

3. Impact of Flexibility on Repayment Behavior

In this section, we examine repayment behavior to test whether seasonal adjustment in microcredit affects the default rate and repayment delays. Through this examination, we assess the general claims by the NGOs vis-à-vis a moratorium during *monga*.

3.1 Extent of Default and Absence in Weekly Meetings

(1) Definition and Summary Statistics of Empirical Variables

We compiled two sets of empirical variables that characterize the extent of repayment problems. Table 2 shows the definitions and summary statistics of these variables.

The first set of empirical variables is based on information concerning a borrower's payment due at the end of a loan cycle. The first variable, *default*, is defined as a dummy variable taking the value of one if the overdue amount is positive, and zero otherwise. On average, 73% of borrowers had a positive overdue amount at the end of the loan cycle. The

[8] We first tested the independence between the attrition dummy and five household status (Flexible 1, Flexible 1 + IGA, Flexible 2, Control, and Nonborrower). The chi-squared statistics with the degree of freedom (dof.) at 4 was 4.257, whose *p*-value was 0.370. We then tested the same null excluding Control households as there was no attrition among this group. The chi-squared statistics with dof at 3 was 1.4654, whose *p*-value was 0.690.

second variable, *overdue*, is a continuous variable for the absolute amount of delinquency; it had a mean of BDT 556.14. We can convert this into a relative number by dividing it by the total due amount (BDT 3,360). On average, the overdue amount was equivalent to 17% of their required accumulated amount at the end of the loan cycle. However, the same calculation adjusted with savings (where total saving amount is adjusted with the due amount, six months after the schedule loan cycle) indicates that on average, around 51% of people had a positive overdue with the average amount outstanding being 9.52% of the required accumulated amount. Therefore, although the incidence of default was frequent, the overdue amount was, on average, small in both absolute and relative terms.

The second set of empirical variables is based on information on the number of weekly meetings missed by borrowers. MFIs typically impose a strict loan collection regime, wherein each borrower must pay weekly loan installments of equal amounts. However, in our experimental design, we instructed GUK not to impose strict loan repayment discipline. Instead, we instructed GUK to conduct weekly household visits, hold weekly meetings, and inform each borrower of the cumulative due amount. This was undertaken, in particular, to observe the loan collection pattern and behavior of loan repayment among borrowers. In our definition, "missed weeks" includes only those cases wherein the borrowers did not pay at all[9] and had not earned any credit toward one or more missed weeks of payments. On average, borrowers missed payments by about six weeks under this definition. The average ratio of total missed weeks to total loan collection weeks (variable *rmiss*) was 0.18, or 18%. Therefore, although the overdue amount was small on average, borrowers missed meetings frequently, at an average rate of one in six.

As discussed in Section 2, our experimental design used as randomization strata three distinct geographical properties: the *char*, river basin, and inland areas. Borrowers in *char* areas had more repayment difficulties than those in the other two areas if we focus on two variables for overdue amount at the end of a loan cycle (*default*, and *overdue*). As *char* households typically face greater difficulties in ensuring a regular flow of income and recurrently suffer as a result of seasonal adversity, we expect *char* households to have more difficulty making regular repayments compared with other households. This expectation was met regarding the overdue amount and default status, as depicted in Figure 2.

[Figure 2 about here]

(2) Seasonality

One important aspect of this loan repayment analysis is understanding the impact of seasonality on total collections and weekly repayments. To examine any pattern of seasonality, Figure 3 plots monthly loan collections and missed weeks information.

[9] Partial payment would not result in missed weeks.

Most underpayments occurred in the off-harvest periods (e.g., September–October and March–April), reflecting the income-smoothing problem faced by borrowers during these months. However, the drop in the repayment ratio during these months was not very large. In contrast, the months of December–January and May–June were associated with higher than average repayments. In December, overpayment was recorded on average. This seasonality pattern was found in the *char*, inland, and river basin areas.

To understand the discipline framework imposed by the MFIs, the aspect of seasonality in terms of the number of weekly meetings missed is informative. As shown in Figure 3, borrowers tended to miss more weekly payments as they reached the end of the loan cycle, compared with at the beginning of the loan collection period. One noteworthy observation is that the ratio of missed weeks to the total monthly due weeks was lower in November–December and in May, which could be attributed to the paddy harvest cycle, as previously observed. A similar pattern and trend are observed for all three regions.

3.2 Impact of Flexibility on Default and Absence in Weekly Meetings

(1) Econometric Model

Since our treatment assignment was randomly distributed (see Section 2) to empirically complement our discussion of the repayment analysis, we can use ordinary least squares (OLS) regressions to evaluate the impact of various treatments on numerous outcomes. More precisely, we estimated

$$Y_h = b_0 + b_1 D_{1h} + b_2 D_{2h} + b_3 D_{3h} + u_h, \quad (3)$$

where Y_h is the outcome variable for household h, D_{jh} (j = 1, 2, 3) is a dummy variable indicating that household h was provided flexible microcredit under treatment arm j (j = 1, 2, 3; i.e., Flexible 1, Flexible 1 + IGA, and Flexible 2, respectively), and u_h is a zero mean error term. Equation (3) was applied to all non-attrited borrowers in the sample so that the number of observations totaled 1,068. Because the randomization was implemented at the village level and sample households were drawn using the village as the primary sampling unit, we tested the null hypothesis using robust standard errors for b's clustered at the village level.

The coefficient b_0 indicates the repayment behavior of control borrowers under the traditional, inflexible microcredit scheme. If the null hypothesis $b_1 = b_2 = b_3 = 0$ is rejected, we investigate which flexibility scheme was more effective by comparing the three parameters of b_1, b_2, and b_3. If the null hypothesis is not rejected, the coefficient b_0 indicates the repayment behavior of all borrowers on average. Therefore, for convenience, the tables that show regression results present the estimate for the intercept in the first row, which is readily

interpreted as the estimate for the overall mean if all coefficients on the dummy variables are zero.

(2) Regression Results

Table 3.1 shows the regression results for the microcredit repayment behavior of borrowers under the different treatment groups by using indicator variables, namely, the total overdue amount, overdue amount as a percentage of total due amount, overdue amount after six months of the loan cycle, and overdue amount adjusted with savings after six months of the scheduled loan cycle. For each variable, the odd column reports the basic regression results controlling for stratification, while the even column reports the results from a specification with additional control for household observables. No statistically significant difference exists among the treatment groups compared with the control group for "traditional microcredit." Furthermore, Flexible 1 groups show more favorable point estimations than other groups (and all other treatment groups in column 5 onwards), albeit this is not statistically significant.

[Tables 3.1 and 3.2 about here]

To understand the repayment discipline and commitment behavior of various groups, Equation (3) was re-estimated using the binary indicator variable of loan discipline, wherein the variable takes the value of one for having one missing week and zero otherwise. Table 3.2 shows that on average, the Control group (traditional, rigid weekly repayment scheme) had difficulties with repayment discipline framework, as expected. If we emphasize the number of total missed weeks as a percentage of total due weeks (Columns 4−5) and the number of total missed weeks (Columns 5–6), our results do not show statistically significant differences among treatment groups. This suggests that flexibility of full moratorium during the *monga* period did not result in reducing repayment discipline, thus contradicting the MFIs' fear.

Now, we continue our discussion by highlighting the indicator variable *default*, a dummy variable equal to one if a borrower's due payment at the end of the loan cycle is positive, and zero otherwise. As shown in Columns (1)–(2) of Table 3.3, the difference between the groups was not statistically significant at any level. The null hypothesis that $b_1 = b_2 = b_3 = 0$ was not rejected at the 10% level, indicating that the flexibility in our RCT did not result in higher default rate.

[Table 3.3 about here]

We found that neither seasonality nor spatial heterogeneity (*char*, river basin, and inland) affected the regression results reported in Columns (1)–(2). The rejection of the null hypothesis that $b_1 = b_2 = b_3 = 0$ was found to be robust to other specifications that allow for seasonality or spatial heterogeneity.[10] We also examined the same default indicator by employing the

[10] The robustness check results are not reported here, but are available upon request.

repayment adjustment technique used by our partner MFI—adjustment of overdue amount with weekly savings amount at the *samity*, six months after the scheduled loan cycle, as reported in Columns (3)–(4). These results are entirely consistent with earlier findings given in Columns (1)–(2). In the last two columns of Table 3.3 (Columns 5−6), we estimated the impact of flexibility on the total saving amount of the borrowing groups. Flexible 1 borrowers, on average, were found to have saved significantly less than the other two groups, which probably indicates that Flexible 1 groups invested their credit in investments that did not immediately generate sufficient revenue that allowed them to save for the weekly meetings.

The loan cycle period for experimentation ran from September 2011 to July 2012. Unfortunately, in May 2012, our survey area suffered from periodic flash floods, which affected most geographical areas. However, the effect was considerably more pronounced in *char* and river basin areas. As a result, flood-affected borrowers might have found it difficult to maintain the repayment discipline stipulated by our partner MFI and may have had higher delinquency rates, which resulted in no significant differences between the borrowing groups. To check whether this is the case, in Table 3.4, we estimated regression with the loan discipline and default indicators of our borrowing groups before the occurrence of the floods (up to May 2012 repayment records). These results are consistent with earlier findings, and we have found no statistical difference among the groups and across the estimations.

[Table 3.4 about here]

During our study period, some *samitys* resisted the weekly repayment after the *monga* period and forced loan officers to accept monthly repayments after the flexible period, rather than weekly repayments as designed. Flexible 2 groups were found to have engaged in more systematic resistance than other groups, perhaps owing to their behavioral adjustment to monthly repayment during the *monga*.

(3) Subjective Evaluation of Flexible Microcredit by Borrowers

To understand borrowers' reactions to the current repayment flexibility experiment as well as their feedback to it, we administered a satisfaction survey, following the work of Devoto et al. (2012), which asked existing clients if they had complaints, problems, or difficulties with the assigned schedule of repayment. The survey was conducted as a part of the first *monga* survey (Panel 2) in November 2011. In the current study, if the borrower responded positively, we categorized the answer as "satisfied" in the satisfaction index, and as zero otherwise.

Table 4 presents the regression result based on Equation (3). It clearly shows that borrowers under the Flexible 1 repayment scheme (complete moratorium of repayment during *monga*) were more likely to report positive satisfaction. Among the treatment arms, Flexible 1

had a higher level of satisfaction than the other groups, and this finding is consistent with our hypothesis. We conjecture that this satisfaction led borrowers to maintain discipline in repayment under flexible schemes.

[Figure 4 about here]

3.3 Summary and Discussion

In this section, we empirically analyzed repayment behavior among borrowers with access to various microcredit products assigned to them under the RCT-based field experimental framework. Using an RCT-based field experiment in northern Bangladesh, we randomly assigned seasonality-adjusted flexible microcredit and traditional rigid microcredit to various borrowing groups. Our results suggest no statistically discernible difference between the treatment arms in terms of default or overdue amounts, and these findings thus support the provision of flexible microcredit.

As mentioned in the introduction, our main motivation in introducing seasonality-adjusted flexible microcredit was to verify the rationales of MFIs working in northern Bangladesh for not providing flexibility in loan repayment during *monga*. The MFIs' reluctance is mainly due to their fear that such flexibility might break the borrowers' loan collection discipline, thus increasing the rate of loan default. When we introduced this experimental design, GUK, our counterpart NGO, strongly argued that the loan default rate would significantly increase in the moratorium group (Flexible 1): they thought that it would hamper loan discipline as well as affect financial behavior vis-à-vis the making of regular repayments. Some GUK executives also said that loan borrowers from the moratorium group might "run away" with the money. Our regression results clearly show that this fear is baseless. In contrast with the claims of Bangladeshi MFIs, we saw no statistically significant difference between treatment arms in terms of seasonality-adjusted flexible microcredit. For the treatment arm featuring a complete moratorium of weekly repayments (high-risk credit) and a change from weekly to monthly repayments during *monga* (low-risk credit), we found that borrowers did not show a statistically significant pattern of delinquency or lower frequency of repayments. Thus, these results do not uphold the MFIs' claims that such flexibility would lead to i) discipline problems or ii) repayment problems. It appears that even when imposing a high level of credit risk (Flexible 1) on our counterpart MFI, GUK did not face a level of delinquency statistically different from that seen among traditional groups (delinquency rates were 3.77 and 3.75% of the total due amount in the cases of traditional and Flexible 1 borrowing, respectively). In other words, even after allowing a moratorium during *monga*, we found that our counterpart NGO regained more than 95% of its targeted amount of credit with interest, meaning that this can be considered a

successful microfinance business model.

4. Impact of Flexibility on Household Consumption

In this section, we examine whether seasonal adjustment in microcredit affects food consumption levels of borrower households. Through this examination, we assess the welfare impact of a moratorium or less frequent repayment meetings during *monga*.

4.1 Data on Household Food Consumption

For the impact analysis regarding consumption, we use microdata collected in the resurvey (Panel 3, July–August 2012) and the second *monga* survey (Panel 4, November–December 2012) of the 1,422 households. Table 5 describes the qualitative measures of food consumption.[11] During *monga* 2011,[12] many households were not able to have three stomach-full meals each day. The average number of *num_mong1* was 2.1 meals per day, and this became as low as 1.67 meals if we focus on the worst days during *monga* (variable named *num_mong2*). A dummy variable that takes the value of one if a household could afford two or three meals per day, even during the worst period, is used as a measure of food safety (denoted as *safe_mong* in the table). Using this measure, 66% of the households were food secure during *monga* 2011. As other measures of food security, we analyze dummy variables for fish and meat consumption within a typical week during *monga* 2011 (denoted as *fish_mong* and *meat_mong*, respectively), indicating that 73% of sample households were able to eat some fish and hardly anyone could manage to consume meat during the *monga* of 2011.[13]

As shown in the middle panel of Table 5, food consumption situations recovered substantially after *monga*. The average number of stomach-full meals in a day during the normal, non-*monga* time in 2012 (*num_norm1*) was 2.85 meals a day; this number dropped slightly to 2.12 if we focus on the worst days during the same period (*num_norm2*). Using *safe_norm*, a dummy variable that takes the value of one if a household could afford two or three meals per day, even during the worst period, 88% of the households were food secure during normal non-*monga* times in 2012.

The last panel of Table 5 shows food consumption situations during *monga* 2012. Households again suffered from consumption irregularities, as in *monga* 2011, with the average

[11] Quantitative information on household consumption—such as total expenditure, including the imputed value of self-produced foods—is not available in our data set.

[12] Information on food consumption during *monga* 2011 was collected in the Panel 3 survey, which covered the entire *monga* period; this information, therefore, is not the same as that on food consumption, which was collected during *monga* 2011, i.e., in the Panel 2 survey in November 2011. The results reported in this paper remain qualitatively the same if we use the Panel 2 survey data instead.

[13] In the questionnaire, we also inquired about fish consumption. The absolute majority of sample households were able to eat fish in a month, even during *monga*. Given this lack of variation, we used meat as a measure of protein security.

number of *monga_foodHH* dropping to 2.08 meals per day, and becoming even lower at 1.35 meals if we focus on the worst days during *monga* 2012 (variable named *minimum_monga*). When surveyed again in 2012, one year after the initial intervention, 70% of the respondents reported that they suffered from food shortage during the *monga*.

Similar to the case for repayment behavior, food consumption variables are systematically correlated with geographical categories: *char*, inland, and river basin. Inland households had the highest mean for all six variables. This is as expected as households in inland areas away from rivers have better access to food markets than do households in *char* areas or close to rivers. Against our expectation, *char* households had higher means for five variables compared with river basin households, although the difference was small.

4.2 Impact of Flexibility on Household Food Consumption

(1) Econometric Model

Because the intervention was randomly assigned (see Section 2), to evaluate the impact on food consumption, we simply regressed the Panel 3 outcomes on the dummy variables for various treatments. More precisely, we estimated

$$Y_h = b_0 + b_1 D_{1h} + b_2 D_{2h} + b_3 D_{3h} + b_4 D_{4h} + u_h, \quad (4)$$

where Y_h is a post-intervention outcome variable for household h, D_{jh} (j = 1, 2, 3) is a dummy variable indicating that household h was provided with flexible microcredit under treatment arm j (j = 1, 2, 3; i.e., Flexible 1, Flexible 1 + IGA, and Flexible 2, respectively), D_{4h} is a dummy for nonborrower households, and u_h is a zero mean error term. If the null hypothesis that $b_1 = b_2 = b_3 = 0$ is not rejected, it indicates that the flexibility within our RCT had no impact. If this null hypothesis is not rejected while another null hypothesis that $b_4 = 0$ is rejected, it indicates that microcredit provision had an impact, regardless of flexibility. If the null hypothesis that $b_1 = b_2 = b_3 = 0$ is rejected, we investigate which flexibility scheme was more effective by comparing the three parameters of b_1, b_2, and b_3. Because the randomization was implemented at the village level, and sample households were drawn using the village as a primary sampling unit, we test the null hypothesis using robust standard errors for b's clustered at the village level.

Although randomization is likely to result in treatment and control households being similar across all variables, minor baseline differences can occur within a particular sample (see Appendix Tables 1–2). To address this, we added to Equation (4) a control for baseline variables associated with significant differences across treatment arms. We report on this as a robustness check. Other specifications using changes in outcomes between Panels 3 and 1 as dependent variables are left for future research.

As additional robustness checks, we estimated two further models. In the first, the last term in Equation (4), b_4D_{4h}, was allowed to have various slopes, depending on the village-level treatment type. If spillover effects from borrower to nonborrower households exist within a *samity*, and if such spillover effects possess systematic differences depending on the treatment arm assigned to the *samity*, nonborrower households could be heterogeneous across the village-level treatment arms. The extended model can accommodate this possibility. In the second model, we dropped the last term in Equation (4), b_4D_{4h}, and estimated the contracted model using only data on borrower households.

(2) Expected Signs of Parameter Estimates

To examine the impact of repayment flexibility on food consumption, we estimated Equation (4) using each variable listed in Table 5, as dependent variables. Theoretically, the impact of repayment flexibility on food consumption is indirect. Flexibility does not directly affect the ways in which households choose consumption. On the other hand, it indirectly affects consumption through income, price, and credit constraint effects.

We begin the discussion with the likely sign of b_4. We expect it to be negative, i.e., we expect that provision of microcredit increases food consumption. The first channel is the income effect. If microcredit enhances permanent household income by allowing households to allocate resources more efficiently, the resulting income increases should be reflected in higher levels of food consumption. This route should apply to each of the six dependent variables. The second channel is the price effect. If microcredit enhances the productivity of self-employment businesses and if labor market are imperfect, the shadow price of family labor should increase, which is likely to lead to more household resources being allocated to food (as the major input to human capital). However, an increase in the shadow wage might work in the *opposite* direction with regard to food consumption demand. Theoretically, the net impact can be either positive or negative, but in either case, the absolute value of the net impact is not likely to be large. The third channel is the credit constraint effect. By definition, the provision of microcredit to a household enhances its ability to smooth resource allocation across time. Since households anticipate *monga* suffering, reducing food consumption during *monga* might be a symptom of a binding liquidity constraint. If this is the case, we expect b_4 to be more negative when the dependent variables are food consumption during *monga* than during the normal time following *monga*.

If the flexibility arrangements examined in our experiments have similar magnitudes of income, price, and credit effects, we expect b_1, b_2, and b_3 to be zero. Alternatively, if Flexible 1 + IGA makes it more likely for borrower households to engage in self-employment businesses that yield immediate gains, then the income and price effects are likely to be larger for this

treatment than for others. If this is the case, we expect b_2 to be positive and larger than either b_1 or b_3. Regarding the liquidity effect, we expect Flexible 1 and Flexible 1 + IGA to have additional gains over Flexible 2, and for Flexible 2 to have additional gains over Control. This is because the repayment moratorium gives households greater freedom to allocate money across the 60 days of *monga* than does the inflexible, traditional microcredit scheme. Similarly, monthly repayments give households more freedom to allocate money across 30 days in a month during *monga* than does traditional microcredit. If this is the case, we expect $b_1 = b_2 > b_3 > 0$.

(3) Regression Results Using Panel 3 Data

The results regarding the impact of our RCT on food consumption using Panel 3 data on food consumption during the *monga* of 2011 are reported in Table 6. Regarding stomach-full meal consumption during *monga* 2011, as reported in Columns (1)-(2), the null hypothesis that $b_1 = b_2 = b_3 = 0$ was rejected at the 10% level. However, for the other consumption variables used for understanding the food intake behavior, as reported in Columns (3)-(10), the null hypothesis was not rejected. This indicates that the flexibility in our RCT had no impact on household-level food consumption behavior during *monga* 2011, expect for the in-kind full moratorium treatment group (Flexible 1+IGA). Examining individual parameters, none are statistically significant if we use the traditional cut-off threshold at the 5% level. In the equation for *num_mong1* (number of stomach-full meals per day during *monga*), parameter b_2 (the impact of Flexible 1 + IGA) is positive and statistically significant at the 5% level. The estimated parameter suggests that such borrowers were 19.1 percentage points more likely to have one more stomach-full meal during the *monga* of 2011.

[Table 6 and 7 about here]

Parameter b_4 was estimated with a negative sign (as expected) in all of the equations, but its absolute value was small; it was also statistically insignificant in all four equations if we use the traditional cut-off threshold at the 5% level. The results regarding the impact of our RCT on food consumption during normal, non-*monga* times in 2012 are reported in Table 7. When the number of stomach-full meals (*num_norm1*) and minimum stomach-full meals per day during these times (*num_norm2*) was used as dependent variables, all coefficients on the four dummy variables were small in terms of absolute values, however, the coefficient of Flexible 1 and Flexible 2 showed weak evidence of reduced meal consumption (Columns 1-2). On the other hand, when the same variable was transformed into a dummy for food safety during normal times (*safe_norm*), none of the treatment variables showed significance even at the 10% level. We further used indicator variables for meat and fish consumption during the normal period (*meat_norm* and *fish_norm*, respectively), reported in Columns (7)-(10), which clearly

shows that microcredit improves the food intake and protein intakes of the borrower households, however, the variation of different repayment schedules adjusted for lean period, were not particularly influential in improving the food intake during the non-lean periods.

The results reported in Table 6 and 7 were robustly found from other specifications.[14] We tried (i) extending model (4) with baseline village and household attributes as additional explanatory variables; (ii) extending the last term in Equation (4), $b_4 D_{4h}$, to have different slopes depending on treatment arm; (iii) re-estimating Equation (4) without the last term while using only borrower households; and (iv) using the limited dependent variable models, considering the truncation or integer nature of the dependent variables. The robustness check results, though not reported, were also found to be qualitatively similar with our findings.

(4) Regression Results using Panel 4 Data

Regression results using Panel 4 data were more favorable for the flexible microcredit scheme. In other words, after a year of initial intervention, we saw positive changes in food intake during the lean season. Tables 8−9 show the regression results regarding food consumption during *monga* 2012. In these tables, we report two sets of regression results for each of the seven variables listed in Table 5 (last panel) as dependent variables. For each variable, the odd column reports the basic regression results controlling for stratification, while the even column reports the results from a specification with additional control for household observables.

Overall, the impact of microcredit has been positive on food consumption. Columns (1)–(2) of Table 8 show that the number of stomach-full meals consumed during *monga* 2012 increased for all treatment groups. However, the impact is considerably more pronounced for Flexible 1 + IGA group and Flexible 2 groups compared with for other treatment groups. Similarly, Columns (3)–(4) of Table 8 indicate strong positive impacts for Flexible 1 + IGA group, as this group consumed about 32% more stomach-full meals on the worst day of *monga* 2012, followed by Flexible 2 group (about 15%). In Columns (5)–(6) of Table 8, the estimated parameter suggests that Flexible 1 + IGA and Flexible 2 borrowers were about 39 and 19 percentage points, respectively, less likely to be food insecure, versus the sample average of 70 percentage points.

[Tables 8 and 9 about here]

We further inquired about this pattern of improvement of food consumption to learn more about improvement in overall protein consumption during *monga* 2012. To explore this, we

[14] The robustness check results are not reported here, but are available upon request.

collected information on protein intake in terms of meat (chicken, lamb, or beef) and fish consumption at dinner during a typical *monga* week. The result of such estimations are depicted in Table 9, which clearly shows that in the category of protein, fish consumption among the treatment groups (Columns 7–8) substantially increased, with Flexible 1 + IGA borrowers significantly improving their fish consumption during *monga* 2012, followed by the other two treatment groups. Columns (5)-(6) of Table 9 show that parameter b_4 is negative (marginally significant at the 10% level), indicating that any type of microcredit is useful in securing higher protein consumption of fish. Regarding meat consumption (Column 1-4, Table 9), parameter b_4 is negative, followed by traditional microcredit, which tend to indicate that the flexible nature of repayment may be influential to consume more protein in the form of meat during *monga* 2012, however, such findings are not statistically significant.

These results indicate that after a year of initial intervention, there were some positive changes in the food intake during the lean season among the treatment groups. We also see that Flexible 1 + IGA borrowers have more successfully translated their credit into better welfare outcomes, when measured through food consumption behavior during the lean season. This is consistent with our previous finding of increased meal intakes by Flexible 1 + IGA borrowers during *monga* 2011. These results might indicate that in-kind seasonal moratorium credit might be useful for the borrowers to achieve welfare improvements due to the "Flypaper" effect where "*capital coming directly to the business sticks there but cash does not*" (Fafchamps *at el.,* 2014, page 1). Flexible 2 borrowers also showed some indication of improvements in food consumption; however, these improvements are marginal and, in most cases, weakly significant. However, Flexible 1 groups showed hardly any improvements in food consumption compared with the control group. One explanation could be that most Flexible 1 group members spend their credit on ambitious business projects owing to no immediate pressure for repayment. These businesses probably do not generate sufficient income in the short-run. As a result, during *monga* 2011 and 2012, we do not see any significant impact of Flexible 1 on food consumption. Another explanation of these findings could indicate the issue of self-control problem, as more restricted credits, Flexible 1 + IGA and Flexible 2, perhaps created more revenue and profit, which resulted in welfare improvements, however, less restrictive ones (Flexible 1) might have ended up in bad investment or non-productive activities, which has failed to generate any improvement in welfare.

4.3 Summary and Discussion

This section empirically assesses whether a flexible repayment design for microcredit can enhance food consumption among the ultrapoor. We used two rounds of cross-sectional data sets from northern Bangladesh collected in 2012, after an RCT was implemented in 2011-12. We

found that, except for in-kind seasonal moratorium credit, repayment flexibility to have no immediate positive impact on food consumption during the intervention as well as during the normal period after the intervention. During the year-long intervention period, all microcredit borrowers tended to have more secure food consumption than did nonborrowers, although the difference was marginal. After a year of initial intervention, the impact became larger and a difference started to appear between the treatment groups and the control group.

In the context of the current study, we can suggest several possible explanations for the insignificance of the flexibility impact until mid-2012. First, if the reduction of liquidity constraints is the main route through which the provision of microcredit enhances consumption, our finding is consistent with the view that the main problem for the ultrapoor is consumption smoothing between the *monga* and non-*monga* seasons, as they were already able to smooth consumption within these seasons in the absence of microcredit. If this is the case—and if income and price effects are negligible—there should be no difference across microcredit types; however, nonborrowers' consumption should be smaller than that of borrowers. Our empirical results broadly support this pattern. Second, the insignificance of the repayment flexibility impact could be due to the insignificant difference in income changes across the four credit schemes studied. This was likely when the borrowed money was invested in a business that did not generate immediate income gains.

Our finding of a positive impact using the Round 4 data, especially among Flexible 1 + IGA borrowers, confirms the above speculation. Under the context of this study, wherein poor borrowers do not have sufficient entrepreneurship ability, Flexible 1 + IGA has higher potential to raise borrowers' income levels. During *monga* 2012, perhaps the higher income generated from IGA enabled borrowers to increase their consumption to a greater extent than other borrowers. Furthermore, during *monga* 2012, protein consumption was more secure among microcredit borrowers of any type than among nonborrowers, consistent with the findings of *monga* 2011. This indicates a continuation of difficulties faced by the ultrapoor in *char* and river-basin areas with regard to smoothing consumption between *monga* and non-*monga* seasons.

5. Conclusion

In this study, we empirically examine whether flexible microcredit leads to an increase in repayment problems for MFIs and whether it can increase and stabilize consumption of borrower households. The empirical analysis is based on data collected through a randomized controlled trial in 2011−12 in northern Bangladesh. Our results suggest no statistically discernible difference between treatment arms in terms of default and overdue amounts, thus supporting flexible microcredit. However, in terms of loan discipline, Flexible 2 groups

exhibited resistance for monthly repayment after the end of the designated *monga* period for repayment adjustment. This is an important lesson for designing seasonality-adjusted flexible microcredit; perhaps implementing a similar repayment pattern throughout the loan cycle with flexibility during the period of seasonality is preferable to mixing different repayment patterns during the course of the loan cycle.

On the other hand, we find that it took time for such seasonality-adjusted flexible microcredit to impact food consumption. Except for in-kind seasonal moratorium credit, hardly any positive impact of repayment flexibility on immediate food consumption was found during the period of seasonality. After a year of initial intervention, however, we saw positive changes in food intake during the lean season. All microcredit borrowers tended to have more secure food consumption than did nonborrowers. This could be due to the possibility that the main problem for the ultrapoor is consumption smoothing between the lean and non-lean seasons as well as the time required to realize income changes induced by credit schemes or due to self-control problem as the least restricted seasonal adjusted microcredit performed badly among the treatment groups. The findings of this study will help MFIs optimize their credit schemes. In addition, they could help other interested parties, including government institutions, advocate a relaxation of microcredit rules or seek alternative policy instruments.

References

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

Banerjee, A. V. and E. Duflo (2011). *Poor Economics: A Radical Rethinking of the Way to Fight Global Poverty*, Public Affairs.

Banerjee, A., E. Duflo, R. Glennerster and C. Kinnan (2009). "The Miracle of Microfinance? Evidence from a Randomized Evaluation." J-PAL Working Paper.

Berg, C. and M. S. Emran (2011). "Does Microfinance Help the Ultrapoor Cope with Seasonal Shocks? Evidence from Seasonal Famine (*Monga*) in Bangladesh." SSRN eLibrary.

Bryan, G., S. Chowdhury and A. Mobarak (2012). "Seasonal Migration and Risk Aversion." CEPR Discussion Paper No. DP8739. Available at SSRN: http://ssrn.com/abstract=1988671.

Chambers, R., R. Longhurst, and A. Pacey (1981). *Seasonal Dimensions to Rural Poverty*. London: Frances Pinter.

Czura, K., D. Karlan and S. Mullainathan (2011). "Does Flexibility in Microfinance Pay Off? Evidence from a Randomized Evaluation in Rural India." Working Paper, Goethe University Frankfurt, October 2011.

Devoto, F., E. Duflo, P. Dupas, W. Parienté, and V. Pons (2012). "Happiness on Tap: Piped Water Adoption in Urban Morocco." *American Economic Journal: Economic Policy* 4(4): 68–99.

Fafchamps, M., D. McKenzie, S. Quinn and C. Woodruff (2014). "Microenterprise growth and the flypaper effect: Evidence from a randomized experiment in Ghana." *Journal of Development Economics* 106(0): 211-226.

Feigenberg, B., E. Field, and R. Pande (2011). "The Economic Returns to Social Interaction: Experimental Evidence from Microfinance." Harvard University.

Field, E. and R. Pande (2008). "Repayment Frequency and Default in Microfinance: Evidence from India." *Journal of the European Economic Association* 6(2–3): 501–509.

Field, E., R. Pande, J. Papp, and Y. J. Park (2012). "Repayment Flexibility Can Reduce Financial Stress: A Randomized Control Trial with Microfinance Clients in India." *PLoS One* 7(9): 1-7. e45679.

Field, E., R. Pande, J. Papp, and N. Rigol (2013). "Does the Classic Microfinance Model Discourage Entrepreneurship Among the Poor? Experimental Evidence from India." *American Economic Review* 103(6): 2196–2226.

Giné, X. and D. Karlan (2011). "Group versus Individual Liability: Short and Long Term Evidence from Philippine Microcredit Lending Groups." Economic Growth Center,

Yale University, New Haven, CT, USA.

Karlan, D. and J. Zinman (2009). “Observing Unobservables: Identifying Information Asymmetries with a Consumer Credit Field Experiment.” *Econometrica* 77(6): 1993–2008.

Karlan, D. and S. Mullainathan (2007). “Is Microfinance Too Rigid?” VoxEU December 2007.

Khandker, S. R. and W. Mahmud (2012). *Seasonal Hunger and Public Policies: Evidence from Northwest Bangladesh*. World Bank Publications, Washington DC, USA.

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

Khandker, S. R. (2012). “Seasonality of Income and Poverty in Bangladesh.” *Journal of Development Economics* 97: 244–56.

Kurosaki, T. and H. U. Khan (2012). “Vulnerability of Microfinance to Strategic Default and Covariate Shocks: Evidence from Pakistan,” *The Developing Economies*, 50(2): 81–115.

Morduch, J. (1999). “The Microfinance Promise.” *Journal of Economic Literature* 37(4): 1569–1614.

Pitt, M. M. and S. R. Khandker (1998). “The Impact of Group-Based Credit Programs on Poor Households in Bangladesh: Does the Gender of Participants Matter? *Journal of Political Economy* 106(5): 958–96.

Pitt, M. M. and S. R. Khandker (2002). “Credit Programmes for the Poor and Seasonality in Rural Bangladesh.” *Journal of Development Studies* 39(2): 1-24.

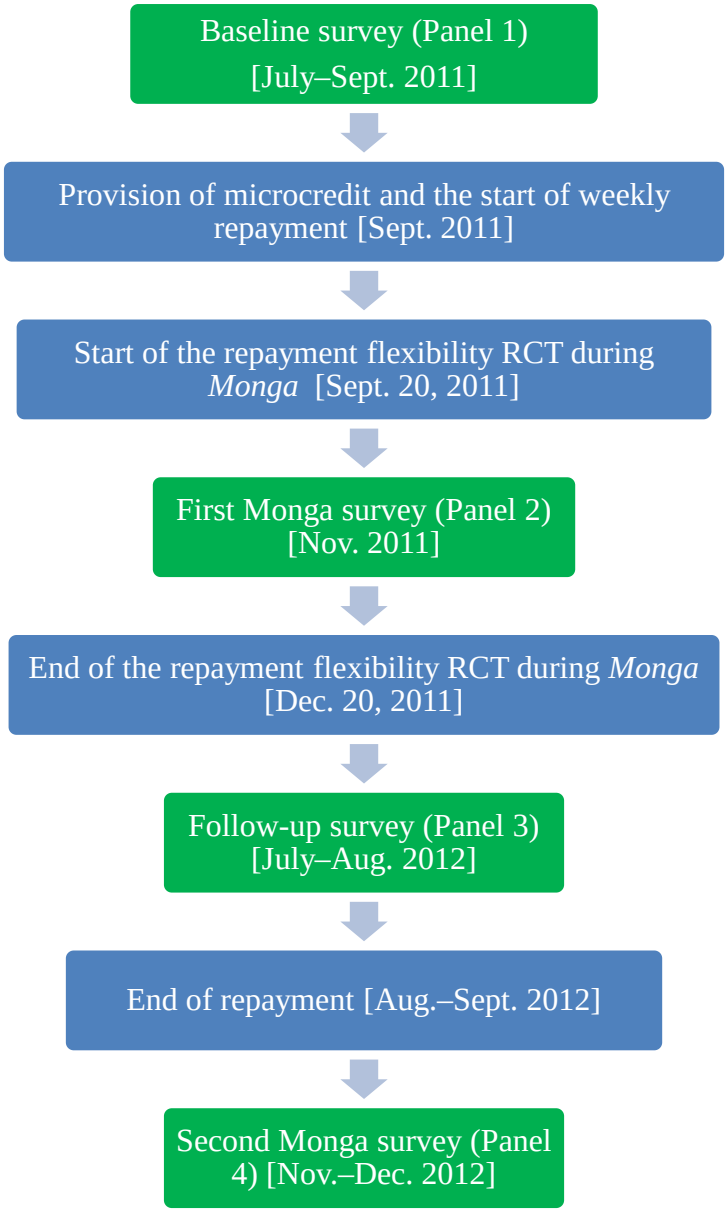
Rahman, H. Z. (1995). “Mora Kartik: Seasonal Deficits and the Vulnerability of the Rural Poor.” In H. Z. Rahman and M. Hossain (Eds.), *Rethinking Rural Poverty: Bangladesh as a Case Study*. New Dehli, India: Sage Publications.

Shoji, M. (2010). “Does Contingent Repayment in Microfinance Help the Poor During Natural Disasters?” *Journal of Development Studies* 46(2): 191–210.

Shonchoy, A. (2009). “Essays in Development Economics.” Unpublished PhD dissertation, University of New South Wales.

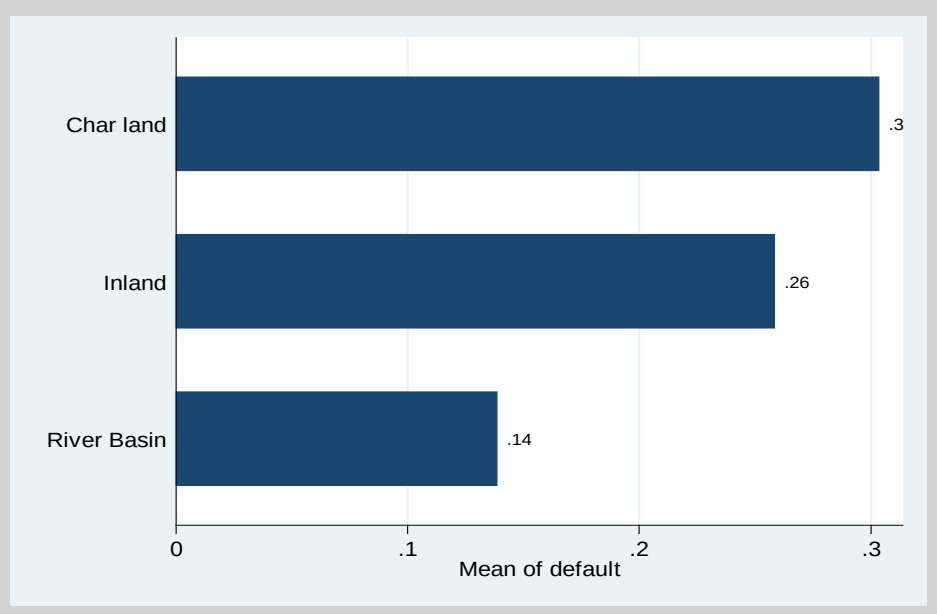
Shonchoy, A. (2011). “Seasonal Migration and Microcredit in the Lean Period: Evidence from Northwest Bangladesh.” IDE Discussion Paper No. 294, Japan.

Figure 1: Timeline of Interventions and Surveys



Source: Prepared by the authors. The blue panels show events regarding interventions, and the green panels show events regarding surveys.

Figure 2: Differences in Repayment Patterns across Three Geographic Areas



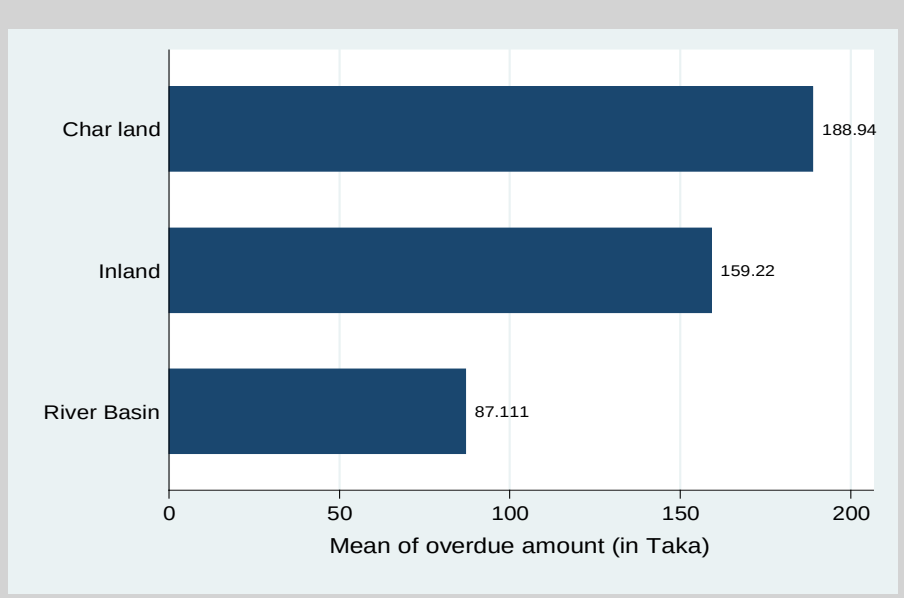


Figure 3: Seasonality of Repayment Behavior

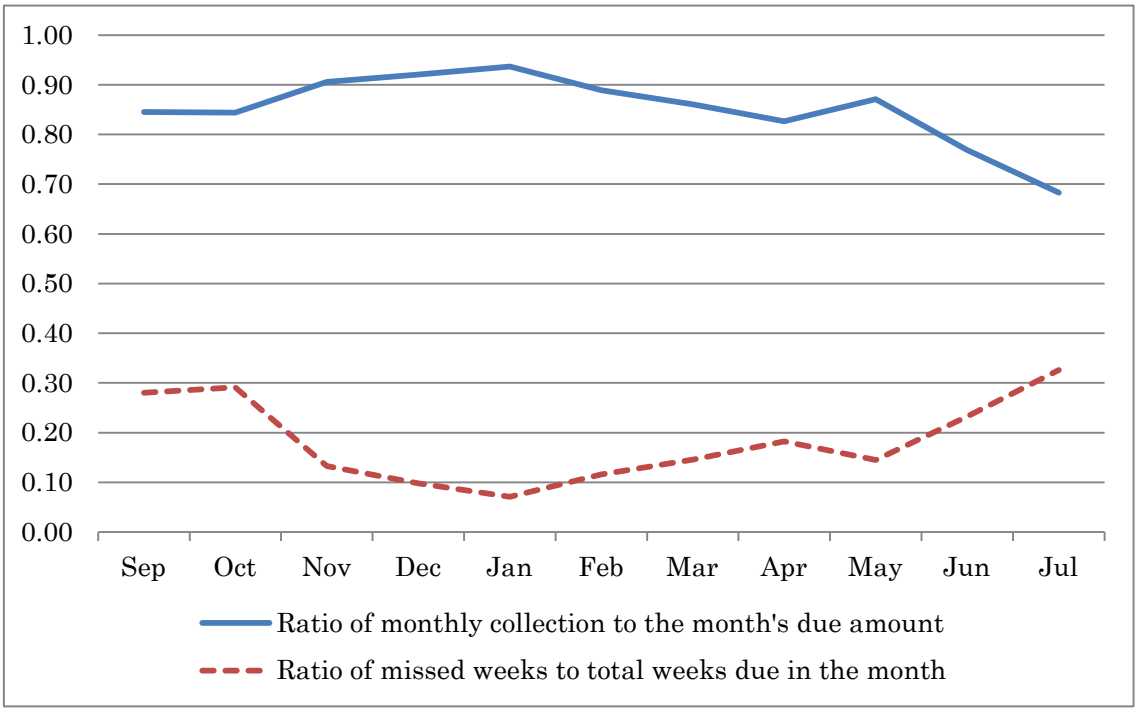


Table 1: Distribution of Sample Villages and Households by Treatment Type, Northern Bangladesh, 2011–12

	Treatment Allocation at the Village Level				Total
	Control	Flexible 1	Flexible 1 + IGA	Flexible 2	
Number of villages	12	24	12	24	72
By district					
Gaibandha District	9	16	8	12	45
Kurigram District	3	8	4	12	27
By location type					
Char	3	6	3	6	18
Inland areas	7	14	7	14	42
River-basin	2	4	2	4	12
Number of households in the beseline survey and first Monga survey, 2011 (Panel 1 and Panel 2)					
Borrower	180	360	180	360	1,080
Nonborrower	60	120	60	120	360
Total	240	480	240	480	1,440
Number of households in the follow-up survey and second monga survey, 2012 (Panels 3 and 4)					
Borrower	180	356	176	356	1,068
Nonborrower	60	117	59	118	354
Total	240	473	235	474	1,422

Source : Compiled by the authors.

Table 2: Definitions and Summary Statistics of Variables Related to Repayment Behavior, Northern Bangladesh, 2011–12

Variable	Definition	N	Mean	Std. Dev.	Min	Max
Overdue at the end of a loan cycle						
default	Dummy for default (1 if the due amount is positive at the end of a loan cycle)	1,080	0.73	0.444	0	1.00
overdue	Amount due at the end of a loan cycle (in BDT)	1,080	556.14	605.0	0	3210.00
loverdue	Log of amount due at the end of a loan cycle (in BDT)	1,080	4.66	2.9	0	8.10
roverdue	Amount due as a percentage of total due amount	1,080	0.17	0.2	0	0.98
due_ledger_closing	Due amount after six months of the loan cycle	1,080	159.64	501.9	0	3210.00
ledgerclosing_adjusted	Due amount adjusted with savings, after six months of scheduled loan cycle	1,080	114.81	423.4	0	2990.00
Overdue before the flood in June						
cummaydue	Cumulative due up to June	1,080	276.25	397.0	0	2550.00
lcummaydue	Log of cumulative due up to June	1,080	3.85	2.7	0	7.85
Number of weekly repayments missed						
weeksdeafult	Total number of missed weeks	1,080	5.92	6.601	0	41.00
lmiss	Log of total number of missed weeks	1,080	1.53	0.924	0	3.74
evermiss	Dummy variable weeks default (1 if at least one week missed of the required due)	1,080	0.86	0.345	0	1.00
rmiss	Number of missed weeks as a percentage of total due weeks	1,080	0.18	0.185	0	1.00
Number of weekly repayments missed before the flood in June						
cummaymiss	Total number of missed weeks up to June	1,080	3.13	4.530	0	34.00
lmissmay	Log of total number of missed weeks up to June	1,080	0.99	0.880	0	3.56
evermiss_may	Dummy variable weeks default (1 if atleast missed one week of the required due)	1,080	0.69	0.462	0	1.00
rmissmay	Number of missed weeks as a percentage of total due weeks up to June	1,080	0.13	0.180	0	1.00

Note: Mean and standard deviations are simple ones, without weighting.

Source: Compiled by the authors using the administrative information for borrowers.

Table 3.1: Impact of Flexible Microcredit on Repayment Behavior (Indicators for Overdue Amount)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	Overdue amount at the end of a loan cycle (in BDT)	Overdue amount at the end of a loan cycle (in BDT)	Overdue as a percentage of total due amount	Overdue as a percentage of Total due amount	Overdue amount after six months of the loan cycle	Overdue amount after 6 months of the loan cycle	Overdue adjusted with savings after six months of scheduled loan cycle	Overdue adjusted with the savings, after six months of schedule loan cycle
Constant	447.710**	830.933**	0.133**	0.247**	221.207	425.394	161.075	339.946
	(197.112)	(317.783)	(0.059)	(0.095)	(145.698)	(262.450)	(130.276)	(230.150)
Flexible 1	-40.702	-30.890	-0.012	-0.009	-107.750	-109.641	-77.289	-77.753
	(185.022)	(185.843)	(0.055)	(0.055)	(130.170)	(130.300)	(116.028)	(116.694)
Flexible 1+ IGA	64.294	69.836	0.019	0.021	-21.244	-21.767	-5.407	-5.200
	(228.326)	(228.633)	(0.068)	(0.068)	(165.169)	(164.333)	(141.985)	(141.566)
Flexible 2	71.686	78.982	0.021	0.024	-51.774	-54.974	-30.399	-32.392
	(202.217)	(202.717)	(0.060)	(0.060)	(134.202)	(133.503)	(118.207)	(118.419)
Mean of the Dependent Variable	556.14	556.14	0.16	0.16	141.57	141.57	99.32	99.32
Observations	1068	1068	1068	1068	1068	1068	1068	1068
R-squared	0.044	0.052	0.044	0.052	0.082	0.089	0.054	0.061
F-stat. for zero slopes of treatment arms	0.30	0.29	0.30	0.29	0.55	0.55	0.52	0.51
F-stat	1.056	2.231	1.056	2.231	1.833	1.266	1.467	0.991
Control of Stratification	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control for Credit Distribution Months	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control for Household Characterestics	No	Yes	No	Yes	No	Yes	No	Yes

Notes: Robust standard errors clustered at the village level are shown in brackets. Significant at the 10% (*), 5% (**), and 1% (***) levels. Household Chracterestics include age, age squared, sex, marital status, education qualification of the household head as well as size of the household, number of adults in households and total land holdings. We dropped those observations that are attrited.

Source: Estimated by the authors using the microdata described in the text.

Table 3.2: Impact of Flexible Microcredit on Repayment Behavior (Repayment Discipline Indicators)

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Indicator for having at least one missed week	Indicator for having atleast one missed week	Missed weeks as a percentage of total due weeks	Missed weeks as a percentage of total due weeks	No. of missed weeks	No. of missed weeks
Constant	0.733***	0.702***	0.148***	0.226**	7.019***	10.297***
	(0.081)	(0.147)	(0.051)	(0.089)	(2.361)	(3.295)
Flexible 1	0.105	0.106	0.034	0.035	-0.307	-0.281
	(0.090)	(0.090)	(0.051)	(0.051)	(2.252)	(2.266)
Flexible 1+ IGA	0.110	0.104	-0.011	-0.010	-2.598	-2.604
	(0.088)	(0.086)	(0.053)	(0.053)	(2.155)	(2.160)
Flexible 2	0.144	0.144	0.052	0.052	-0.257	-0.279
	(0.094)	(0.094)	(0.054)	(0.055)	(2.292)	(2.302)
Mean of the Dependent Variable	0.86	0.86	0.17	0.17	5.77	5.77
Observations	1068	1068	1068	1068	1068	1068
R-squared	0.068	0.077	0.112	0.118	0.140	0.147
F-stat. for zero slopes of treatment arms	0.79	0.8	1.02	1.01	2.08	2.09
F-stat	2.593	1.910	3.745	2.780	5.293	3.196
Control of Stratification	Yes	Yes	Yes	Yes	Yes	Yes
Control for Credit Distribution Months	Yes	Yes	Yes	Yes	Yes	Yes
Control for Household Characterestics	No	Yes	No	Yes	No	Yes

Notes: Robust standard errors clustered at the village level are shown in brackets. Significant at the 10% (*), 5% (**), and 1% (***) levels. Household Chracterestics include age, age squared, sex, marital status, education qualification of the household head as well as size of the household, number of adults in households and total land holdings. We dropped those observations that are attrited.

Source: Estimated by the authors using the microdata described in the text.

Table 3.3: Impact of Flexible Microcredit on Repayment Behavior (Default Indicators)

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Binary Default (if total due amount at the end of loan cycle > 0)	Binary Default (if total due amount at the end of loan cycle > 0)	Binary Default (if total due adjusted six months after the loan cycle with savings amount > 0)	Binary Default (if total due adjusted 6 month after the loan cycle with savings amount > 0)	Total Savings	Total Savings
Constant	0.490***	0.637***	0.257**	0.455*	527.212***	566.785***
	(0.108)	(0.209)	(0.122)	(0.256)	(45.168)	(93.693)
Flexible 1	0.013	0.017	0.094	0.104	-93.569**	-92.460*
	(0.111)	(0.112)	(0.134)	(0.133)	(46.807)	(47.115)
Flexible 1+ IGA	0.049	0.051	0.034	0.042	-87.268	-86.715
	(0.139)	(0.139)	(0.158)	(0.157)	(66.252)	(65.928)
Flexible 2	0.042	0.047	0.139	0.150	-30.695	-28.698
	(0.116)	(0.117)	(0.141)	(0.141)	(55.785)	(55.803)
Mean of the Dependent Variable	0.73	0.73	0.48	0.48	433.51	433.51
Observations	1,068	1,068	1,068	1,068	1,068	1,068
R-squared	0.239	0.242	0.112	0.127	0.181	0.189
F-stat. for zero slopes of treatment arms	0.08	0.08	0.44	0.5	1.82	1.82
F-stat	7.358	3.638	2.422	4.800	5.990	3.894
Control of Stratification	Yes	Yes	Yes	Yes	Yes	Yes
Control for Credit Distribution Months	Yes	Yes	Yes	Yes	Yes	Yes
Control for Household Characterestics	No	Yes	No	Yes	No	Yes

Notes: Robust standard errors clustered at the village level are shown in brackets. Significant at the 10% (*), 5% (**), and 1% (***) levels. Household Chracterestics include age, age squared, sex, marital status, education qualification of the household head as well as size of the household, number of adults in households and total land holdings. We dropped those observations that are attrited.

Source: Estimated by the authors using the microdata described in the text.

Table 3.4: Impact of Flexible Microcredit on Repayment Behavior (Various Indicators up to the Flood, May 2012)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	Overdue amount up to May (in BDT)	Overdue amount upto May (in BDT)	Overdue as a percentage of total due amount (up to May)	Overdue as a percentage of total due amount (upto May)	No. of missed weeks up to May	No. of missed weeks upto May	Indicator for having at least one missed week up to May	Indicator for having atleast one missed week upto May
Constant	352.188**	495.447**	0.105**	0.147**	4.665**	6.571***	0.639***	0.526**
	-143.875	-205.383	-0.043	-0.061	-1.897	-2.368	-0.108	-0.235
Flexible 1	-25.631	-25.339	-0.008	-0.008	-0.923	-0.921	0.11	0.107
	-132.79	-132.21	-0.04	-0.039	-1.752	-1.744	-0.118	-0.116
Flexible 1+ IGA	-89.804	-93.344	-0.027	-0.028	-2.063	-2.105	0.015	0.01
	-130.224	-129.892	-0.039	-0.039	-1.671	-1.665	-0.143	-0.143
Flexible 2	28.532	26.557	0.008	0.008	-0.66	-0.691	0.191	0.187
	-141.267	-140.278	-0.042	-0.042	-1.744	-1.736	-0.121	-0.12
Mean of the Dependent Variable	267.40	267.40	0.08	0.08	3.04	3.04	0.69	0.69
Observations	1,068	1,068	1,068	1,068	1,068	1,068	1,068	1,068
R-squared	0.121	0.132	0.121	0.132	0.135	0.147	0.114	0.118
F-stat. for zero slopes of treatment arms	0.92	0.92	0.92	0.92	1.89	1.89	1.4	1.37
F-stat	3.365	2.201	3.365	2.201	4.966	2.992	3.491	2.189
Control of Stratification	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control for Credit Distribution Month	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control for Household Characterestics	No	Yes	No	Yes	No	Yes	No	Yes

Notes: Robust standard errors clustered at the village level are shown in brackets. Significant at the 10% (*), 5% (**), and 1% (***) levels. Household Chracterestics include age, age squared, sex, marital status, education qualification of the household head as well as size of the household, number of adults in households and total land holdings. We dropped those observations that are attrited.

Source: Estimated by the authors using the microdata described in the text.

Table 4: Regression Result for Satisfaction Survey, Panel 2 (2011)

	(1)	(2)	(3)
VARIABLES	Indicator variable, indicating borrower is satisfied with the credit repayment scheme	Indicator variable, indicating borrower is satisfied with the credit repayment scheme	Indicator variable, indicating borrower is satisfied with the credit repayment scheme
Constant	0.450***	0.458***	0.147
	(0.102)	(0.100)	(0.234)
Flexible 1	0.339***	0.338***	0.334***
	(0.116)	(0.109)	(0.105)
Flexible 1+ IGA	0.226	0.178	0.169
	(0.139)	(0.136)	(0.135)
Flexible 2	0.179	0.135	0.135
	(0.127)	(0.121)	(0.118)
Mean of the Dependent Variable	0.66	0.66	0.66
Observations	1,068	1,068	1,068
R-squared	0.060	0.134	0.158
F-stat. for zero slopes of treatment arms	3.10**	4.12***	4.46***
F-stat	3.100	4.060	3.651
Control of Stratification	No	Yes	Yes
Control for Credit Distribution Month	No	Yes	Yes
Control for Household Characterestics	No	No	Yes

Notes: Robust standard errors clustered at the village level are shown in brackets. Significant at the 10% (*), 5% (**), and 1% (***) levels. Household Chracterestics include age, age squared, sex, marital status, education qualification of the household head as well as size of the household, number of adults in households and total land holdings. We dropped those observations that are attrited.

Source: Estimated by the authors using the microdata described in the text.

Table 5: Definitions and Summary Statistics of Variables Related to Food Consumption, Northern Bangladesh, 2011–12

Variable	Definition	N	Mean	Std. Dev.	Min	Max
	Food consumption during *monga* 2011					
num_mong1	Number of stomach-full meals in a day during *monga* 2011	1,422	2.11	0.42	1	3
num_mong2	Number of minimum stomach-full meals a day during *monga* 2011	1,422	1.67	0.49	1	3
safe_mong	Dummy for food safety during monga 2011 (defined as *num_mong2* = 2 or 3)	1,422	0.66	0.47	0	1
fish_mong	Dummy for having fish within a typical week during *monga* 2011	1,422	0.73	0.44	0	1
meat_mong	Dummy for having meat within a typical week during *monga* 2011	1,422	0.00	0.04	0	1
	Food consumption during normal times in 2012					
num_norm1	Number of stomach-full meals in a day during normal time in 2012	1,422	2.85	0.39	1	3
num_norm2	Number of minimum stomach-full meals a day during normal time in 2012	1,422	2.12	0.59	1	3
safe_norm	Dummy for food safety during normal time in 2012 (defined as *num_norm2* = 2 or 3)	1,422	0.88	0.33	0	1
fish_norm	Dummy for having fish within a typical week during normal time in 2012	1,422	0.02	0.13	0	1
meat_norm	Dummy for having meat within a typical week during normal time in 2012	1,422	0.98	0.13	0	1
	Food consumption during *monga* in 2012					
monga_foodHH	Number of Stomack full meals during the Monga 2012	1,422	2.08	0.43	1	3
minimum_monga	Number of Minimum Stomack full meals during the Monga 2012	1,422	1.35	0.50	1	3
foodshortage	Dummy for Foood Shortage: Household suffering from food shortage during the monga of 2012	1,422	0.70	0.46	0	1
meat_monga	Dummy for having meat (chicken, beef or lamb) during a typical week in the Monga 2012	1,422	0.00	0.04	0	1
nmeat_monga	No. of times dinner contains meat (chicken, beef, or lamb) in a typical week during *monga* 2012	1,422	0.00	0.04	0	1
fish_monga	Dummy for having fish during a typical week in the Monga 2012	1,422	0.71	0.46	0	1
nfish_monga	No. of times dinner contains fish in a typical week during monga 2012	1,422	0.96	0.90	0	7

Note: Mean and standard deviations are simple ones, without weighting. The question of "Number of (minimum) stomach-full meals in a day" was asked to respondents who had reported a typical number; thus, the answer took an integer value of either 1, 2, or 3.

Source: Compiled by the authors using the 2012 resurvey data (Panel 3) and 2012 monga survey (Panel 4)

Table 6: Impact of Flexible Microcredit on Food Consumption, *monga 2011* (Panel 3)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
VARIABLES	*num_mong1*	*num_mong1*	*num_mong2*	*num_mong2*	*safe_mong*	*safe_mong*	*meat_mong*	*meat_mong*	*fish_mong*	*fish_mong*
Constant	2.122***	1.949***	1.766***	1.692***	0.745***	0.672***	0.002	0.012	0.801***	0.661***
	(0.046)	(0.138)	(0.081)	(0.183)	(0.082)	(0.177)	(0.002)	(0.011)	(0.053)	(0.173)
Flexible 1	0.030	0.025	0.041	0.037	0.046	0.041	0.000	0.001	-0.066	-0.074
	(0.059)	(0.060)	(0.087)	(0.088)	(0.088)	(0.090)	(0.001)	(0.001)	(0.068)	(0.067)
Flexible 1+ IGA	0.191**	0.184**	0.054	0.044	0.052	0.043	0.006	0.006	-0.085	-0.092
	(0.079)	(0.079)	(0.097)	(0.097)	(0.097)	(0.096)	(0.005)	(0.005)	(0.096)	(0.094)
Flexible 2	-0.002	-0.002	-0.042	-0.046	-0.046	-0.051	0.003	0.004	-0.077	-0.085
	(0.053)	(0.054)	(0.087)	(0.087)	(0.086)	(0.087)	(0.003)	(0.003)	(0.070)	(0.069)
Non-Borrower	-0.031	-0.040	-0.042	-0.040	-0.036	-0.034	-0.003	-0.003	-0.014	-0.014
	(0.025)	(0.024)	(0.037)	(0.036)	(0.036)	(0.036)	(0.002)	(0.002)	(0.036)	(0.037)
Mean of the Dependent Variable	2.10	2.10	1.66	1.66	0.66	0.66	0.53	0.53	0.73	0.73
Observations	1,422	1,422	1,422	1,422	1,422	1,422	1,422	1,422	1,422	1,422
R-squared	0.040	0.075	0.039	0.054	0.038	0.052	0.005	0.011	0.009	0.020
F-stat. for zero slopes of treatment arms	2.39*	2.29*	0.93	0.91	1.13	1.14	0.76	0.74	0.48	0.61
F-stat	1.776	3.43	2.118	2.296	1.979	2.044	0.262	0.181	0.410	5.612
Control of Stratification	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control for Credit Distribution Months	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control for Household Characterestics	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes

Notes: Robust standard errors clustered at the village level are shown in brackets. Significant at the 10% (*), 5% (**), and 1% (***) levels. Household Chracterestics include age, age squared, sex, marital status, education qualification of the household head as well as size of the household, number of adults in households and total land holdings. We dropped those observations that are attrited.

Source: Estimated by the authors using the microdata described in the text.

Table 7: Impact of Flexible Microcredit on Food Consumption, Normal times in *2012* (Panel 3)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
VARIABLES	*num_norm1*	*num_norm1*	*num_norm2*	*num_norm2*	*safe_norm*	*safe_norm*	*meat_norm*	*meat_norm*	*fish_norm*	*fish_norm*
Constant	2.943***	2.509***	2.218***	1.818***	0.948***	0.806***	0.024**	0.010	0.970***	0.998***
	(0.030)	(0.171)	(0.059)	(0.210)	(0.036)	(0.131)	(0.011)	(0.055)	(0.013)	(0.035)
Flexible 1	-0.063*	-0.070*	-0.033	-0.043	-0.036	-0.041	-0.003	-0.003	0.010	0.009
	(0.036)	(0.036)	(0.080)	(0.080)	(0.043)	(0.042)	(0.010)	(0.011)	(0.014)	(0.014)
Flexible 1+ IGA	-0.011	-0.020	0.069	0.052	0.044	0.035	0.008	0.008	0.004	0.002
	(0.045)	(0.046)	(0.074)	(0.073)	(0.042)	(0.040)	(0.017)	(0.017)	(0.015)	(0.015)
Flexible 2	-0.069*	-0.076*	-0.013	-0.019	-0.050	-0.055	0.000	0.001	0.010	0.009
	(0.040)	(0.038)	(0.074)	(0.075)	(0.042)	(0.040)	(0.011)	(0.011)	(0.015)	(0.015)
Non-Borrower	-0.025	-0.022	0.018	0.017	-0.020	-0.015	0.003	0.004	-0.012	-0.013
	(0.029)	(0.029)	(0.033)	(0.034)	(0.020)	(0.020)	(0.011)	(0.011)	(0.008)	(0.008)
Mean of the Dependent Variable	2.84	2.84	2.12	2.12	0.66	0.66	0.87	0.87	0.02	0.02
Observations	1,422	1,422	1,422	1,422	1,422	1,422	1,422	1,422	1,422	1,422
R-squared	0.020	0.039	0.052	0.087	0.035	0.056	0.006	0.014	0.009	0.017
F-stat. for zero slopes of treatment arms	1.51	1.88	0.95	0.76	1.13	1.14	2.25*	2.06	0.89	0.90
F-stat	2.124	2.689	3.876	3.856	3.723	3.715	1.178	1.488	1.866	1.254
Control of Stratification	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control for Credit Distribution Months	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control for Household Characterestics	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes

Notes: Robust standard errors clustered at the village level are shown in brackets. Significant at the 10% (*), 5% (**), and 1% (***) levels. Household Chracterestics include age, age squared, sex, marital status, education qualification of the household head as well as size of the household, number of adults in households and total land holdings. We dropped those observations that are attrited.

Source: Estimated by the authors using the microdata described in the text.

Table 8: Impact of Flexible Microcredit on Food Consumption during *monga* 2012

	Number of stomach-full meals during monga 2012	*Number of Stomack full meals during the Monga 2012*	*Number of minimum stomach-full meals during monga 2012*	*Number of Minimum Stomack full meals during the Monga 2012*	*Dummy for food shortage: Is this household suffering from food shortage during monga 2012?*	*Dummy for Foood Shortage: Is this Household sufferin from food shortage during monga 2012*
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	2.077***	2.084***	1.254***	1.319***	0.754***	0.930***
	(0.061)	(0.140)	(0.085)	(0.189)	(0.075)	(0.165)
Flexible 1	0.122	0.123	0.141	0.146	-0.154*	-0.155*
	(0.078)	(0.078)	(0.106)	(0.104)	(0.091)	(0.087)
Flexible 1+ IGA	0.274**	0.273**	0.315***	0.313***	-0.386***	-0.378***
	(0.110)	(0.111)	(0.115)	(0.114)	(0.109)	(0.107)
Flexible 2	0.146*	0.146*	0.149	0.155	-0.186*	-0.190**
	(0.080)	(0.080)	(0.110)	(0.109)	(0.095)	(0.091)
Non-Borrower	-0.047	-0.048	0.029	0.029	0.009	0.006
	(0.029)	(0.031)	(0.029)	(0.029)	(0.031)	(0.030)
Mean of the Dependent Variable	2.28	2.28	1.35	1.35	0.7	0.7
Observations	1,422	1,422	1,422	1,422	1,422	1,422
R-squared	0.094	0.100	0.100	0.107	0.107	0.128
F-stat. for zero slopes of treatment arms	2.29*	2.24*	2.6**	2.58*	4.23***	4.17***
F-stat	2.233	1.661	5.383	3.867	4.341	4.197
Control of Stratification	Yes	Yes	Yes	Yes	Yes	Yes
Control for Credit Distribution Months	Yes	Yes	Yes	Yes	Yes	Yes
Control for Household Characterestics	No	Yes	No	Yes	No	Yes

Notes: Robust standard errors clustered at the village level are shown in brackets. Significant at the 10% (*), 5% (**), and 1% (***) levels. Household Chracterestics include age, age squared, sex, marital status, education qualification of the household head as well as size of the household, number of adults in households and total land holdings. We dropped those observations that are attrited.

Source: Estimated by the authors using the microdata described in the text.

Table 9: Impact of Flexible Microcredit on Protein Intake during *monga* 2012

	Dummy for having meat (chicken, beef or lamb) during a typical week in the Monga 2012	*Dummy for having meat (chicken, beef or lamb) during a typical week in the Monga 2013*	*Number of times your dinner contains meat (chicken, beef, or lamb) in a typical week during monga 2012*	*Number of times your dinner contains meat (chicken, beef or lamb) during a typical week in the Monga 2012*	*Dummy for having fish during a typical week in the Monga 2012*	*Dummy for having fish during a typical week in the Monga 2013*	*Number of times your dinner contains fish in a typical week during monga 2012*	*Number of times your dinner contains fish during a typical week in the Monga 2012*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	-0.001	-0.002	-0.001	-0.002	0.883***	0.782***	1.123***	1.003***
	(0.001)	(0.007)	(0.001)	(0.007)	(0.044)	(0.186)	(0.087)	(0.289)
Flexible 1	0.002	0.002	0.002	0.002	0.003	0.003	0.198	0.192
	(0.002)	(0.002)	(0.002)	(0.002)	(0.056)	(0.056)	(0.123)	(0.118)
Flexible 1+ IGA	0.005	0.005	0.005	0.005	-0.015	-0.029	0.488**	0.456**
	(0.004)	(0.004)	(0.004)	(0.004)	(0.068)	(0.069)	(0.208)	(0.208)
Flexible 2	0.001	0.001	0.001	0.001	0.012	0.015	0.221*	0.217*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.060)	(0.061)	(0.131)	(0.126)
Non-Borrower	-0.003	-0.003	-0.003	-0.003	-0.040*	-0.042*	-0.013	-0.010
	(0.002)	(0.002)	(0.002)	(0.002)	(0.023)	(0.023)	(0.055)	(0.055)
Mean of the Dependent Variable	0.00	0.00	0.00	0.00	0.71	0.71	0.96	0.96
Observations	1,422	1,422	1,422	1,422	1,422	1,422	1,422	1,422
R-squared	0.007	0.015	0.007	0.015	0.242	0.259	0.254	0.285
F-stat. for zero slopes of treatment arms	0.78	0.81	0.78	0.81	0.05	0.14	2.46*	2.35*
F-stat	0.305	0.278	0.305	0.278	14.35	13.25	11.34	7.706
Control of Stratification	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control for Credit Distribution Months	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control for Household Characterestics	No	Yes	No	Yes	No	Yes	No	Yes

Notes: Robust standard errors clustered at the village level are shown in brackets. Significant at the 10% (*), 5% (**), and 1% (***) levels. Household Chracterestics include age, age squared, sex, marital status, education qualification of the household head as well as size of the household, number of adults in households and total land holdings. We dropped those observations that are attrited.

Source: Estimated by the authors using the microdata described in the text.

Appendix Table 1: Balance Test at the Village Level

	A. Dependent variable: Location (strata used in randomization)			B. Dependent variable: Minutes of travel to the nearest facility					
	Distance from the closest bus station (km)	Dummy for a *char* village	Dummy for an inland village	Bazar	College	Mondir (Hindu temple)	Town	Bus stand	Railway station
Intercept	32.167***	0.250*	0.583***	7.917**	37.083***	43.333***	47.917***	39.583**	76.667***
	(10.649)	(0.128)	(0.146)	(3.712)	(5.171)	(7.197)	(5.469)	(16.799)	(14.891)
Flexible 1	8.875	-0.042	0.042	1.042	-4.583	-6.250	-0.000	21.708	3.333
	(13.042)	(0.157)	(0.179)	(4.546)	(6.333)	(8.815)	(6.699)	(20.575)	(18.238)
Flexible 1+IGA	17.667	0.083	-0.083	4.583	4.167	10.417	11.250	15.833	17.917
	(15.060)	(0.181)	(0.206)	(5.249)	(7.313)	(10.178)	(7.735)	(23.758)	(21.059)
Flexible 2	15.167	-0.000	0.000	0.000	-5.208	5.625	2.083	4.375	15.625
	(13.042)	(0.157)	(0.179)	(4.546)	(6.333)	(8.815)	(6.699)	(20.575)	(18.238)
R^2	0.020	0.001	0.001	0.017	0.039	0.063	0.045	0.023	0.020
F-stat. for zero slopes of all dummies	0.610	0.210	0.160	0.382	0.923	1.518	1.066	0.544	0.469

Note: The number of observations is 72. Robust standard errors are shown in brackets. Significant at the 10% (*), 5% (**), and 1% (***) levels. Dependent variables for B are measured in minutes if public transportation is used, and the value of zero is assigned when the facility exists in the village.

Source: Estimated by the authors using the benchmark survey data.

Appendix Table 2: Balance Test at the Household Level

	A. Dep. variable: Characteristics of the head				B. Dependent variable: Charactesitics of household members					
	Age	Dummy for female	Dummy for literacy	Years of schooling	Household size	Average age	Female ratio	Ratio of adults (age 15+)	Literacy rate of adult males	Literacy rate of adult females
Intercept	38.672***	0.228***	0.239***	1.589***	3.722***	26.367***	0.557***	0.702***	0.277***	0.229***
	[1.142]	[0.063]	[0.038]	[0.246]	[0.211]	[1.238]	[0.021]	[0.026]	[0.038]	[0.037]
D 1 (dummy for Flexible 1)	-0.536	-0.036	-0.017	-0.186	0.328	-1.302	-0.022	-0.045	0.009	-0.014
	[1.296]	[0.081]	[0.045]	[0.287]	[0.257]	[1.404]	[0.026]	[0.030]	[0.047]	[0.042]
D 2 (dummy for Flex. 1+IGA)	-0.411	-0.117	0.006	-0.183	0.433	-2.166	-0.031	-0.039	0.030	0.108*
	[1.376]	[0.070]	[0.070]	[0.362]	[0.280]	[1.489]	[0.023]	[0.030]	[0.057]	[0.056]
D 3 (dummy for Flexible 2)	-0.467	-0.058	-0.028	-0.189	0.431*	-2.144	-0.044*	-0.077**	0.007	0.050
	[1.259]	[0.078]	[0.048]	[0.307]	[0.247]	[1.326]	[0.024]	[0.029]	[0.048]	[0.046]
D 4 (dummy for non-borrower)	-0.583	-0.022	-0.039	-0.198	0.078	0.246	-0.011	-0.016	0.019	0.001
	[1.206]	[0.063]	[0.041]	[0.273]	[0.211]	[1.333]	[0.023]	[0.030]	[0.044]	[0.041]
R^2	0.000	0.007	0.001	0.000	0.012	0.013	0.005	0.015	0.000	0.010
F -stat. for zero slopes of all dummies	0.06	1.54	0.44	0.14	2.59**	3.63***	1.42	4.95***	0.11	2.24*
F -stat. for zero slopes of *D* 1, *D* 2, and *D* 3	0.06	1.31	0.16	0.16	1.12	1.13	1.27	2.85**	0.10	2.86**
Number of observations	1,440	1,440	1,440	1,440	1,440	1,437	1,440	1,440	1,252	1,428

	C: Dependent variable: Landholdings					D: Dependent variable: Liquid asset				
	Dummy for owning the house land	Dummy for owning farm land	Size of operational farmland for *aus*	Size of operational farmland for *aman*		Total value of household assets (BDT)	Dummy for owning livestock animals	Number of cows and bulls owned	Number of goats and sheep owned	Number of chickens and ducks owned
Intercept	0.306***	0.056**	0.567**	2.167***	2.339***	2827***	0.656***	0.378***	0.464***	2.961***
	[0.093]	[0.022]	[0.276]	[0.737]	[0.792]	[333]	[0.076]	[0.097]	[0.128]	[0.717]
D 1 (dummy for Flexible 1)	0.150	-0.033	0.956	0.242	1.294	425	0.039	0.117	0.042	0.250
	[0.113]	[0.023]	[0.804]	[1.160]	[1.254]	[527]	[0.091]	[0.139]	[0.161]	[0.837]
D 2 (dummy for Flex. 1+IGA)	0.072	-0.022	0.728	0.322	-1.022	613	-0.011	0.272	0.153	-0.561
	[0.129]	[0.029]	[0.728]	[1.518]	[1.036]	[473]	[0.093]	[0.230]	[0.182]	[0.838]
D 3 (dummy for Flexible 2)	0.125	-0.017	-0.147	-1.222	-0.861	411	-0.025	0.003	0.092	-0.192
	[0.121]	[0.029]	[0.318]	[0.834]	[0.917]	[395]	[0.090]	[0.121]	[0.158]	[0.812]
D 4 (dummy for non-borrower)	0.083	-0.014	0.753	0.186	0.553	381	-0.042	0.069	0.011	-0.689
	[0.090]	[0.023]	[0.621]	[1.162]	[1.041]	[319]	[0.077]	[0.110]	[0.135]	[0.676]
R^2	0.009	0.003	0.004	0.004	0.008	0.002	0.004	0.009	0.002	0.005
F -stat. for zero slopes of all dummies	0.67	0.88	1.01	1.17	1.82	0.50	1.19	0.61	0.43	1.81
F -stat. for zero slopes of *D* 1, *D* 2, and *D* 3	0.65	0.85	1.17	1.46	1.68	0.60	0.31	0.76	0.28	0.61
Number of observations	1,440	1,440	1,440	1,440	1,440	1,440	1,440	1,440	1,440	1,440

Notes: Robust standard errors clustered at the village level are shown in squared brackets. Significant at the 10% (*), 5% (**), and 1% (***) levels.
Source: Estimated by the authors, using the microdata described in the text.

Appendix Table 3: Attrition and Treatment Status

	(1)
VARIABLES	Dummy for Attrition
Constant	0.003
	(0.004)
Flexible 1	0.008
	(0.008)
Flexible 1+ IGA	0.008
	(0.013)
Flexible 2	0.010
	(0.009)
Dummy for Non-borrower	0.006
	(0.006)
Mean of the Dependent Variable	0.70
Observations	1,439
R-squared	0.002
F-stat. for zero slopes of treatment arms	0.75
F-stat	1.13
Control of Stratification	No
Control for Credit Distribution Month	No
Control for Household Characterestics	No

Notes: Robust standard errors clustered at the village level are shown in brackets. Significant at the 10% (*), 5% (**), and 1% (***) levels.

Source: Estimated by the authors using the microdata described in the text.