Estimating lending impacts using original 800 households

September 9, 2019
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Abstract We estimate the impacts of entrepreneurship in microfinance under a rural, low income setting of Northern Bangladesh using a randomised controlled trial. We provided a packaged loan that bundles an asset lending with managerial support programs which is intended to render entrepreneurship unnecessary. Following the cash flow of the asset, the packaged loan has a loan maturity of three years with one year of grace period. In comparing with a classic Grameen style loan that is a third in amount and has no grace period, we add two more treatment arms which jointly serve as a bridge between the two, large loan size arms with and without a grace period. For the Grameen style loans which serves as a control group, we repeat loan disbursement twice so the total loan size becomes equivalent. We thereby obtain a stepped-wedge design over the key features of loans, i.e., upfront liquidity, grace period, and in-kind loans with support programs. It is shown that entrepreneurship supports and a grace period do not change asset levels. It is also found that upfront liquidity increases both repayment rates and asset levels. These are accompanied with reduced consumption growth and increased labour income growth and decreased schooling of elder daughters towards the end of loan cycle. We take these results as evidence of a poverty trap which can be overcome by increasing the loan size.

Contents

I Introduction

- Describe outreach to ultra poor
- Motivate poverty trap and nonconvexity

According to over 3700 microfinance institutions (MFIs), there are estimated 204 million borrowers around the world in 2013, of which 110 million are "the poorest" borrowers whose incomes are below the national poverty line (Microcredit Summit Campaign, 2015). The outreach to the poorest of "the poorest," or the *ultra poor*, however, is arguably slow in comparison.[*1] This is in contrast with the idea that "everyone is an entrepreneur" where MFIs provide credits to the people of any income levels.

The potential reasons behind slow outreach to the ultra poor can be grouped into demand and supply sides. On the demand side, the ultra poor borrowers may not be entrepreneurial enough to demand credits for production, or may face an inferior production possibility than wealthier borrowers. On the supply side, MFIs may perceive the ultra poor as riskier than the moderately poor, or the loan size may be too small to justify the fixed transaction costs while the lender is constrained to keep the interest rate low to avoid adverse selection and moral hazard.

In assessing the plausibility of these possible causes, we run a randomised controlled trial on the poorest population in Bangladesh. Specifically, we test the necessity of entrepreneurial skills in successfully completing a loan cycle. To do so, we provided a packaged loan that bundles an asset lease with managerial support programs which is intended to render entrepreneurship unnecessary. Provided that the managerial support programs cover a sufficiently wide range of issues, the package is expected to achieve a no smaller return relative to a regular credit, had the entrepreneurial skills been indeed essential. As we track all the potential borrowers including who eventually opted out of borrowing, we are able to estimate the intention to treat estimates of offering loans and their implied necessity for entrepreneurial skills.

The asset, a heifer, is a prime investment choice in the studied area. There is little loss in production opportunity even when the loan takes an in-kind form that takes away a choice from the borrower therefore is generally considered to be less efficient. A heifer needs to be at least 2 years old to start lactation. The packaged loan is therefore given one year of grace period as we expect a member to acquire a heifer of one year old. In comparing with a classic Grameen style loan that is smaller in amount and has no grace period, we add two more treatment arms which jointly serve as a bridge between the two, large loan arms with and without a grace period. For the Grameen style loans which serves as a control group, we repeat loan disbursement twice so the total loan size becomes the same. We thereby obtain a stepped-wedge design over the key features of loans, i.e., upfront liquidity, grace period, and in-kind loans with support programs.

Our study closely follows the literature of microfinance design as hallmarked in Field et al. (2013) who found a grace period induces more risk taking and subsequent loan delinquency. Similar to their study, we allow some borrowers a grace period in repayment. We use an experiment under a more controlled environment that the investment choice set is smaller and the duration of grace period is tailored to match the cash flow profile of presumed (dairy cattle) production. Under our setting, unless one is committed to behave opportunistically, it is difficult to delay a payment or to invest in riskier assets when given a grace period that suits the actual cash flow of investment with a Pareto-dominant risk-return profile. Our study is also related to a large scale cattle transfer study

[*1] MF is not successful in reaching out to the poorest of the poor, or the ultra poor (Scully, 2004). Empirical evidence in Yaron (1994); Navajas et al. (2000); Rahman and Razzaque (2000); Armendáriz-Aghion and Morduch (2007) supports this claim. Some authors discuss the tradeoff between sustainability and outreach for microfinance institutions (MFIs) Hermes and Lensink (2011); Hermes et al. (2011); Cull et al. (2011).

conducted in the neighbouring area (Bandiera et al., 2017). The targeted population of their study is similar to ours, yet our study population resides on less stable terrain, are more exposed to flood and water logging, are considered to be less well connected to the market, are equally less trained, and are probably poorer. The chance of survival for each investment is expected to be no higher. The difference in experimental design is that they use a transfer while we use loans and leases, and charge a market-rate fee to everything we provide. Our experiment is designed to be financially viable if the repayment is made.

We found that entrepreneurship is not a prerequisite for microfinance lending and repayments. There is little difference in the outcomes out of the packaged attribute when compared to the traditional Grameen style lending. We intepret this as due to more uniform investment opportunity in the area compared with the urban setting of Field et al. (2013). We found that having upfront liquidity is the key to greater asset accumulation and higher loan repayment rates. We consider this as evidence of a poverty trap which is formed by the nnconvex production set of cattle. We also found weak evdence that a grace period also increases asset accumulation.

In the following section, we will describe the experimental setting of the microfinance intervention. The next Section summarises the existing literature. Section III gives the brief account of background of study site. Section IV shows a possible mechanism of poverty trap that our target population is under. Section V lays out the details of experimental design. Section VI explains the estimation strategy. In section VII, we provide a brief overview of the experimental results. Section VIII discusses the interpretation of results.

II Existing studies

- A high uptake rate (among members) poses less of the statistical power issue that plagues the benchmark study of Banerjee et al. (2015a)
- Heterogenous impacts of microcredits: Experiences/skills matter
- Mixed and weak impacts of MFI training programs: Entrepreneurial skills are not trained easily, it may have to be outsourced
- Grace period: Our study is marked to actual cash flow profile which may not encourage defaults
- Lending suffices: We also observe sustained asset level increase as in asset transfer programs

Due partly to insufficient statistical power,[*2] doubts are cast on the magnitude of microfinance impacts (Banerjee et al., 2015a; Duvendack and Mader, 2019; Meager, 2019) while asset grants (capital injection) remain to show high returns (de Mel et al., 2008; de Mel et al., 2014; Fafchamps et al., 2014; Bandiera et al., 2017). Lack of mean impacts forces researchers to look for a particular subgroup which shows impacts, or impact heterogeneity (Banerjee et al., 2017): Borrowers with prior experiences or high ability are shown to have higher returns (Banerjee et al., 2015c; McKenzie, 2017; Buera et al., 2017). By focusing on experienced members or existing firms, the current literature increasingly looks at impacts on the intensive margins. This study is targeted to an isolated greenfield population, so it looks at impacts on the extensive margins.

Higher impacts on experience is consistent with the large impacts of capital grant programs on existing firm owners. Wheather such experience or entrepreneurship is trainable remains unsettled. A growing body of management capital literature in developing countries is insightful yet most

[*2] Banerjee et al. (2015a) collects five studies of microfinance lending impacts. They raise lack of statistical power due to low take up. This naturally gives way to erroneously large impacts. Banerjee et al. (2015a) point that more able and experienced borrowers saw larger, "transformative effects." In the current study, in contrast, the up take rate is relatively high at 75%, of which 5% is lost to flood.

of the research is necessarily geared to existing firms, so it does not inform much on how one can assist novice entrepreneurs, or the trainability on the extensive margins.[*3] Karlan and Valdivia (2011); Bruhn and Zia (2011); Argent et al. (2014) are the exceptions, but results and quality of evidence are mixed: Former two report ineffectiveness using RCTs and the last reports effectiveness with observational data assuming placement exogeneity. The current study explicitly tests if the entrepreneurship matters in microfinance outcomes.

Another factor consistent with capital grant effectiveness is production set nonconvexity. Theories base lumpiness and credit market imperfection as keys to a povety trap (e.g., Galor and Zeira, 1993) but its empirical application is scant. A few studies report impacts of transfer programs. A transfer program in Northern Bangladesh closely related to this study, shows an occupational change and an income increase (Bandiera et al., 2017). Other transfer programs to the ultra poor also show increases in incomes and assets (Blattman et al., 2014; Banerjee et al., 2015b; Blattman et al., 2016; Haushofer and Shapiro, 2016). Similar to these studies, we note that the higher-return production set exhibits nonconvexity in the current study. So this study tests if frontloading the disbursement results in a higher asset level. Unlike previous studies, however, this paper uses a loan or a lease, not a transfer. If the liquidity constraint is keeping the people from using a higher-return production set, a loan is more straightforward way than a transfer to test it. Moreover, a loan or a lease, or charging a fee in general, may have an effect on its own on top of liquidity through self-selection or its use (Ashraf et al., 2010; Cohen and Dupas, 2010) which should be incorporated in, not separated from, testing a liquidity constraint.

In incorporating a heifer lease which requies some time to produce milk, we introduced a grace period. Previous research has shown its risk-inducing effects in the urban setting with the emphasis on liquidity of assets and its implications for shock coping (Field et al., 2013). Unlike them, the experimental setting of the current study has much a smaller choice set that limits the extent of willful/rational risk taking. It is shown that a grace period does not cause delinquency. This study is more in line with Beaman et al. (2015) who redesigned the repayment schedule after adopting the borrower's cash flow profile (repay after harvest), thus, on a good faith, a grace period is expected to reduce delinquency.

III Background

- Lowest income area with high annual flood risks
- No NGO/MFI presence
- Argue: Cattle $\geqslant$ goat in risk-return if invested
- But: higher inputs and upfront fixed costs
- Goats are better in: Inputs, returns, but worse in mortality/morbidity risks
- Goat sales: Requires relatively high incomes and gives an infrequent cash flow
- Cows: Higher price, vaccination, fodder

In the study area, cattle and goats/sheep are the main livestock that residents own. Existing studies in the South Asian context show the morbidity of goat kids ranges from 12% (Mahmud et al., 2015)

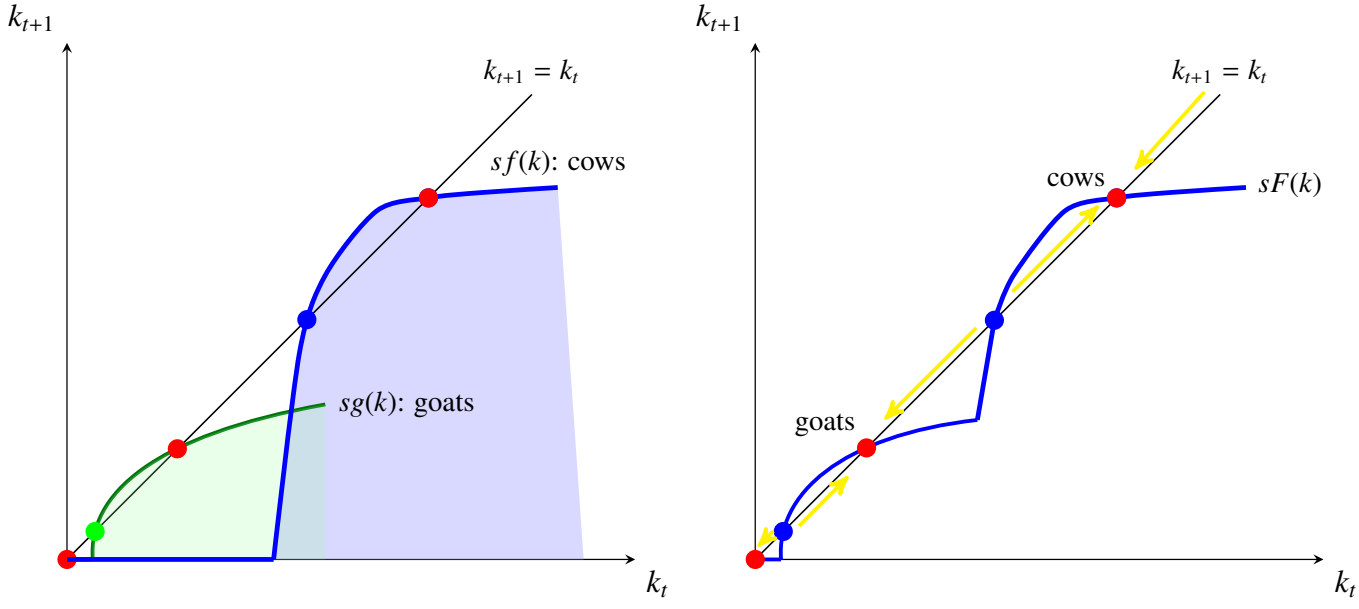
[*3] Bruhn et al. (2018) shows intensive management consulting services to the small scale firms in Mexico resulted in sustained improvements in management practices which led to higher TFP and larger employment. Others also show effectiveness (Calderon et al., 2011; Berge et al., 2012; Bloom et al., 2013) while others do not (Bruhn et al., 2012; Karlan et al., 2015). McKenzie and Woodruff (2013) put them as: These managerial impacts studies are too different to compare, in terms of population, interventions, measurement (variables, timing), and most importantly, implied statistical power in the design.

to more than 50% in some diseases (Nandi et al., 2011, Table 5), while cattle morbidity is around 22% (Bangar et al., 2013). Goat kid mortality ranges from 6% (Mahmud et al., 2015) to 30% (Paul et al., 2014, Table 5) (Ershaduzzaman et al., 2007). Heifer mortality is between 5% (Hossain et al., 2014, p.332R) to 10% (Alauddin et al., 2018). Higher morbidity of goat kids partly reflects their eating style that uses lips rather than tongues (as cattles do) and vulnerability to logging water.

Reproductive capacity of goats are high that parity size approaches to 2 at the third birth, and the birth interval is about 200 days (Hasan et al., 2014). An indigenous cow has a birth interval of 375 to 458 days (Hasan et al., 2018), resulting in about 2 years for gestation and calving interval (Habib et al., 2012) with the mean lifetime births of 4 (Hasan et al., 2018, Table 1). Lactation length is 227 days and milk yield is 2.2 kg per day (Rokonuzzaman et al., 2009) while goat milk is seldom marketed. It is also worth noting that a meat market requires a cluster of relatively high income earners, which takes some efforts to get to from the river islands. Goat meat sales is seasonal and it does not provide a frequent cash flow.

Rearing costs are higher for cattle as it requires fodder while a goat will eat the bushes. Cattle requires vaccination shots when a goat is usually left unvaccinated. Goat kid's potentially higher reproductive capacity and lower rearing costs are, however, more than offset by the elevated morbidity and mortality risks, and a less frequent cash flow. Residents also report that a goat herd is less mobile than single cattle when they are forced to evacuate during the flood. All of these considerations prompt residents to opt for cattle when they can afford it, and do not expand the herd size of goats, which are both confirmed in our data.

IV Theory



- Contour of two production functions, a nonconvex production set, gives rise to a poverty trap
- Goats relative to cows as an investment: Infrequent income stream, limited local consumption, vulnerability to logging water, a herd is less mobile
- Goat returns net of mortality are lower (not generally, only in this area) and one cannot scale up goats: Takes long to switch to cow ownership
- No saving constraint required, saving = depreciation at equilibria
- The entire region depicted in the diagram represents poverty, so it shows a poverty trap within poverty (i.e., ultra poor and moderately poor)

- We are not going to show the production nonconvexity, instead we show lower repayment rates and smaller cattle holding for a smaller loan size, just as Bandiera et al. (2017) did

V Experimental design

The primary aim of the study is to assess if the entrepreneurial skills matter in microfinance lending outcomes. We do so by providing knowledge to a group through training so some part of entrepreneurship will no longer be a prerequisite. Some of other members who are not provided knowledge may opt out the loan or perform worse. One can measure impacts of entrepreneurship by comparing these two groups.

In an attempt to make entrepreneurial skills that members may possess redundant, we provide a packaged loan that bundles an asset lease with managerial support programs. The asset, a heifer, is a prime investment choice in the studied area. So there is little loss in production opportunity even when the lending takes an in-kind form (which then becomes a lease with an option to repay with money) that takes away a choice from the borrower therefore is generally considered to be less efficient. Provided that the managerial support programs cover a sufficiently wide range of issues, the package effectively renders the entrepreneurial skills redundant and is expected to achieve a no smaller return relative to a regular credit, had the entrepreneurial skills are indeed essential.

As entrepreneurial skills are unobservable, one must assume its characterisation as a production factor. In one of the experimental arms, we offer advise, relevant knowledge through training sessions, provide links to veterinarians, fodder suppliers, and milk buyers. It can be seen that we are offering a capacity to use the best practice or *cristalised intelligence* related to cattle production. This is only a part of entrepreneurial skills. As we were unable to randomly provide *fluid intelligence* that may be amenable to apply a suitable action to unforeseen events, the estimated impacts are considered to reflect hightened awareness of the production knowledge that can be manipulated by outsiders. This characterisation suggests that this portion of entrepreneurial skills is a tradeable input that professional consultants provide in the management capital literature.

A heifer needs to be about 15 months old to be ready for insemination and takes about 9.5 months to deliver a calf as it starts lactation, or the total of about 2 years. Presuming that one acquires a heifer of one year old, the packaged loan requires at least one year of grace period. As a natural reference, we compare it with the traditional regular microcredit, a classic Grameen style loan that is about a third in loan size and has no grace period. In order to make comparison feasible, we added two intermediate treatment arms to bridge in between: Arms with a large amount of cash that is equivalent of heifer price, one with a grace period and another without a grace period. With the loan sizes that are three times the traditional microfinance loans, we extended the maturity to three years. As the comparison arm, the traditional regular microcredit, has only one year maturity, we provided the total of three loans in three loan cycles which are unconditionally disbursed annually so the total loaned amount will be aligned and there is no selection due to delin quency. As a result, four arms have the equivalent loan size but with different characteristics in upfront liquidity, grace period, and the medium of loans bundled with support programs. In effect, we constructed a stepped-wedge design over these key features of loans, namely, Upfront, WithGrace, and InKind, to assess individual impacts on the outcomes as indicated in Table 1.

Our sample is drawn from the population of river island (*char*) villages in Northern Bangladesh. We selected the areas of no NGO/MFI activity. 80 villages are randomly chosen and we formed a member committee of 10 households, of which 6 are ultra poor and 4 are moderately poor. The poverty status was determined by a participatory ranking process. We randomised the loan arms at the village level. All loan products are of individual liability and the committee was intended to serve as an activity platform for MFI operations.

Baseline data was collected in 2012 prior to the loan type randomisation. After offering the arms, three groups opted out as a group. This was unexpected as we have explained the loan types, the

TABLE 1: A 4×4 FACTORIAL, STEPPED WEDGE DESIGN

	large, grace	large	traditional
cow	entrepreneurial capacity constraint (InKind)	saving constraint (WithGrace)	liquidity constraint (Upfront)
large, grace		saving constraint (WithGrace)	liquidity constraint (Upfront)
large			liquidity constraint (Upfront)

Note: Cell contents are hypothesised constraints on investments that exists in the column arm but are eased in the row arm. Contents in brackets are variable names of respective attributes.

random assignment process, and have obtained everyone's consent to participate before randomisation. Although they refused to receive a loan, they gave a consent to be surveyed so we track them in subsequent survey rounds. We further lost four groups to the flood in 2013. As they relocated, we had no choice but to drop them from the study. In addition to group level rejection/attrition, we had 90 individual loan rejectors. They agreed to receive a loan before we offered it, and they changed their mind. We retain them in the study as they agreed to be surveyed even in the absence of loans. As a result, we have flood victims whom we do not track, group rejectors, individual rejectors and borrowers that we track. See Takahashi et al. (2017) for more details on the randomisation and acceptance process.

VI Empirical strategy

With the panel of 4 rounds, we use the difference-in-differences (DID) estimators to measure impacts of a particular loan attribute. As we include loan rejecters, what we are estimating is intention-to-treat effects. For an ease of interpretation, we will assign indicator variables for each attribute, Upfront, WithGrace, InKind rather than using loan arm indicators. Numerically, both are equivalent. The first estimating equation is:

$$\Delta y_{it} = a_{10} + \boldsymbol{a}_1' \mathbf{d}_i + e_{it}, \tag{1}$$

where, for member i in period t, y_{it} is an outcome measure, $\mathbf{d}_i$ is a vector of indicator variables in loan attributes that i receives, e_{it} is an error term which can be correlated within a MFI group, and Δ is a first-difference operator. To allow for time-varying impacts, we estimate:

$$\Delta y_{it} = a_{10} + \boldsymbol{a}_1' \mathbf{d}_i + a_{t0} c_t + \boldsymbol{a}_t' c_t \mathbf{d}_i + \boldsymbol{b}' \Delta \mathbf{x}_{it} + e_{it}, \tag{2}$$

where c_t is a period indicator variable for $t > 1$ that takes the value of 1 at t, 0 otherwise, $\mathbf{x}_{it}$ is a vector of time-variant covariates. The specification allows treatment effects to be time-varying by interacting with the period indicator. a_{t0} measures the period t deviation from a_{10}, $\boldsymbol{a}_t'$ measures the period t deviation from $\boldsymbol{a}_1'$ for each attribute. The estimates of main interest $\boldsymbol{a}_1', \boldsymbol{a}_t'$ constitute a collection of DID estimates. By using a differenced data on fixed covariates, we obtain incremental impacts in a period as main estimates. With incremental changes per period, one can compute cumulative effect sums. [*4] All the standard errors are clustered at the group (char) level as suggested

[*4] For an attribute A, all periods share $a_{10} + a_{1,\mathrm{A}}$ as the baseline change per period, and $a_{t0} + a_{t,\mathrm{A}}$ are deviations from it at period t, so the incremental change is their sum. Cumulative change sum is:

$$\Delta 1\text{st period} = a_{10} + a_{1,\mathrm{A}},$$

$$\Delta 1\text{st period} + \Delta 2\text{nd period} = 2\left(a_{10} + a_{1,\mathrm{A}}\right) + a_{20} + a_{2,\mathrm{A}},$$

$$\Delta 1\text{st period} + \Delta 2\text{nd period} + \Delta 3\text{rd period} = 3\left(a_{10} + a_{1,\mathrm{A}}\right) + a_{20} + a_{2,\mathrm{A}} + a_{30} + a_{3,\mathrm{A}}.$$

by Abadie et al. (2017).[*5]

VII Results

- Randomisation went well at group level
- Loan rejection is related to flood and smaller household size in nontraditional arm, smaller livestock values for traditional arm
- Traditional arm rejecters have smaller livestock values but with similar household size as non-traditional rejecters, implying some unused capacity for them to raise more livestock, or participation to large sized lending if offered
- This hints that once household size and risk are mitigated, poverty trap may be overcome
- Less educated members attrited in traditional arm indicates there may be underestimation, if there is an attrition bias at all (so, no need to use Lee bounds, I think)
- Greater accumulation of assets (livestock, productive assets, household assets) for Upfront attribute
- No impacts of InKind on asset accumulation, rejecting the necessity of entrepreneurship, which is in contrast with the finding of existing studies that impacts are larger for the experienced borrowers ... everyone can be an entrepreneur at this level of skills?
- Lower repayment rates for traditional
- Greater asset accumulation and higher repayment rates for Upfront suggests nonconvex production, a poverty trap
- More diverse and smaller scale investment portfolio among traditional
- Large consumption increase in period 2, smaller consumption increase and larger increase in labour incomes in period 3, interpreting these as repayment burden
- Schooling of primary school aged girls increased but decreased for high school age girls for Upfront, nutrition/wealth effects for younger girls and stronger labour demand effects for older girls

VII.1 Participation

The reasons behind nonparticipation are fundamental in understanding the outreach. Selective attrition may bias the estimates so we need to know attriter's characteristics. In this section, we check how participation and attrition are different between arms. To do so, we test if the household characteristics are different between participants and nonpariticipants, or attriters and nonattriters. We use permutation tests to examine if there is a difference in mean characteristics between any two groups. We use 100000 random draws from all admissible permutations.

Before examining participation decisions, we confirm randomisation balance. Despite there were rejections to participate at the group level, we see randomisation balance was reasonably achieved

[*5] To aid the understanding if the data is more suited to the assumption of first-difference (FD) rather than fixed-effects (FE), we use a check suggested by Wooldridge (2010, 10.71). It is an AR(1) regression using FD residuals. Most of results show low autocorrelations in FD residuals which is consistent with the assumption of FD estimator. The issue of choice between FD or FE is not of primary importance, as the use of cluster-robust standard errors gives consistent estimates of SEs in both estimators, and it boils down to efficiency.

TABLE 2: PERMUTATION TEST RESULTS OF GROUP REJECTION IN TRADITIONAL ARM VS. PARTICIPANTS IN NON-TRADITIONAL ARM

variables	NonTradArm	TradArm	p-value.lower	p-value.mid	p-value.upper
HeadLiteracy	0.124	0.050	0.123	0.166	0.209
HeadAge	38.073	39.026	0.558	0.561	0.564
HHsize	4.236	4.200	0.859	0.882	0.905
FloodInRd1	0.465	0.275	0.013	0.017	0.021
HAssetAmount	804	872	0.505	0.507	0.509
PAssetAmount	1152	1362	0.489	0.489	0.489
LivestockValue	5958	1291	0.003	0.003	0.003
NumCows	0.267	0.037	0.005	0.005	0.005
NetValue	7924	3078	0.024	0.024	0.024
n	491	40	(rate: 0.075)		

Source: Estimated with GUK administrative and survey data.

Notes: 1. R's package coin is used for baseline group mean covariates to conduct approximate permutation tests. Number of repetition is set to 100000. Step-down method is used to adjust for multiple testing of a multi-factor grouping variable. TradArm is group-rejecters in traditional arm NonTradArm is borrowers in non-traditional arms. Both columns show means of each group.

2. ***, **, * indicate statistical significance at 1%, 5%, 10%, respetively. Standard errors are clustered at group (village) level.

as there is no household characteristics whose p value exceeding 10% for the difference between intervention arms at the group level (TABLE B1 in Appendix B).

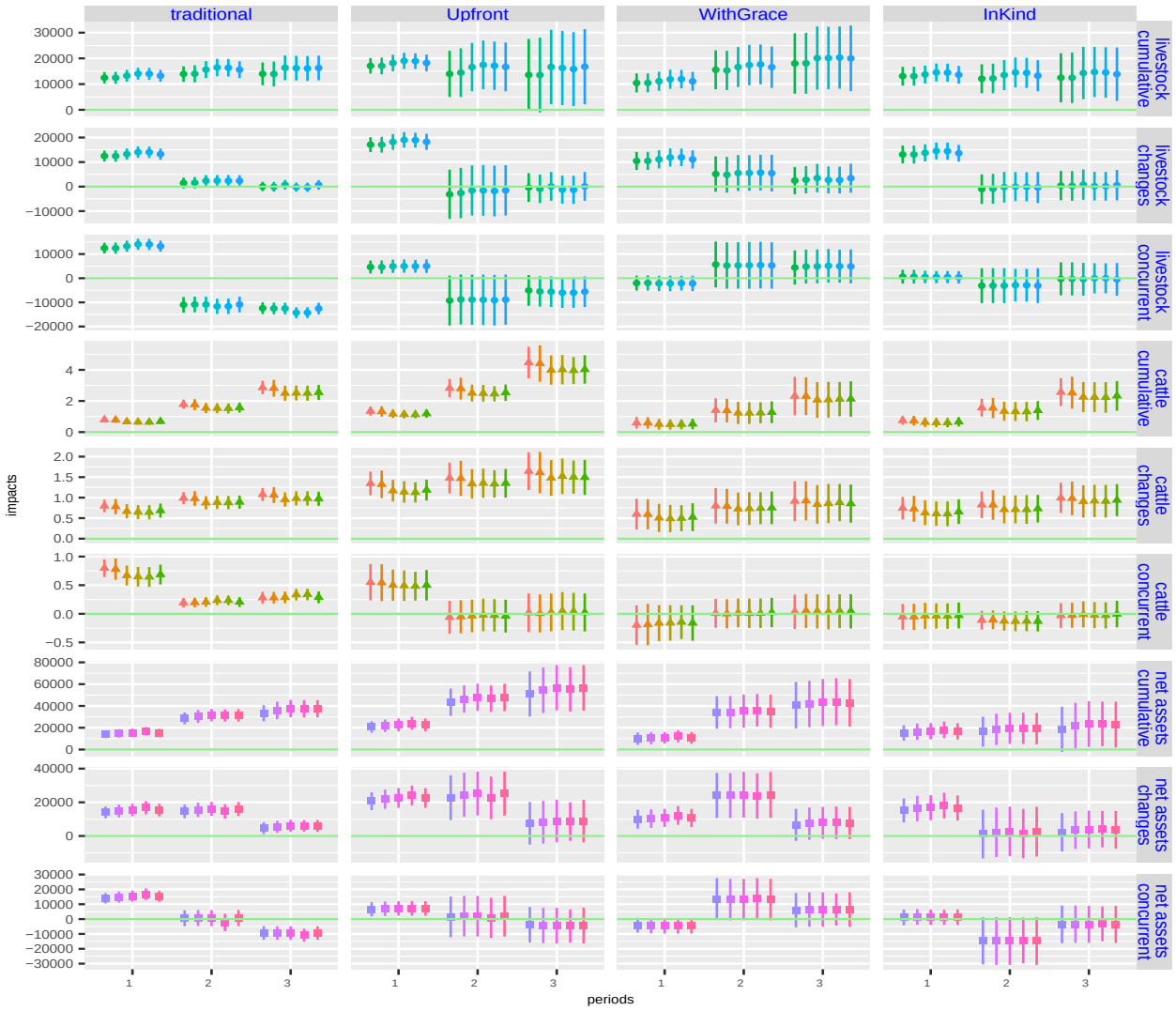
We examined the difference between various groups in Appendix C. In summary, group rejecters of traditional and non-traditional differ. Baseline flood and younger household head are associated with group rejection for non-traditional while low livestock values for traditional (TABLE C8, TABLE C9). Non-traditional group rejecter have more livestock values than traditional group rejecters (TABLE C10). In contrast to group rejecters, individual rejecters have similar characteristics between these two groups (TABLE C14), and the common factor associated with nonparticipation is small household size (TABLE C12), and for non-traditional arms, baseline flood exposure is also correlated (TABLE C13).

As for group rejecters, we observed that lower livestock values are associated in traditional arm while it was mostly flood exposure for non-traditional arms. Given randomisation, we conjecture that it is lack of liquidity, or lack of Upfront attribute, prevented smaller livestock holders of traditional arm because they cannot purchase cattle due to insufficient saving or resale value of livestock, when members of similar characteristics partcipated in non-traditional arms. In TABLE 2, group rejecters of traditional arm and borrowers of non-traditional arms are compared. It shows the former is less exposed to flood in baseline and has lower livestock values. This implies that, once large enough sum of loan is disbursed, a poverty trap at this level may be overcome once household size and negative asset shocks are accounted for.

We see that households lacking labour resources and with a recent flood damage may opt out the borrowing. This is in contrast to the asset transfer programs where everyone participates. As some households who did not meet the conditions to raise cattle withheld themselves from participating, it may have caused the repayment rates to be higher than other programs targeting the poor.

The survey comes with a moderate rate of attrition. We checked for systematic differences between attriters and nonattriters in TABLE 3 (see more detailed attrition examination in Appendix C). The attrition is not correlated with household level characteristics. As attrition rates differ between traditional and non-traditional arms, we compare them in TABLE 4. It shows that traditional arm attriters have a lower rate of head literacy while non-traditional arm attriters are more exposed to the flood. The traditional arm attriters may be less entrepreneurial, if anything, so their attrition may upwardly bias the positive gains of the arm, hence understate the relative impacts of non-traditional arm. So one can employ Lee bounds for stronger results, but doing so will give us less precision and require more assumptions.

FIGURE 1: CUMULATIVE EFFECTS ON LIVESTOCK AND NET ASSETS



Source: Constructed from FD estimation results.

Note: For traditional arm, additional impact in a period relative to period 1, or a second-order difference, is given by $\Delta^2$2nd period = Period2, $\Delta^2$3rd period = Period3. For attribute X, Δ^1_X1st period = X, Δ^2_X2nd period = Period2 + X.Period2, Δ^2_X3rd period = Period3 + X.Period3. Per period changes in period 1 is Δ1st period = intercept for traditional, Δ_X1st period = intercept + X for other attributes, period 2 and 3 for traditional are Δ2nd period = Δ1st period + $\Delta^2$2nd period = intercept + Period2, Δ3rd period = Δ1st period + $\Delta^2$3rd period = intercept + Period3. For other attributes, Δ_X2nd period = Δ_X1st period + Δ^2_X2nd period = intercept + X + Period2 + X.Period2, Δ_X3rd period = Δ_X1st period + Δ^2_X3rd period = intercept + X + Period3 + X.Period3. Cumulative change sums are Δ1st period + Δ2nd period = 2intercept + Period2, Δ1st period + Δ2nd period + Δ3rd period = 3intercept + Period2 + Period3, Δ_X1st period + Δ_X2nd period = 2(intercept + X) + Period2 + X.Period2, Δ_X1st period + Δ_X2nd period + Δ_X3rd period = 3(intercept + X) + Period2 + X.Period2 + Period3 + X.Period3. For each outcome, top panel shows cumulative sums. Second panel shows per period changes Δ1st period, Δ2nd period, Δ3rd period. Third panel shows per period chanegs relative to period 1 change of traditional, $\Delta^2$2nd period, Δ^2_X2nd period, $\Delta^2$3rd period, Δ^2_X3rd period are plotted. For period 1, Δperiod 1 for traditional and Δ^1_X1st period for other attributes are shown. Bars show 95% confidence intervals using cluster robust standard errors.

TABLE 3: PERMUTATION TEST RESULTS OF ATTRITION

variables	NonAttrited	Attrited	p-value.lower	p-value.mid	p-value.upper
HeadLiteracy	0.115	0.112	0.873	0.937	1.000
HeadAge	37.996	39.095	0.279	0.280	0.281
HHsize	4.178	4.267	0.537	0.548	0.559
Arm	0.789	0.517	0.000	0.000	0.000
FloodInRd1	0.493	0.496	0.920	0.960	1.000
HAssetAmount	774	705	0.210	0.210	0.210
PAssetAmount	1161	1266	0.665	0.665	0.665
LivestockValue	6069	5554	0.533	0.533	0.533
NumCows	0.271	0.262	0.813	0.832	0.850
NetValue	7722	7790	0.962	0.962	0.962
n	684	116	(rate: 0.145)		

Source: Estimated with GUK administrative and survey data.

Notes: 1. R's package coin is used for baseline mean covariates to conduct approximate permutation tests. Number of repetition is set to 100000. Step-down method is used to adjust for multiple testing of a multi-factor grouping variable. Attrited and Nonattrited columns show means of each group. For Arm, proportions of non-traditional arm are given.

2. ***, **, * indicate statistical significance at 1%, 5%, 10%, respetively. Standard errors are clustered at group (village) level.

TABLE 4: PERMUTATION TEST RESULTS OF ATTRITERS BETWEEN TRADITIONAL AND NON-TRADITIONAL ARMS

variables	NonTradArm	TradArm	p-value.lower	p-value.mid	p-value.upper
HeadLiteracy	0.125	0.028	0.096	0.150	0.205
HeadAge	40.175	38.694	0.582	0.585	0.588
HHsize	4.275	3.972	0.384	0.404	0.425
FloodInRd1	0.650	0.400	0.020	0.029	0.039
HAssetAmount	697	684	0.920	0.923	0.925
PAssetAmount	767	882	0.254	0.254	0.254
LivestockValue	3382	5094	0.244	0.244	0.244
NumCows	0.152	0.242	0.224	0.245	0.266
NetValue	4702	5375	0.815	0.815	0.815
n	40	36	(rate: 0.474)		

Source: Estimated with GUK administrative and survey data.

Notes: 1. R's package coin is used for baseline mean covariates to conduct approximate permutation tests. Number of repetition is set to 100000. Step-down method is used to adjust for multiple testing of a multi-factor grouping variable. NonTradArm and TradArm columns show means of each group. Attrition due to flood is dropped.

2. ***, **, * indicate statistical significance at 1%, 5%, 10%, respetively. Standard errors are clustered at group (village) level.

VII.2 Impacts

FIGURE 1 summarises estimation results as cumulative impact sums and additional impacts (see Appendix tables for full estimation results). There are three stock outcome variables, livestock values, number of cattle, and net asset values. For each outcome, there are three panels. First panel shows cumulative impacts up to period 1 (between survey rounds 1-2), period 2 (rounds 2-3), and period 3 (rounds 3-4) which are displayed along the horizontal axis. In each period, there are several estimation specifications which are bunched side-by-side. This is intended to show robustness to specification changes at a glance. One sees that there is little variation across specifications. As we multiply the estimates when we compute cumulative sums, it widens standard error bands in the later periods which unnecessarily clouds impact estimates. To assess the estimates in a less noisy way, the second panel shows the changes in each period, Δ1st period, Δ2nd period, Δ3rd period. In addition, to make comparison easier against the traditional arm, the third panel shows changes relative to concurrent changes of traditional arm. For traditional arm in the third panel, they show changes in period 1, period 2 - period 1, and period 3 - period 1.

FIGURE 1 shows impacts on livestock holding values, cattle holding, and net asset values. One sees in livestock values, cumulative a sustained increase of livestock holding values in all arms. Second panel livestock values, changes, showing per period changes, indicates positive impacts only in period 1 for all attributes which reflects the loan receipt. When we convert these impacts to contemporaneous relative-to-traditional impacts in the third panel livestock values, contemporaneous, one sees that changes in period 2 and 3 cannot be statistically distinguishable from tradtional arm. This may not be surprising that all arms are receiving the equivalent sums by the beginning of period 3. At the same time, we acknowledge that the price information used to convert livestock holding to values, the median reported prices among survey respondents, is expected to have measurement

errors. This may bias the results to any direction, so we use number of cattle holding as a proxy of livestock holding values in the second three panels. It is a reasonable proxy as the largest share of livestock value comes from cattle and goats and sheep are less popular in the area.

Expectedly, we see a sustained cumulative increase in all arms in number of cattle, cumulative panel. The relative additional impacts by period, shown in number of cattle, concurrent panel, are found to be large with the Upfront attribute especially in the first period. This is no surprise as a large liquid sum disbursed from the lender should face a relatively less obstacle in converting into livestock holding than in traditional arm while households may not have additional resource to buy more calf in period 2 or 3. The traditional arm members have increasing changes in the size of cattle holding in period 2 and 3, which can be explained by the second and third disbursements. Upfrontness does not lead to constant additional increase in period 3 as one sees the error bands cross the zero line. WithGrace attribute and InKind attribute received sustained cumulative impacts, yet the increaments relative to traditional are statistically zero for all periods.

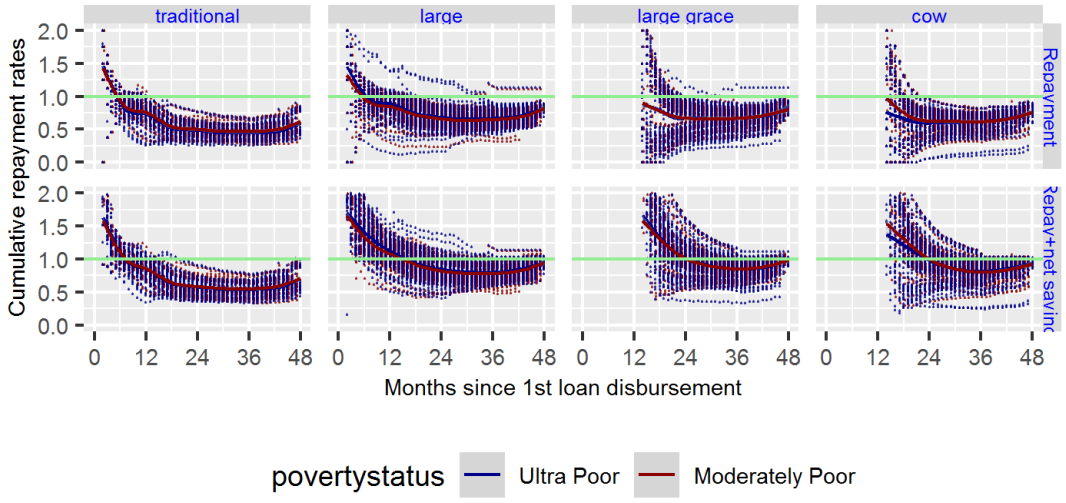
Net assets, defined by asset and livestock holding values less debt values, shows similar patterns as in livestock holding values, a sustained increase in assets, only that net assets have larger increments. This reflects that loan recipients accumulate household and productive assets. Livestock values did not change in period 2 and 3 for traditional arm, but the net asset values continue to increase in period 2 and 3, indicating sales of livestock. WithGrace attribute has relatively large increments in period 2 when one compares with contemporaneous traditional arm increments while the opposite is true in period 1. The latter is expected because debt does not decrease in period 1 for WithGrace arm when they do not repay, and the cattle valuation remains at the price of purchase, hence no increase, during the first year. Relative increases were larger in period 2 and 3 for WithGrace than traditional although the p values are around 10%. This suggests that having a grace period helps accumulate assets. The Upfront attribute has the larger asset accumulation relative to traditional in period 1. In all arms, net asset increments are large during first two periods, and smallest in the last period. We conjecture that this is due to loan repayment burden, which is consistent with what we observe in consumption and labour income patterns.

Traditional arm experienced a sustained increase in all outcomes. However, even they received an equivalent loan amount, the cumulative impacts on net assets are smaller than Upfront attribute. This is consistent with the nonconvex production technology for cattle under a liquidity constraint.

Looking at impacts of the InKind attribute on cattle holding, livestock values and net asset values, entrepreneurship (to the extent that is necessary for dairy livestock production) may not be an impediment for a microfinance loan uptake and successes among members. This is in contrast with the existing studies which observed larger impacts among the more experienced borrowers. Previous studies targeted the population with a richer set of investment possibilities in a more urbanised setting, which feeds impact heterogeneity. In the current study, the population resides in a remote area with cattle as the dominant production possibility, and this may drive impacts to be more homogenous. The dairy cattle farming that consists of feeding, grazing, pregnancy and calving may turn out not to be too demanding in terms of crystalised intelligence in comparison with micro scale production in urban areas.

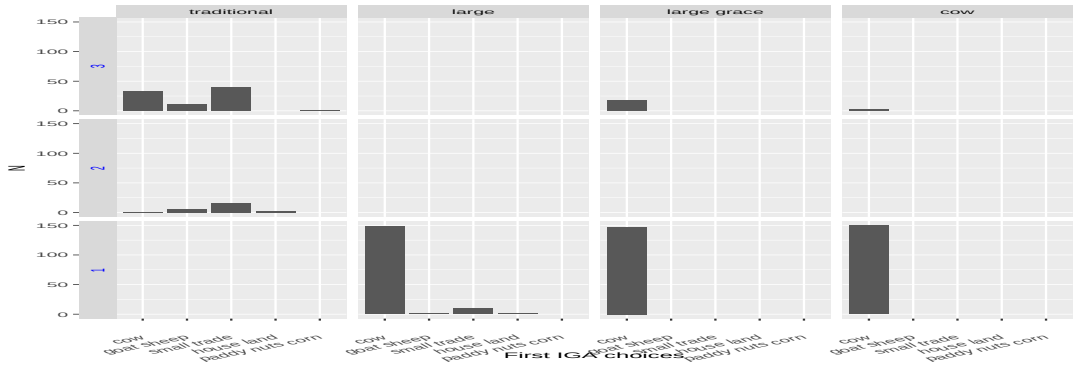
FIGURE 2 shows ratio of cumulative repayment to cumulative due amount, ratio of sum of cumulative repayment and cumulative net saving (saving - withdrawal) to cumulative due amount, both are plotted against weeks after first disbursement. Each dot represents a member at each time point. Value of 1, which is given by a horizontal line, indicates the member is at per with repayment schedule. One sees that repayment rates are above 1 at the beginning but stay below 1 for most of the time. The majority of borrowing members did not repay the loan by the 48th month with installments. One notes traditional arm has lower repayment rates of all arms. When a member does not reach the due amount with installments, they had to repay from net saving, an arrangement to which the lender and the borrowers agreed at the loan contract. Repayment rates after paying from net saving are 44.71, 93.57, 97.01, 95.42%, respectively, for traditional, large, large grace, cow arms and 87.85% for overall. [Abu-san: Why does the admin data continue up to the 48th month,

FIGURE 2: CUMULATIVE WEEKLY REPAYMENT RATES



Note: Each dot represents weekly observations. Only members who received loans are shown. Each panel shows ratio of cumulative repayment sum to cumulative due amount sum, ratio of sum of cumulative repayment and cumulative net saving (saving - withdrawal) sum to cumulative due amount sum, both are plotted against weeks after first disbursement. Value of 1 indicates the member is at per with repayment schedule. Horizontal lines has a Y intercept at 1. Lines are smoothed lines with a penalized cubic regression spline in ggplot2::geom_smooth function, originally from mgcv::gam with bs='cs'.

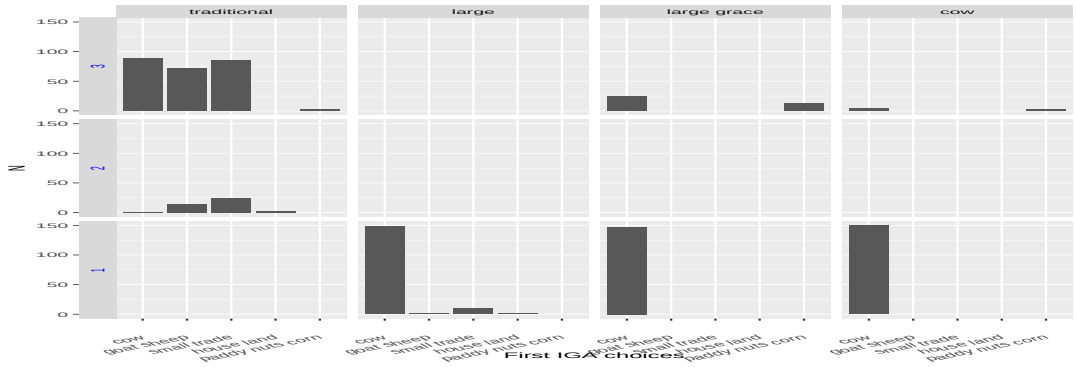
FIGURE 3: IGA CHOICES



Source: Administrative data.

Note: Based on information reported at the weekly meeting.

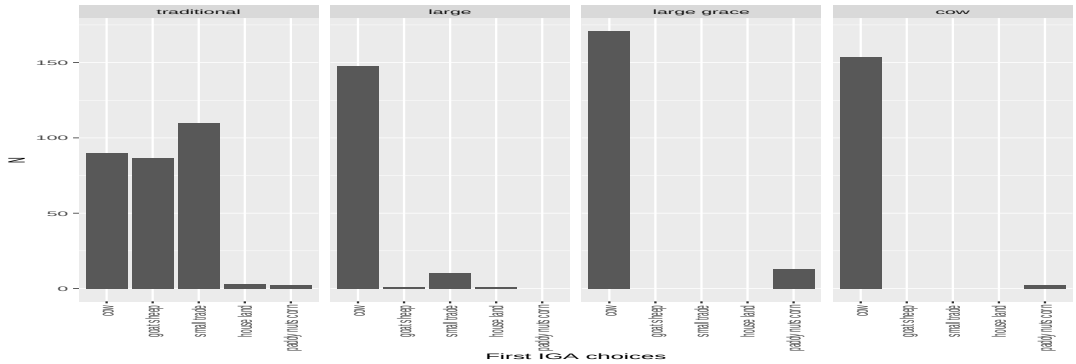
FIGURE 4: ALL IGA CHOICES



Source: Administrative data.

Note: Based on information reported at the weekly meeting.

FIGURE 5: ALL IGA CHOICES



Source: Administrative data.

Note: Based on information reported at the weekly meeting.

not 36th?]

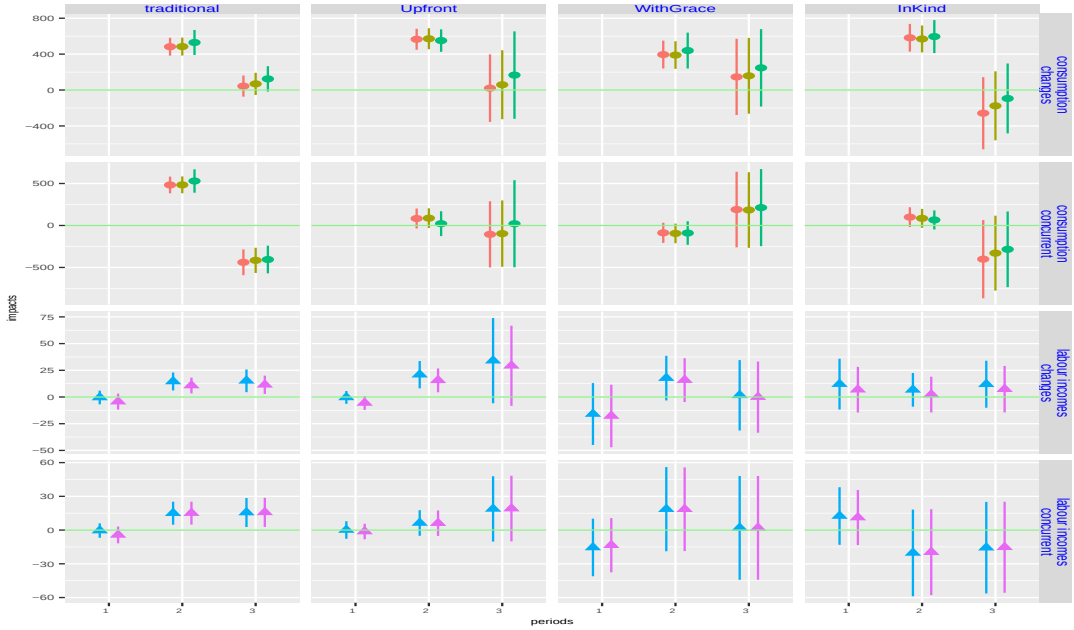
There is little difference in repayment rates by poverty classes. FIGURE 2 depicts both moderately poor and ultra poor. It is impossible to distinguish between them with eyeballs, and DID estimates also confirm this. This is in contrast to a popular belief that the ultra poor are the riskiest among all income classes. Poverty gradation through a participatory process, however, does not distinguish the moderately poor and the ultra poor on the observables. FIGURE A1 shows net asset values at baseline by poverty class, and FIGURE A2 shows initial livestock values at baseline by poverty class. Both show little difference in these observable characteristics. [Abu-san: Any ideas why?]

Smaller cumulative impacts and lower repayment rates of traditional arm members stand out once we acknowledge that they are receiving an equivalent amount and their contract differs with other arms only in the attributes we focus. These differences arise partly from the difference in investment choices. FIGURE 3, 4 show that almost no one of the traditional arm invested only in one project while only few members did so with the Upfront attribute. Goat/sheep and small trades are the top choices for the first income generating activities (IGAs) in traditional. This is consistent with convexity in the production technology of large domestic animals under a liquidity constraint. This also validates our supposition in experimental design that cattle production is the most preferred and probably the only economically viable investment choice. It reduces a concern that the cow arm may have imposed an unnecessary restriction in an investment choice by forcing to receive cattle. FIGURE 5 shows there are a significant number of cases in the traditional arm that members reportedly raise cows, yet they are also accompanied by pararell projects in smaller livestock production and small trades.

FIGURE 6 depicts estimates of consumption and labour incomes. As these are flow variables, we do not show cumulative impacts, and the top panel shows changes per period, the second panel shows changes relative to traditional. Consumption is not measured in the baseline, so we do not use it to understand welfare impacts but to understand how the members have dealt with the loan repayment. Consumption increased in period 3 and 4 except for InKind attribute. Increments were smaller in period 4 in all arms. As the repayment was delinquent after period 2, it is interesting that members increased the consumption while kept the loan repayment at sub-due level in period 3, but decreased the consumption and increased loan repayment in period 4. This hints naïveté of members who are not used to borrowing yet still conforming with the repayment discipline at the end. Labour income follows a pattern consistent with this interpretation of consumption that members increase their labour supply towards the end of loan cycle to aid repayment. The increased repayment in period 4 may thus have been born out of reduced consumption and increased wage labour.

In FIGURE 7, effects on child schooling are plotted. The impacts are on school enrollment probability changes, and concurrent panels are of interest as they show differences in enrollment changes

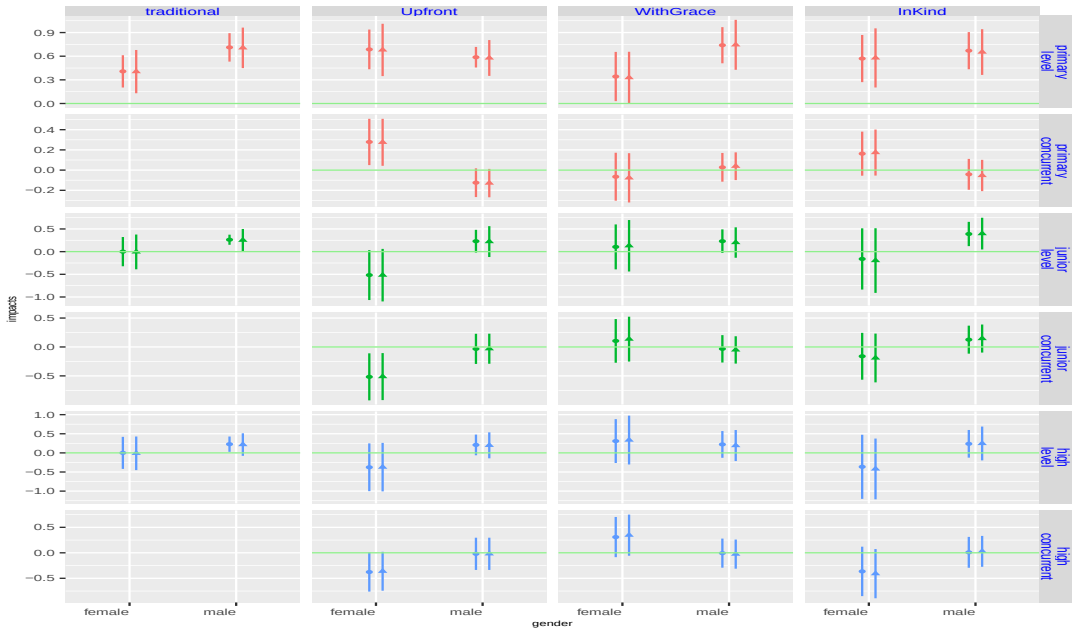
FIGURE 6: EFFECTS ON LABOUR INCOMES, CONSUMPTION



Source: Constructed from FD estimation results.

Note: Top panel shows additional impacts by period which are obtained by Δ1st period = intercept + X, Δ2nd period = intercept + X + Period2 + X.Period2, Δ3rd period = intercept + X + Period3 + X.Period3. Second panel shows changes relative to traditional which is obtained by X, X.Period2, X.Period3. Bars show 95% confidence intervals using cluster robust standard errors.

FIGURE 7: EFFECTS ON SCHOOLING



Source: Constructed from FD estimation results.

Note: Top panel shows additional impacts by period which are obtained by Δ1st period = intercept + X, Δ2nd period = intercept + X + Period2 + X.Period2, Δ3rd period = intercept + X + Period3 + X.Period3. Second panel shows changes relative to traditional which is obtained by X, X.Period2, X.Period3. Bars show 95% confidence intervals using cluster robust standard errors.

between each attribute and traditional. One sees positive impacts on female primary school enrollments and negative impacts on female junior and high school enrollments with Upfront attribute. We interpret the former impact as nutrition/wealth effects of cattle rearing that children get to drink milk more. The reason, we conjecture, that only girls have positive impacts is that boys might have been drinking milk even in the absence of intervention. Negative impacts of elder girl's schooling may be due to stronger demand for cattle production in a household. Having cattle to take care of naturally shifts the relative prices in a household against child schooling, especially for elder girls as their returns on human capital are considered to be lower and task contents of cattle labour are less brawn intensive yet requires to be above primary school ages. This may be a downside of having more household production with cattle.

VIII Conclusion

- No entrepreneurship is necessary for project success, due probably to a simpler production process
- Upfront liquidity increases asset holding and repayment rates, not the loan size *per se*
- Cattle has higher returns and lower risks, resulting in higher repayment rates, but also has larger initial fixed costs, possibly generating a poverty trap
- Lending uptake is impeded by small household size and asset shocks
- If these are met, a poverty trap may be overcome
- In the remote rural setting, larger upfront loan suited to project needs is shown to be Pareto improving, despite widely believed fears of inefficiency due to information asymmetry
- In the remote rural setting, slow pace of outreach may be explained by not sufficiently cracking the liquidity constraint
- Consumption and wage labour were adversely affected to repay the loan
- Female schooling beyond primary school were adversely affected due possibly to stronger labour demand for cattle production

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TABLE A1: DESCRIPTIVE STATISTICS BY ARM IN ADMINISTRATIVE DATA

variables	traditional	large	large grace	cow
Head Literacy	0.11	0.14	0.10	0.13
Head Age	37.96	38.12	38.66	37.86
Household size	4.37	4.08	4.17	4.08
Flood in round 1	0.58	0.50	0.36	0.55
Net saving (% of loan) in 2013	3.45	4.02	5.49	6.70
Effective Repayemntment in Loan Year -1	165.45	517.45	567.27	565.26
Effective Repayemntment in Loan Year 1	403.33	493.44	212.63	211.66
Effective Repayemntment in Loan Year 2	179.06	320.09	499.23	455.44
Effective Repayemntment in Loan Year 3	248.21	382.42	566.32	535.22
Effective Repayemntment in Loan Year 4	345.50	314.41	282.75	350.22
Repayment in Loan Year -1	55.19	38.93	0.00	0.00
Repayment in Loan Year 1	352.96	420.63	42.87	37.67
Repayment in Loan Year 2	139.43	272.92	463.21	420.32
Repayment in Loan Year 3	206.11	338.97	538.29	505.76
Repayment in Loan Year 4	318.00	291.86	270.47	333.69
Number of loan receiving members	116	180	180	190

Source: Estimated with GUK administrative and survey data.

Notes: 1. Information of original 800 households. Net saving as percentage of loan amount is a mean over loan recipients whose first disbursement is in 2013. Effective repayment is a sum of repayment and net saving.

2. Loan year -1 is preparation period for loan disbursement when only saving is allowed.

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A Data description

B Randomisation checks

C Attrition and rejection

Among 800 observations, there are 4 whose villages are washd away and 70 who by group rejected the assigned arms which are traditional, large, large grace with 40, 20, 10, 0 individuals, respectively. There are 31, 9, 13, 37 individuals who individually rejected traditional, large, large grace, cow, respectively. Among attrited HHs, when were they lost?

```
  1
116
```

Reasons for attrition and relation to flood damage.

```
          BStatus
FloodInRd1 borrower individual rejection group rejection rejection by flood
      0          26                     7               2                  23
      1          20                     7              13                  17
```

Table A2: Number of observations by borrower status and arm

(a) File	(b) BStatus	(c) traditional	(d) large	(e) large grace	(f) cow	(g) sum
Schooling	borrower	128	224	205	183	740
	individual rejection	23	9	16	41	89
	group rejection	54	13	17	0	84
	rejection by flood	27	0	13	11	51
	sum	232	246	251	235	964
AllMeetingsRepayment	borrower	85	171	167	153	576
	individual rejection	31	9	13	37	90
	group rejection	0	0	0	0	0
	rejection by flood	0	0	0	0	0
	sum	116	180	180	190	666
Repayment	borrower	109	171	167	153	600
	individual rejection	31	9	13	37	90
	group rejection	40	20	10	0	70
	rejection by flood	20	0	10	10	40
	sum	200	200	200	200	800
Asset	borrower	109	171	167	153	600
	individual rejection	30	9	13	37	89
	group rejection	40	20	10	0	70
	rejection by flood	20	0	10	10	40
	sum	199	200	200	200	799
Livestock	borrower	109	171	166	153	599
	individual rejection	30	9	13	37	89
	group rejection	40	20	0	0	60
	rejection by flood	20	0	10	10	40
	sum	199	200	189	200	788
LivestockProducts	borrower	109	171	167	153	600
	individual rejection	30	9	13	37	89
	group rejection	40	20	10	0	70
	rejection by flood	20	0	10	10	40
	sum	199	200	200	200	799
LabourIncome	borrower	109	171	167	153	600
	individual rejection	30	9	13	37	89
	group rejection	40	20	10	0	70
	rejection by flood	20	0	10	10	40
	sum	199	200	200	200	799
FarmIncome	borrower	9	38	24	23	94
	individual rejection	2	0	0	2	4
	group rejection	0	8	0	0	8
	rejection by flood	1	0	0	0	1
	sum	12	46	24	25	107
Consumption	borrower	84	166	166	152	568
	individual rejection	27	9	11	33	80
	group rejection	39	19	0	0	58
	rejection by flood	18	0	0	10	28
	sum	168	194	177	195	734

Source: Survey data.

Note:

TABLE A3: NUMBER OF OBSERVATIONS USED IN ESTIMATION BY BORROWER STATUS AND ARM

(a) File	(b) BStatus	(c) traditional	(d) large	(e) large grace	(f) cow	(g) sum
saving	borrower	82	163	165	149	559
saving	individual rejection	0	0	0	0	0
saving	group rejection	0	0	0	0	0
saving	rejection by flood	0	0	0	0	0
saving	sum	82	163	165	149	559
schooling	borrower	79	160	156	139	534
schooling	individual rejection	15	5	8	25	53
schooling	group rejection	45	10	0	0	55
schooling	rejection by flood	17	0	0	10	27
schooling	sum	156	175	164	174	669
assets	borrower	83	161	155	145	544
assets	individual rejection	24	8	9	26	67
assets	group rejection	36	19	0	0	55
assets	rejection by flood	0	0	0	0	0
assets	sum	143	188	164	171	666
livestock	borrower	83	161	155	144	543
livestock	individual rejection	24	8	9	26	67
livestock	group rejection	36	19	0	0	55
livestock	rejection by flood	0	0	0	0	0
livestock	sum	143	188	164	170	665
assetslivestock	borrower	83	161	155	144	543
assetslivestock	individual rejection	24	8	9	26	67
assetslivestock	group rejection	36	19	0	0	55
assetslivestock	rejection by flood	0	0	0	0	0
assetslivestock	sum	143	188	164	170	665
netassets	borrower	83	161	155	144	543
netassets	individual rejection	24	8	9	26	67
netassets	group rejection	36	19	0	0	55
netassets	rejection by flood	0	0	0	0	0
netassets	sum	143	188	164	170	665
income	borrower	2	16	9	6	33
income	individual rejection	0	0	0	0	0
income	group rejection	0	0	0	0	0
income	rejection by flood	0	0	0	0	0
income	sum	2	16	9	6	33
consumption	borrower	84	164	163	150	561
consumption	individual rejection	26	9	11	30	76
consumption	group rejection	36	18	0	0	54
consumption	rejection by flood	17	0	0	10	27
consumption	sum	163	191	174	190	718

Source: Survey data.

Note:

TABLE B1: PERMUTATION TEST RESULTS

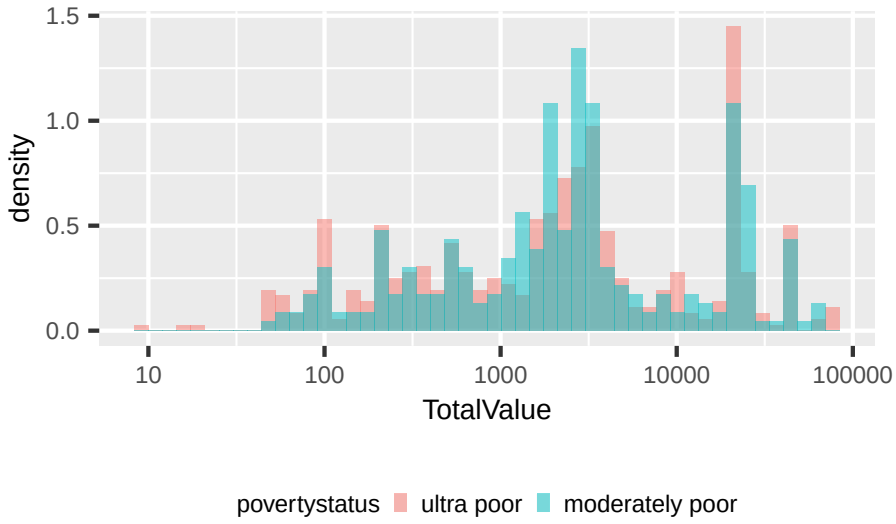
variables	p-value	p-value adjustments: step-down			
		traditional	large	large grace	cow
MeanHeadLiteracy	0.213	0.213	0.753	0.917	0.510
MeanHeadAge	0.882	0.882	0.882	0.882	0.882
MeanHHsize	0.198	0.830	0.198	0.920	0.459
MeanFlood	0.177	0.933	0.271	0.177	0.964
MeanFemale	0.693	0.896	0.924	0.924	0.693
MeanEnrolled	0.880	0.950	0.950	0.950	0.880
MeanHAssetAmount	0.877	0.877	0.959	0.986	0.986
MeanPAssetAmount	0.183	0.628	0.628	0.183	0.183
MeanLivestockValue	0.528	0.720	0.528	0.720	0.628
MeanNumCows	0.451	0.866	0.451	0.866	0.451

Source: Estimated with GUK administrative and survey data.

Notes: 1. R's package coin is used for baseline group mean covariates to conduct approximate permutation tests. Number of repetition is set to 100000. Number of groups is 72. Step-down method is used to adjust for multiple testing of a multi-factor grouping variable.

2. ***, **, * indicate statistical significance at 1%, 5%, 10%, respetively. Standard errors are clustered at group (village) level.

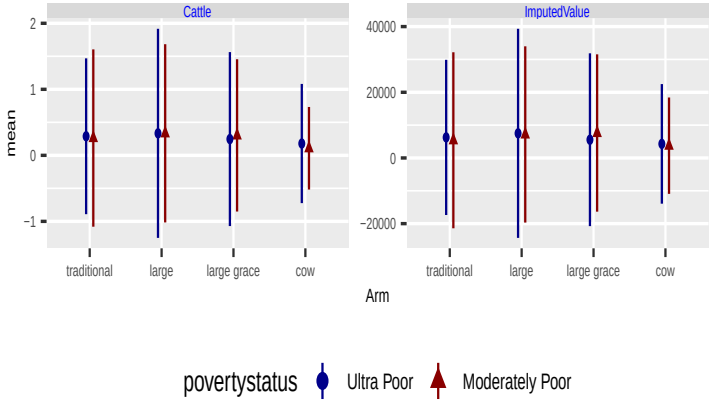
FIGURE A1: NET ASSET VALUES AT BASELINE



Source: Survey data.

Note: Net asset values = total gross asset values - debt outstanding. Debt outstanding takes the value of the month immediately after the respective survey round interview.

FIGURE A2: LVESTOCK HOLDING AT BASELINE



Source: Survey data.

Note: Livestock holding at baseline. Median market price is used to convert holding to values.

<NA>	0	1	0	0

	BStatus			
AssignOriginal	borrower	individual rejection	group rejection	rejection by flood
traditional	26	6	0	0
large	7	0	0	0
large grace	7	2	0	0
cow	6	7	0	0
<NA>	0	0	15	40

Use coin package's independence_test: Approximate permutation tests by randomly resampling 100000 times.

Table C1: Permutation test results of attrition

variables	NonAttrited	Attrited	p-value.lower	p-value.mid	p-value.upper
HeadLiteracy	0.115	0.112	0.873	0.937	1.000
HeadAge	37.996	39.095	0.279	0.280	0.281
HHsize	4.178	4.267	0.537	0.548	0.559
Arm	0.789	0.517	0.000	0.000	0.000
FloodInRd1	0.493	0.496	0.920	0.960	1.000
HAssetAmount	774	705	0.210	0.210	0.210
PAssetAmount	1161	1266	0.665	0.665	0.665
LivestockValue	6069	5554	0.533	0.533	0.533
NumCows	0.271	0.262	0.813	0.832	0.850
NetValue	7722	7790	0.962	0.962	0.962
n	684	116	(rate: 0.145)		

Source: Estimated with GUK administrative and survey data.

Notes: 1. R's package coin is used for baseline mean covariates to conduct approximate permutation tests. Number of repetition is set to 100000. Step-down method is used to adjust for multiple testing of a multi-factor grouping variable. Attrited and Nonattrited columns show means of each group. For Arm, proportions of non-traditional arm are given.

2. ***, **, * indicate statistical significance at 1%, 5%, 10%, respetively. Standard errors are clustered at group (village) level.

Table C2: Permutation test results of attriters between traditional and non-traditional arms

variables	NonTradArm	TradArm	p-value.lower	p-value.mid	p-value.upper
HeadLiteracy	0.125	0.028	0.096	0.150	0.205
HeadAge	40.175	38.694	0.582	0.585	0.588
HHsize	4.275	3.972	0.384	0.404	0.425
FloodInRd1	0.650	0.400	0.020	0.029	0.039
HAssetAmount	697	684	0.920	0.923	0.925
PAssetAmount	767	882	0.254	0.254	0.254
LivestockValue	3382	5094	0.244	0.244	0.244
NumCows	0.152	0.242	0.224	0.245	0.266
NetValue	4702	5375	0.815	0.815	0.815
n	40	36	(rate: 0.474)		

Source: Estimated with GUK administrative and survey data.

Notes: 1. R's package coin is used for baseline mean covariates to conduct approximate permutation tests. Number of repetition is set to 100000. Step-down method is used to adjust for multiple testing of a multi-factor grouping variable. NonTradArm and TradArm columns show means of each group. Attrition due to flood is dropped.

2. ***, **, * indicate statistical significance at 1%, 5%, 10%, respetively. Standard errors are clustered at group (village) level.

TABLE C3: PERMUTATION TEST RESULTS OF REJECTION

variables	NonRejected	Rejected	p-value.lower	p-value.mid	p-value.upper
HeadLiteracy	0.120	0.081	0.157	0.180	0.203
HeadAge	38.244	37.763	0.593	0.594	0.596
HHsize	4.237	3.938	0.019	0.020	0.021
Arm	0.818	0.556	0.000	0.000	0.000
FloodInRd1	0.474	0.585	0.013	0.014	0.016
HAssetAmount	775	699	0.185	0.185	0.185
PAssetAmount	1130	1013	0.429	0.429	0.429
LivestockValue	6115	4352	0.036	0.036	0.036
NumCows	0.278	0.182	0.022	0.023	0.025
NetValue	7990	5124	0.015	0.015	0.015
n	600	160	(rate: 0.211)		

TABLE C4: PERMUTATION TEST RESULTS OF REJECTION AMONG TRADITIONAL ARM

variables	NonRejected	Rejected	p-value.lower	p-value.mid	p-value.upper
HeadLiteracy	0.101	0.099	0.801	0.901	1.000
HeadAge	39.009	37.800	0.430	0.433	0.435
HHsize	4.239	3.958	0.189	0.198	0.207
FloodInRd1	0.514	0.386	0.095	0.111	0.126
HAssetAmount	652	756	0.264	0.265	0.266
PAssetAmount	1032	1172	0.607	0.607	0.607
LivestockValue	6803	2380	0.001	0.001	0.001
NumCows	0.326	0.084	0.000	0.000	0.000
NetValue	8284	3986	0.019	0.019	0.019
n	109	71	(rate: 0.394)		

TABLE C5: PERMUTATION TEST RESULTS OF REJECTION AMONG NON-TRADITIONAL ARM

variables	NonRejected	Rejected	p-value.lower	p-value.mid	p-value.upper
HeadLiteracy	0.124	0.067	0.103	0.126	0.149
HeadAge	38.073	37.733	0.770	0.773	0.775
HHsize	4.236	3.921	0.056	0.058	0.061
FloodInRd1	0.465	0.742	0.000	0.000	0.000
HAssetAmount	804	655	0.045	0.045	0.045
PAssetAmount	1152	888	0.141	0.141	0.141
LivestockValue	5958	5909	0.965	0.965	0.965
NumCows	0.267	0.259	0.851	0.877	0.902
NetValue	7924	6133	0.259	0.259	0.259
n	491	89	(rate: 0.153)		

TABLE C6: PERMUTATION TEST RESULTS OF REJECTERS, TRADITIONAL VS. NON-TRADITIONAL ARM

variables	NonTradArm	TradArm	p-value.lower	p-value.mid	p-value.upper
HeadLiteracy	0.067	0.099	0.391	0.479	0.567
HeadAge	37.733	37.800	0.967	0.969	0.972
HHsize	3.921	3.958	0.883	0.902	0.921
FloodInRd1	0.742	0.386	0.000	0.000	0.000
HAssetAmount	655	756	0.262	0.263	0.264
PAssetAmount	888	1172	0.198	0.198	0.198
LivestockValue	5909	2380	0.003	0.003	0.003
NumCows	0.259	0.084	0.003	0.003	0.004
NetValue	6133	3986	0.143	0.143	0.143
n	89	71	(rate: 0.444)		

Source: Estimated with GUK administrative and survey data.

Notes: 1. R's package coin is used for baseline group mean covariates to conduct approximate permutation tests. Number of repetition is set to 100000. Step-down method is used to adjust for multiple testing of a multi-factor grouping variable. Rejection is either group-rejection or individual-rejection. TradArm and NonTradArm columns show means of each group.
2. ***, **, * indicate statistical significance at 1%, 5%, 10%, respetively. Standard errors are clustered at group (village) level.

TABLE C1 shows results from tests of independence between attriters and non-attriters. We see a moderate rate of attrition is not correlated with household level characteristics. TABLE C2 compares attriters of traditional arm and non-traditional arms. It shows that traditional arm attriters have a (marginally) lower rate of head literacy while non-traditional arm attriters are more exposed to the flood. The traditional arm attriters may be less entrepreneurial, if anything, so their attrition may upwardly bias the positive gains of the arm, hence understate the impacts of non-traditional arm. So one can employ Lee bounds for stronger results, but doing so will give us less precision and require more assumptions.

TABLE C3 shows test results of independence between loan receivers and nonreceivers (group, individual rejecters) on 760 members whose residence was not washed away by flood. It shows that smaller household size, being affected by flood at the baseline, smaller livestock holding, smaller net

assets, and less exposue to cattle growing are correlated with opting out the offered type of lending.

Group rejecters and non-group rejecters are compared in Table C7. Marked differences are found in arm (traditional vs. non-traditional) and net asset values. Table C8 compares group rejecters in traditional arm and finds less flood exposure and smaller livestock holding to be correlated with rejection. Group rejecters in non-traditional arm are examined in Table C9 and flood at baseline and younger head age are correlated with rejection. Comparing group rejecters between traditional and non-traditional arms, flood at baseline, net asset values, and livestock holding are different (Table C10). These hint that for non-traditional arm group rejecters, it is baseline flood that may have constrained them from participation, and asset levels for traditional group rejecters.

Acknowledging the reasons for rejection can be different, we tested the independence of each characteristics for individual rejecters (vs. non-individual rejeceters) in Table C11. Smaller HHsize, being affected with FloodInRd1, and smaller NumCows are associated with individual rejecters. Individual decisions not to participate may be more straightforward: Smaller household size may indicate difficulty in securing the cattle production labour in a household, being hit with a flood may have resulted in lower livestock levels that would prompt them to reconsider partaking in another livestock project.

Table C12 and Table C13 compare individual rejecters and nonrejecters in traditional arm and non-traditional arms, respectively. Somewhat surprisingly, smaller household size is found to be correlated with rejection in all arms but more pronounced among traditional members. This hints that traditional arm borrowers may have been looking into cattle production but were held back by lack of household labour. Livestock and other asset values are not correlated with rejection, only cattle holding is smaller for traditional rejecters. Comparison of individual rejecters between traditional and non-traditional arms show no detectable difference (Table C14). This suggests that indvidual rejecters in all arms were constrained with small household size.

In summary, group level rejecters between traditional and non-traditional differ that smaller household size and baseline flood withheld participation for non-traditional while low livestock values withheld participation for traditional. Individual rejecters have similar characteristics between two groups.

TABLE C7: PERMUTATION TEST RESULTS OF GROUP REJECTION

variables	NonGRejected	GRejected	p-value.lower	p-value.mid	p-value.upper
HeadLiteracy	0.117	0.057	0.109	0.136	0.162
HeadAge	38.276	36.841	0.259	0.261	0.262
HHsize	4.184	4.071	0.515	0.529	0.544
Arm	0.797	0.429	0.000	0.000	0.000
FloodInRd1	0.490	0.571	0.168	0.190	0.211
HAssetAmount	763	739	0.760	0.760	0.761
PAssetAmount	1098	1199	0.632	0.632	0.632
LivestockValue	5913	4366	0.178	0.178	0.178
NumCows	0.265	0.200	0.241	0.257	0.273
NetValue	7685	4371	0.053	0.053	0.053
n	690	70	(rate: 0.092)		

TABLE C8: PERMUTATION TEST RESULTS OF GROUP REJECTION AMONG TRADITIONAL ARM

variables	NonGRejected	GRejected	p-value.lower	p-value.mid	p-value.upper
HeadLiteracy	0.114	0.050	0.129	0.250	0.372
HeadAge	38.400	39.026	0.726	0.730	0.733
HHsize	4.107	4.200	0.713	0.736	0.758
FloodInRd1	0.518	0.275	0.004	0.006	0.007
HAssetAmount	637	872	0.030	0.030	0.031
PAssetAmount	1003	1362	0.202	0.202	0.202
LivestockValue	6305	1291	0.001	0.001	0.001
NumCows	0.295	0.037	0.001	0.001	0.001
NetValue	7618	3078	0.034	0.034	0.034
n	140	40	(rate: 0.222)		

TABLE C9: PERMUTATION TEST RESULTS OF GROUP REJECTION AMONG NON-TRADITIONAL ARM

variables	NonGRejected	GRejected	p-value.lower	p-value.mid	p-value.upper
HeadLiteracy	0.118	0.067	0.374	0.467	0.560
HeadAge	38.244	34.000	0.025	0.025	0.025
HHsize	4.204	3.900	0.242	0.256	0.271
FloodInRd1	0.483	0.967	0.000	0.000	0.000
HAssetAmount	794	561	0.048	0.048	0.048
PAssetAmount	1122	982	0.651	0.651	0.651
LivestockValue	5814	8467	0.129	0.129	0.129
NumCows	0.257	0.417	0.055	0.062	0.070
NetValue	7702	6957	0.804	0.804	0.804
n	550	30	(rate: 0.052)		

TABLE C10: PERMUTATION TEST RESULTS OF GROUP REJECTERS, TRADITIONAL VS. NON-TRADITIONAL ARM

variables	NonTradArm	TradArm	p-value.lower	p-value.mid	p-value.upper
HeadLiteracy	0.067	0.050	0.630	0.815	1.000
HeadAge	34.000	39.026	0.026	0.027	0.027
HHsize	3.900	4.200	0.342	0.366	0.389
FloodInRd1	0.967	0.275	0.000	0.000	0.000
HAssetAmount	561	872	0.022	0.023	0.023
PAssetAmount	982	1362	0.588	0.588	0.588
LivestockValue	8467	1291	0.000	0.000	0.000
NumCows	0.417	0.037	0.000	0.000	0.000
NetValue	6957	3078	0.032	0.032	0.032
n	30	40	(rate: 0.571)		

Source: Estimated with GUK administrative and survey data.

Notes: 1. R's package coin is used for baseline group mean covariates to conduct approximate permutation tests. Number of repetition is set to 100000. Step-down method is used to adjust for multiple testing of a multi-factor grouping variable. Rejection is individual-rejection. TradArm and NonTradArm columns show means of each group.

2. ***, **, * indicate statistical significance at 1%, 5%, 10%, respetively. Standard errors are clustered at group (village) level.

Table C11: Permutation test results of individual rejection

variables	NonIRejected	IRejected	p-value.lower	p-value.mid	p-value.upper
HeadLiteracy	0.120	0.100	0.481	0.543	0.606
HeadAge	38.244	38.494	0.824	0.826	0.828
HHsize	4.237	3.833	0.012	0.013	0.014
Arm	0.818	0.656	0.001	0.001	0.001
FloodInRd1	0.474	0.596	0.031	0.036	0.041
HAssetAmount	775	664	0.140	0.141	0.141
PAssetAmount	1130	847	0.114	0.114	0.114
LivestockValue	6115	4340	0.111	0.111	0.111
NumCows	0.278	0.166	0.040	0.043	0.046
NetValue	7990	5632	0.116	0.116	0.116
n	600	90	(rate: 0.130)		

Source: Estimated with GUK administrative and survey data.

Notes: 1. R's package coin is used for baseline group mean covariates to conduct approximate permutation tests. Number of repetition is set to 100000. Step-down method is used to adjust for multiple testing of a multi-factor grouping variable. Rejection is either group-rejection or individual-rejection. Rejected and Nonrejected columns show means of each group. For Arm, proportions of non-traditional arm are given. Individual rejection is observed only for non group rejecters. Sample size is smaller in Table C11 as 70 observations are dropped.

2. ***, **, * indicate statistical significance at 1%, 5%, 10%, respetively. Standard errors are clustered at group (village) level.

Table C12: Permutation test results of individual rejection among traditional arm

variables	NonIRejected	IRejected	p-value.lower	p-value.mid	p-value.upper
HeadLiteracy	0.101	0.161	0.373	0.449	0.525
HeadAge	39.009	36.258	0.182	0.184	0.186
HHsize	4.239	3.645	0.038	0.042	0.045
FloodInRd1	0.514	0.533	0.841	0.920	1.000
HAssetAmount	652	575	0.566	0.568	0.571
PAssetAmount	1032	874	0.619	0.619	0.619
LivestockValue	6803	4088	0.177	0.177	0.177
NumCows	0.326	0.157	0.069	0.080	0.092
NetValue	8284	5197	0.269	0.269	0.269
n	109	31	(rate: 0.221)		

Table C13: Permutation test results of individual rejection among non-traditional arm

variables	NonIRejected	IRejected	p-value.lower	p-value.mid	p-value.upper
HeadLiteracy	0.124	0.068	0.201	0.243	0.285
HeadAge	38.073	39.732	0.247	0.248	0.250
HHsize	4.236	3.932	0.119	0.125	0.131
FloodInRd1	0.465	0.627	0.013	0.016	0.020
HAssetAmount	804	708	0.288	0.289	0.290
PAssetAmount	1152	834	0.138	0.138	0.138
LivestockValue	5958	4461	0.263	0.263	0.263
NumCows	0.267	0.170	0.137	0.148	0.160
NetValue	7924	5853	0.254	0.254	0.254
n	491	59	(rate: 0.107)		

Table C14: Permutation test results of individual rejecters, traditional vs. non-traditional arm

variables	NonTradArm	TradArm	p-value.lower	p-value.mid	p-value.upper
HeadLiteracy	0.068	0.161	0.155	0.211	0.267
HeadAge	39.732	36.258	0.220	0.222	0.224
HHsize	3.932	3.645	0.448	0.467	0.487
FloodInRd1	0.627	0.533	0.368	0.432	0.495
HAssetAmount	708	575	0.305	0.307	0.310
PAssetAmount	834	874	0.764	0.764	0.765
LivestockValue	4461	4088	0.820	0.820	0.821
NumCows	0.170	0.157	0.855	0.928	1.000
NetValue	5853	5197	0.780	0.780	0.780
n	59	31	(rate: 0.344)		

Source: Estimated with GUK administrative and survey data.

Notes: 1. R's package coin is used for baseline group mean covariates to conduct approximate permutation tests. Number of repetition is set to 100000. Step-down method is used to adjust for multiple testing of a multi-factor grouping variable. Rejection is individual-rejection. TradArm and NonTradArm columns show means of each group.

2. ***, **, * indicate statistical significance at 1%, 5%, 10%, respetively. Standard errors are clustered at group (village) level.

TABLE C15: PERMUTATION TEST RESULTS OF GROUP REJECTION IN TRADITIONAL ARM VS. PARTICIPANTS IN NON-TRADITIONAL ARM

variables	NonTradArm	TradArm	p-value.lower	p-value.mid	p-value.upper
HeadLiteracy	0.124	0.050	0.123	0.166	0.209
HeadAge	38.073	39.026	0.558	0.561	0.564
HHsize	4.236	4.200	0.859	0.882	0.905
FloodInRd1	0.465	0.275	0.013	0.017	0.021
HAssetAmount	804	872	0.505	0.507	0.509
PAssetAmount	1152	1362	0.489	0.489	0.489
LivestockValue	5958	1291	0.003	0.003	0.003
NumCows	0.267	0.037	0.005	0.005	0.005
NetValue	7924	3078	0.024	0.024	0.024
n	491	40	(rate: 0.075)		

Source: Estimated with GUK administrative and survey data.

Notes: 1. R's package coin is used for baseline group mean covariates to conduct approximate permutation tests. Number of repetition is set to 100000. Step-down method is used to adjust for multiple testing of a multi-factor grouping variable. Rejection is group-rejection. TradArm and NonTradArm columns show means of each group.

2. ***, **, * indicate statistical significance at 1%, 5%, 10%, respetively. Standard errors are clustered at group (village) level.

TABLE C16: PERMUTATION TEST RESULTS OF BORROWERS, COW VS. NON-COW ARMS

variables	NonCowArm	CowArm	p-value.lower	p-value.mid	p-value.upper
HeadLiteracy	0.107	0.157	0.083	0.098	0.112
HeadAge	38.412	37.750	0.468	0.470	0.471
HHsize	4.275	4.124	0.242	0.249	0.255
FloodInRd1	0.476	0.467	0.779	0.816	0.853
HAssetAmount	783	751	0.592	0.592	0.593
PAssetAmount	1220	862	0.016	0.016	0.016
LivestockValue	6778	4150	0.003	0.003	0.003
NumCows	0.310	0.182	0.003	0.004	0.004
NetValue	8875	5409	0.007	0.007	0.007
n	447	153	(rate: 0.255)		

Source: Estimated with GUK administrative and survey data.

Notes: 1. R's package coin is used for baseline group mean covariates to conduct approximate permutation tests. Number of repetition is set to 100000. Step-down method is used to adjust for multiple testing of a multi-factor grouping variable. Rejection is group-rejection. CowArm and NonCowArm columns show means of each group.

2. ***, **, * indicate statistical significance at 1%, 5%, 10%, respetively. Standard errors are clustered at group (village) level.

TABLE C17: PERMUTATION TEST RESULTS OF BOROWERS, COW VS. LARGE GRACE ARMS

variables	NonCowArm	CowArm	p-value.lower	p-value.mid	p-value.upper
HeadLiteracy	0.102	0.157	0.133	0.156	0.178
HeadAge	38.731	37.750	0.366	0.367	0.369
HHsize	4.174	4.124	0.735	0.751	0.766
FloodInRd1	0.349	0.467	0.029	0.034	0.038
HAssetAmount	858	751	0.139	0.139	0.139
PAssetAmount	1369	862	0.006	0.006	0.006
LivestockValue	7374	4150	0.002	0.002	0.002
NumCows	0.331	0.182	0.004	0.004	0.005
NetValue	8300	5409	0.029	0.029	0.029
n	167	153	(rate: 0.478)		

Source: Estimated with GUK administrative and survey data.

Notes: 1. R's package coin is used for baseline group mean covariates to conduct approximate permutation tests. Number of repetition is set to 100000. Step-down method is used to adjust for multiple testing of a multi-factor grouping variable. Rejection is group-rejection. CowArm and LargeGraceArm columns show means of each group.

2. ***, **, * indicate statistical significance at 1%, 5%, 10%, respetively. Standard errors are clustered at group (village) level.

D Estimated results

D.1 Saving and repayment

TABLE D1: FD ESTIMATION OF CUMULATIVE NET SAVING AND REPAYMENT

	Cumulative net saving		Cumulative repayment			Cumulative net saving +cumulative repayment			Cumulative excess repayment		
covariates	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(Intercept)	39.0***	36.6***	250.3***	231.3***	232.0***	289.3***	267.9***	263.8***	−161.9***	−180.1***	−179.6***
	(2.1)	(2.2)	(15.8)	(17.0)	(15.5)	(16.8)	(17.9)	(16.4)	(15.8)	(16.6)	(14.9)
Large	7.2**	28.4***	79.0***	170.0***	162.1***	86.2***	198.4***	206.5***	76.1***	45.2*	35.5*
	(3.5)	(4.8)	(16.5)	(23.5)	(21.1)	(17.6)	(25.1)	(22.3)	(16.6)	(23.2)	(21.1)
LargeGrace	18.6***	109.1***	87.0***	−158.8***	−205.8***	105.6***	−49.6*	−74.6***	85.2***	252.6***	202.7***
	(4.2)	(19.1)	(18.2)	(23.0)	(12.2)	(18.2)	(29.5)	(24.6)	(18.6)	(22.7)	(12.2)
Cow	20.1***	111.5***	80.9***	−169.8***	−204.7***	101.0***	−58.3**	−66.5***	76.5***	241.5***	203.2***
	(5.0)	(16.7)	(16.9)	(23.4)	(12.3)	(17.5)	(29.0)	(23.8)	(17.1)	(23.2)	(12.2)
LY2		18.7***		47.3*	−59.2***		66.0**	−35.4*		439.9***	328.7***
		(3.4)		(26.0)	(20.2)		(26.5)	(19.7)		(63.2)	(45.2)
Large × LY2		−19.4***		−132.3***	−51.9***		−151.6***	−86.5***		−176.2***	−91.8***
		(4.9)		(15.3)	(15.8)		(19.1)	(16.5)		(16.8)	(17.6)
LargeGrace × LY2		−111.3***		386.8***	292.0***		275.5***	165.2***		−400.1***	−496.6***
		(19.0)		(21.2)	(32.7)		(32.0)	(41.0)		(21.9)	(33.5)
Cow × LY2		−114.6***		355.0***	259.4***		240.4***	124.9***		−433.3***	−529.5***
		(15.9)		(27.2)	(26.3)		(30.1)	(28.4)		(28.0)	(26.6)
LY3		22.6***		40.0	−118.4***		62.7**	−91.0***		411.6***	246.9***
		(4.3)		(28.1)	(21.7)		(29.6)	(21.8)		(71.9)	(54.5)
Large × LY3		−21.9***		−61.7***	−88.6***		−83.5***	−126.1***		−70.1***	−97.2***
		(5.5)		(19.1)	(19.7)		(19.5)	(19.6)		(18.7)	(19.3)
LargeGrace × LY3		−118.1***		466.4***	506.2***		348.3***	364.9***		−361.1***	−318.3***
		(20.2)		(19.3)	(11.5)		(33.2)	(27.4)		(19.1)	(11.5)
Cow × LY3		−119.0***		444.9***	475.4***		326.0***	328.0***		−381.1***	−347.1***
		(16.5)		(28.8)	(21.1)		(34.7)	(30.6)		(28.7)	(20.5)
LY4		32.1***		141.6***	−0.7		173.8***	34.0		579.2***	432.2***
		(5.5)		(40.5)	(23.6)		(43.4)	(25.3)		(79.1)	(53.3)
Large × LY4		−43.3***		−118.8***	−105.0***		−162.1***	−165.9***		411.2***	427.4***
		(7.0)		(42.1)	(29.2)		(44.3)	(31.4)		(41.7)	(28.5)
LargeGrace × LY4		−134.3***		188.6***	330.4***		54.3	174.4***		182.6***	330.5***
		(20.2)		(37.0)	(18.7)		(47.1)	(35.3)		(37.0)	(17.7)
Cow × LY4		−132.5***		262.7***	344.6***		130.2**	186.7***		256.5***	343.1***
		(17.5)		(45.1)	(18.7)		(53.8)	(34.5)		(45.1)	(18.0)
FloodInRd1					−23.7***			−22.1***			−23.2***
					(6.4)			(6.6)			(6.6)
Head literate					7.6			8.7			7.4
					(6.5)			(5.9)			(6.5)
Head age					0.1			0.2			0.1
					(0.2)			(0.2)			(0.3)
6M repayment					4.5***			4.5***			4.6***
					(0.1)			(0.1)			(0.1)
6M net saving					0.3***			2.0***			0.1
					(0.1)			(0.2)			(0.1)
6M other member net saving					−0.5*			−1.7***			−0.2
					(0.3)			(0.3)			(0.4)
6M other member Repaid					− 0.0			− 0.0			0.0
					(0.3)			(0.3)			(0.4)
$\bar{R}^2$	0.006	0.16	0.006	0.112	0.768	0.008	0.081	0.741	0.004	0.279	0.773
$\hat{\rho}$	0.538	0.274	0.629	0.430	0.395	0.577	0.411	0.379	0.568	0.377	0.331
$\Pr[\hat{\rho} = 0]$	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N	26388	24175	26388	24175	24051	26388	24175	24051	26388	24175	24051

Source: Estimated with GUK administrative and survey data.

Notes: 1. First-difference estimates using administrative and survey data. First-differenced ($\Delta x_{t+1} \equiv x_{t+1} - x_t$) regressands are regressed on categorical and time-variant covariates. Head age and literacy are from baseline survey data. ρ indicates the AR(1) coeffcient of first-difference residuals as suggested by Wooldridge (2010, 10.71) and $\Pr[\rho = 0]$ is its p value. 6M repayment, 6M net saving are mean lagged 6 month repayment and net saving. 6M other repayment, 6M other net saving are mean lagged 6 month repayment and net saving of other members in a group. Saving and repayment information is taken from administrative data. Time invariant household characteristics are taken from household survey data. Administrative data are merged with survey data by the dating the survey rounds in administrative data. Net saving is saving - withdrawal. Excess repayment is repayment - due amount. extsfLY2, LY3, LY4 are dummy variables for second, third, and fourth year into borrowing.

2. ***, **, * indicate statistical significance at 1%, 5%, 10%, respetively. Standard errors are clustered at group (village) level.

Table D2: FD estimation of cumulative net saving and repayment by attributes

	Cumulative net saving		Cumulative repayment			Cumulative net saving +cumulative repayment			Cumulative excess repayment		
covariates	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(Intercept)	39.0*** (2.1)	36.6*** (2.2)	250.3*** (15.8)	231.3*** (17.0)	232.0*** (15.5)	289.3*** (16.8)	267.9*** (17.9)	263.8*** (16.4)	−161.9*** (15.8)	−180.1*** (16.6)	−179.6*** (14.9)
Upfront	7.2** (3.5)	28.4*** (4.8)	79.0*** (16.5)	170.0*** (23.5)	162.1*** (21.1)	86.2*** (17.6)	198.4*** (25.1)	206.5*** (22.3)	76.1*** (16.6)	45.2* (23.2)	35.5* (21.1)
WithGrace	11.4** (4.6)	80.8*** (19.5)	8.0 (10.0)	−328.7*** (22.2)	−367.8*** (18.2)	19.4** (8.6)	−248.0*** (29.1)	−281.0*** (27.6)	9.1 (11.0)	207.4*** (22.1)	167.2*** (18.0)
InKind	1.5 (5.8)	2.4 (25.2)	−6.1 (10.8)	−11.1 (22.0)	1.1 (6.4)	−4.6 (8.5)	−8.7 (32.5)	8.0 (29.1)	−8.6 (11.8)	−11.1 (22.0)	0.4 (5.6)
LY2		18.7*** (3.4)		47.3* (26.0)	−59.2*** (20.2)		66.0** (26.5)	−35.4* (19.7)		439.9*** (63.2)	328.7*** (45.2)
Upfront × LY2		−19.4*** (4.9)		−132.3*** (15.3)	−51.9*** (15.8)		−151.6*** (19.1)	−86.5*** (16.5)		−176.2*** (16.8)	−91.8*** (17.6)
WithGrace × LY2		−91.9*** (19.6)		519.0*** (26.6)	343.9*** (36.6)		427.1*** (37.5)	251.8*** (44.5)		−223.8*** (27.3)	−404.8*** (37.7)
InKind × LY2		−3.3 (24.7)		−31.8 (34.7)	−32.6 (39.4)		−35.1 (44.0)	−40.3 (47.7)		−33.2 (35.2)	−32.9 (40.6)
LY3		22.6*** (4.3)		40.0 (28.1)	−118.4*** (21.7)		62.7** (29.6)	−91.0*** (21.8)		411.6*** (71.9)	246.9*** (54.5)
Upfront × LY3		−21.9*** (5.5)		−61.7*** (19.1)	−88.6*** (19.7)		−83.5*** (19.5)	−126.1*** (19.6)		−70.1*** (18.7)	−97.2*** (19.3)
WithGrace × LY3		−96.2*** (20.9)		528.1*** (27.0)	594.8*** (22.2)		431.9*** (38.3)	491.0*** (33.3)		−290.9*** (26.3)	−221.1*** (21.7)
InKind × LY3		−0.9 (26.0)		−21.5 (34.6)	−30.8 (24.0)		−22.4 (47.8)	−36.9 (41.3)		−20.0 (34.3)	−28.8 (23.4)
LY4		32.1*** (5.5)		141.6*** (40.5)	−0.7 (23.6)		173.8*** (43.4)	34.0 (25.3)		579.2*** (79.1)	432.2*** (53.3)
Upfront × LY4		−43.3*** (7.0)		−118.8*** (42.1)	−105.0*** (29.2)		−162.1*** (44.3)	−165.9*** (31.4)		411.2*** (41.7)	427.4*** (28.5)
WithGrace × LY4		−91.0*** (21.4)		307.4*** (55.3)	435.4*** (33.7)		216.4*** (64.0)	340.4*** (46.7)		−228.6*** (55.0)	−96.9*** (32.8)
InKind × LY4		1.9 (26.8)		74.1 (57.5)	14.2 (24.7)		75.9 (71.0)	12.3 (49.1)		73.9 (57.5)	12.6 (23.9)
FloodInRd1					−23.7*** (6.4)			−22.1*** (6.6)			−23.2*** (6.6)
Head literate					7.6 (6.5)			8.7 (5.9)			7.4 (6.5)
Head age					0.1 (0.2)			0.2 (0.2)			0.1 (0.3)
6M repayment					4.5*** (0.1)			4.5*** (0.1)			4.6*** (0.1)
6M net saving					0.3*** (0.1)			2.0*** (0.2)			0.1 (0.1)
6M other member net saving					−0.5* (0.3)			−1.7*** (0.3)			−0.2 (0.4)
6M other member Repaid					− 0.0 (0.3)			− 0.0 (0.3)			0.0 (0.4)
$\bar{R}^2$	0.006	0.16	0.006	0.112	0.768	0.008	0.081	0.741	0.004	0.279	0.773
$\hat{\rho}$	0.538	0.274	0.629	0.430	0.395	0.577	0.411	0.379	0.568	0.377	0.331
$\Pr[\hat{\rho} = 0]$	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N	26388	24175	26388	24175	24051	26388	24175	24051	26388	24175	24051

Source: Estimated with GUK administrative and survey data.

Notes: 1. First-difference estimates using administrative and survey data. First-differenced ($\Delta x_{t+1} \equiv x_{t+1} - x_t$) regressands are regressed on categorical and time-variant covariates. Head age and literacy are from baseline survey data. ρ indicates the AR(1) coeffcient of first-difference residuals as suggested by Wooldridge (2010, 10.71) and $\Pr[\rho = 0]$ is its p value. 6M repayment, 6M net saving are mean lagged 6 month repayment and net saving. 6M other repayment, 6M other net saving are mean lagged 6 month repayment and net saving of other members in a group. LargeSize is an indicator function if the arm is of large size, WithGrace is an indicator function if the arm is with a grace period, InKind is an indicator function if the arm provides a cow. Saving and repayment information is taken from administrative data. Time invariant household characteristics are taken from household survey data. Administrative data are merged with survey data by the dating the survey rounds in administrative data. Net saving is saving - withdrawal. Excess repayment is repayment - due amount. extsfLY2, LY3, LY4 are dummy variables for second, third, and fourth year into borrowing.

2. ***, **, * indicate statistical significance at 1%, 5%, 10%, respetively. Standard errors are clustered at group (village) level.

TABLE D3: FD ESTIMATION OF NET CUMULATIVE SAVING AND REPAYMENT, ULTRA POOR VS. MODERATELY POOR

	Cumulative net saving		Cumulative repayment			Cumulative net saving +cumulative repayment			Cumulative excess repayment		
covariates	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(Intercept)	49.8***	42.2***	325.0***	331.9***	322.7***	374.8***	374.1***	364.1***	−89.9***	−107.1***	−120.4***
	(2.2)	(1.6)	(5.3)	(6.8)	(13.4)	(5.9)	(7.0)	(14.2)	(5.3)	(5.1)	(12.7)
UltraPoor	3.0**	67.8***	−6.5*	−132.2***	−130.6***	−3.5	−64.4***	−49.6**	−6.2*	72.9***	70.2***
	(1.4)	(8.7)	(3.6)	(24.5)	(25.3)	(3.5)	(21.0)	(21.8)	(3.6)	(17.1)	(15.8)
LY2		17.0***		65.5**	−55.0***		82.5***	−34.2*		407.7***	287.5***
		(3.5)		(26.5)	(19.9)		(27.0)	(19.9)		(57.0)	(38.3)
UltraPoor × LY2		−71.5***		142.9***	114.6***		71.4**	30.2		−315.9***	−339.9***
		(9.9)		(35.1)	(28.0)		(30.4)	(24.0)		(22.3)	(30.6)
LY3		17.6***		87.9***	−83.4***		105.5***	−63.3***		351.3***	179.6***
		(4.3)		(29.6)	(19.6)		(31.2)	(20.4)		(60.9)	(43.6)
UltraPoor × LY3		−74.7***		222.1***	222.3***		147.4***	130.2***		−242.2***	−236.4***
		(10.5)		(35.1)	(38.1)		(30.4)	(33.0)		(22.0)	(18.6)
LY4		20.7***		171.2***	38.8*		191.9***	58.6**		569.2***	435.7***
		(5.4)		(40.6)	(21.7)		(43.1)	(23.8)		(77.6)	(53.2)
UltraPoor × LY4		−90.8***		84.8***	131.1***		−6.0	24.4		306.2***	357.3***
		(10.7)		(29.1)	(29.5)		(28.8)	(26.9)		(28.8)	(16.1)
FloodInRd1					−29.7***			−29.3***			−22.1***
					(8.6)			(8.9)			(8.4)
Head literate					7.2			9.3			5.5
					(8.1)			(8.1)			(7.3)
Head age					− 0.0			0.1			0.0
					(0.3)			(0.3)			(0.3)
6M repayment					4.3***			4.4***			4.3***
					(0.1)			(0.1)			(0.1)
6M net saving					0.7***			2.2***			0.1
					(0.1)			(0.2)			(0.1)
6M other member net saving					−0.6			−1.7***			0.3
					(0.4)			(0.4)			(0.3)
6M other member Repaid					0.1			0.1			− 0.0
					(0.3)			(0.3)			(0.4)
$\bar{R}^2$	0	0.084	0	0.029	0.689	0	0.019	0.689	0	0.23	0.682
$\hat{\rho}$	0.522	0.392	0.671	0.602	0.612	0.595	0.554	0.541	0.578	0.413	0.444
Pr[$\hat{\rho} = 0$]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N	26388	24175	26388	24175	24051	26388	24175	24051	26388	24175	24051

Source: Estimated with GUK administrative and survey data.

Notes: 1. First-difference estimates using administrative and survey data. First-differenced ($\Delta x_{t+1} \equiv x_{t+1} - x_t$) regressands are regressed on categorical and time-variant covariates. Head age and literacy are from baseline survey data. ρ indicates the AR(1) coeffcient of first-difference residuals as suggested by Wooldridge (2010, 10.71) and Pr[$\rho = 0$] is its p value. 6M repayment, 6M net saving are mean lagged 6 month repayment and net saving. 6M other repayment, 6M other net saving are mean lagged 6 month repayment and net saving of other members in a group. UltraPoor is an indicator function if the household is classified as the ultra poor. Saving and repayment information is taken from administrative data. Time invariant household characteristics are taken from household survey data. Administrative data are merged with survey data by the dating the survey rounds in administrative data. Net saving is saving - withdrawal. Excess repayment is repayment - due amount. extsfLY2, LY3, LY4 are dummy variables for second, third, and fourth year into borrowing.

2. ***, **, * indicate statistical significance at 1%, 5%, 10%, respetively. Standard errors are clustered at group (village) level.

D.2 Schooling

TABLE D4: FD ESTIMATION OF SCHOOL ENROLLMENT, ROUND 1 VS. ROUND 4 DIFFERENCES

covariates	(1)	(2)	(3)	(4)
(Intercept)	0.60***	0.75***	0.75***	0.75***
	(0.13)	(0.10)	(0.10)	(0.10)
Secondary	−0.44***	−0.46***	−0.46***	−0.46***
	(0.12)	(0.10)	(0.10)	(0.10)
College	−0.50***	−0.50***	−0.50***	−0.50***
	(0.13)	(0.12)	(0.12)	(0.12)
Large	−0.14	−0.15*	−0.15*	−0.15*
	(0.09)	(0.08)	(0.08)	(0.08)
LargeGrace	−0.11	−0.12	−0.13	−0.13
	(0.10)	(0.09)	(0.09)	(0.09)
Cow	−0.14	−0.15*	−0.16*	−0.16*
	(0.10)	(0.09)	(0.09)	(0.09)
Large × Secondary	−0.03	−0.02	−0.02	−0.02
	(0.15)	(0.13)	(0.13)	(0.13)
LargeGrace × Secondary	−0.06	−0.06	−0.06	−0.06
	(0.14)	(0.13)	(0.13)	(0.13)
Cow × Secondary	0.05	0.07	0.07	0.07
	(0.15)	(0.14)	(0.14)	(0.14)
Large × College	0.01	−0.01	− 0.00	− 0.00
	(0.17)	(0.16)	(0.16)	(0.16)
LargeGrace × College	0.01	−0.01	−0.01	−0.01
	(0.16)	(0.16)	(0.16)	(0.16)
Cow × College	−0.01	0.01	0.01	0.01
	(0.19)	(0.17)	(0.17)	(0.17)
Female		−0.30***	−0.30***	−0.30***
		(0.08)	(0.08)	(0.08)
Secondary × Female		0.61***	0.62***	0.62***
		(0.15)	(0.16)	(0.16)
College × Female		0.51***	0.51***	0.51***
		(0.14)	(0.14)	(0.14)
Large × Female		0.27**	0.27**	0.27**
		(0.12)	(0.12)	(0.12)
LargeGrace × Female		0.20*	0.20*	0.20*
		(0.11)	(0.11)	(0.11)
Cow × Female		0.37***	0.37***	0.37***
		(0.11)	(0.11)	(0.11)
Large × Secondary × Female		−0.51**	−0.51**	−0.51**
		(0.21)	(0.21)	(0.21)
LargeGrace × Secondary × Female		−0.41**	−0.41**	−0.41**
		(0.20)	(0.20)	(0.20)
Cow × Secondary × Female		−0.58***	−0.58***	−0.58***
		(0.22)	(0.22)	(0.22)
Large × College × Female		−0.36*	−0.36*	−0.36*
		(0.19)	(0.19)	(0.19)
LargeGrace × College × Female		−0.07	−0.06	−0.06
		(0.20)	(0.21)	(0.21)
Cow × College × Female		−0.43*	−0.43*	−0.43*
		(0.24)	(0.23)	(0.23)
FloodInRd1			−0.01	−0.01
			(0.03)	(0.03)
EldestSon			− 0.00	− 0.00
			(0.04)	(0.04)
EldestDaughter			− 0.00	− 0.00
			(0.05)	(0.05)
BStatusindividual rejection	−0.12*	−0.10*	−0.10*	−0.10*
	(0.06)	(0.06)	(0.06)	(0.06)
BStatusgroup rejection	−0.03	−0.06	−0.06	−0.06
	(0.06)	(0.06)	(0.05)	(0.05)
HHsize	0.02	0.05	0.05	0.05
	(0.02)	(0.03)	(0.03)	(0.03)
ChildAgeOrderAtRd1		−0.06	−0.06	−0.06
		(0.04)	(0.04)	(0.04)
$\bar{R}^2$	0.218	0.231	0.226	0.226
N	542	542	542	542

Source: Estimated with GUK administrative and survey data.

Notes: 1. First-difference estimates using administrative and survey data. First-differenced ($\Delta x_{t+1} \equiv x_{t+1} - x_t$) regressands are regressed on categorical and time-variant covariates. Head age and literacy are from baseline survey data. ρ indicates the AR(1) coeffcient of first-difference residuals as suggested by Wooldridge (2010, 10.71) and Pr[$\rho = 0$] is its p value. 6M repayment, 6M net saving are mean lagged 6 month repayment and net saving. 6M other repayment, 6M other net saving are mean lagged 6 month repayment and net saving of other members in a group.

2. ***, **, * indicate statistical significance at 1%, 5%, 10%, respetively. Standard errors are clustered at group (village) level.

TABLE D5: FD ESTIMATION OF SCHOOL ENROLLMENT, ROUND 1 VS. ROUND 4 DIFFERENCES BY ATTRIBUTES

covariates	(1)	(2)	(3)	(4)
(Intercept)	0.58***	0.71***	0.71***	0.71***
	(0.06)	(0.09)	(0.13)	(0.13)
Secondary	−0.45***	−0.45***	−0.45***	−0.45***
	(0.05)	(0.10)	(0.10)	(0.10)
College	−0.50***	−0.48***	−0.49***	−0.49***
	(0.06)	(0.12)	(0.13)	(0.13)
Upfront	−0.13***	−0.12*	−0.13*	−0.13*
	(0.05)	(0.07)	(0.07)	(0.07)
WithGrace	0.02	0.03	0.04	0.04
	(0.05)	(0.07)	(0.07)	(0.07)
InKind	−0.01	−0.04	−0.05	−0.05
	(0.06)	(0.08)	(0.08)	(0.08)
WithGrace × Secondary		−0.03	−0.05	−0.05
		(0.12)	(0.12)	(0.12)
WithGrace × College		−0.01	−0.03	−0.03
		(0.15)	(0.15)	(0.15)
Upfront × Secondary		−0.03	−0.03	−0.03
		(0.13)	(0.13)	(0.13)
Upfront × College		−0.02	−0.02	−0.02
		(0.16)	(0.16)	(0.16)
InKind × Secondary		0.13	0.15	0.15
		(0.12)	(0.12)	(0.12)
InKind × College		0.01	0.03	0.03
		(0.15)	(0.15)	(0.15)
Female		−0.30***	−0.30***	−0.30***
		(0.08)	(0.08)	(0.08)
Secondary × Female		0.61***	0.61***	0.61***
		(0.15)	(0.15)	(0.15)
College × Female		0.51***	0.50***	0.50***
		(0.14)	(0.15)	(0.15)
WithGrace × Female		−0.07	−0.08	−0.08
		(0.12)	(0.12)	(0.12)
Upfront × Female		0.28**	0.28**	0.28**
		(0.12)	(0.12)	(0.12)
InKind × Female		0.16	0.17	0.17
		(0.11)	(0.12)	(0.12)
WithGrace × Secondary × Female		0.10	0.14	0.14
		(0.19)	(0.20)	(0.20)
WithGrace × College × Female		0.31	0.35*	0.35*
		(0.20)	(0.21)	(0.21)
Upfront × Secondary × Female		−0.52**	−0.51**	−0.51**
		(0.21)	(0.21)	(0.21)
Upfront × College × Female		−0.38*	−0.36*	−0.36*
		(0.20)	(0.19)	(0.19)
InKind × Secondary × Female		−0.16	−0.19	−0.19
		(0.21)	(0.21)	(0.21)
InKind × College × Female		−0.36	−0.41*	−0.41*
		(0.25)	(0.25)	(0.25)
FloodInRd1			−0.01	−0.01
			(0.03)	(0.03)
Head literate			−0.03	−0.03
			(0.08)	(0.08)
Head age			0.00	0.00
			(0.00)	(0.00)
EldestSon			0.00	0.00
			(0.05)	(0.05)
EldestDaughter			− 0.00	− 0.00
			(0.05)	(0.05)
HHsize	0.02	0.06*	0.06*	0.06*
	(0.02)	(0.03)	(0.03)	(0.03)
ChildAgeOrderAtRd1		−0.07	−0.07	−0.07
		(0.04)	(0.05)	(0.05)
$\bar{R}^2$	0.221	0.229	0.225	0.225
N	542	542	539	539

Source: Estimated with GUK administrative and survey data.

Notes: 1. First-difference estimates using administrative and survey data. First-differenced ($\Delta x_{t+1} \equiv x_{t+1} - x_t$) regressands are regressed on categorical and time-variant covariates. Head age and literacy are from baseline survey data. ρ indicates the AR(1) coeffcient of first-difference residuals as suggested by Wooldridge (2010, 10.71) and $\Pr[\rho = 0]$ is its p value. 6M repayment, 6M net saving are mean lagged 6 month repayment and net saving. 6M other repayment, 6M other net saving are mean lagged 6 month repayment and net saving of other members in a group. LargeSize is an indicator function if the arm is of large size, WithGrace is an indicator function if the arm is with a grace period, InKind is an indicator function if the arm provides a cow. Saving and repayment information is taken from administrative data. Time invariant household characteristics are taken from household survey data. Administrative data are merged with survey data by the dating the survey rounds in administrative data. Net saving is saving - withdrawal. Excess repayment is repayment - due amount. extsfLY2, LY3, LY4 are dummy variables for second, third, and fourth year into borrowing.

2. ***, **, * indicate statistical significance at 1%, 5%, 10%, respetively. Standard errors are clustered at group (village) level.

D.3 Assets

TABLE D6: FD ESTIMATION OF ASSETS

	Household asset amount (Tk)				Productive asset amount (Tk)			
covariates	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(Intercept)	6395.1***	8078.7***	8843.5***	8764.5***	−191.0***	128.1	168.6	−508.7*
	(999.1)	(1397.3)	(1491.6)	(2638.5)	(53.1)	(241.5)	(261.3)	(303.8)
Large	2141.7	2205.9	2501.5	3303.5	143.2	591.4*	599.1*	−572.7
	(2043.1)	(1843.8)	(1842.1)	(3156.8)	(150.2)	(335.7)	(342.1)	(671.9)
LargeGrace	956.9	1288.1	1119.6	4296.5	−88.7	160.8	153.5	−122.6
	(1437.5)	(1561.3)	(1495.7)	(3293.7)	(114.8)	(278.5)	(277.8)	(377.9)
Cow	214.6	1654.0	1721.9	−258.6	158.0*	238.2*	246.1*	79.9
	(1565.5)	(2306.5)	(2275.6)	(3357.2)	(85.4)	(140.7)	(140.2)	(276.9)
rd 2 - 3		1078.7	1071.5			−688.4	−689.8	
		(2284.8)	(2315.3)			(511.4)	(512.7)	
Large × rd 2 - 3		3514.7	3577.1			−2328.1	−2330.6	
		(4634.4)	(4635.5)			(1546.7)	(1550.5)	
LargeGrace × rd 2 - 3		3867.8	3936.2			−804.4	−804.9	
		(5534.5)	(5535.5)			(1110.2)	(1113.0)	
Cow × rd 2 - 3		−5856.3	−6009.4			−382.8	−385.7	
		(7504.3)	(7641.7)			(609.7)	(610.4)	
rd 3 - 4		−7762.4***	−7707.7***	−9211.1***		−881.3**	−884.1**	−41.3
		(1887.0)	(1864.8)	(2206.2)		(417.9)	(419.7)	(255.5)
Large × rd 3 - 4		−2824.9	−2838.2	−9134.0		−2367.3**	−2373.5**	181.8
		(3374.9)	(3387.8)	(5923.4)		(1091.7)	(1094.3)	(912.1)
LargeGrace × rd 3 - 4		−6008.2**	−6073.0**	−16468.4***		−1808.6	−1819.9	−962.6
		(3013.1)	(3010.1)	(5502.5)		(1143.5)	(1153.2)	(672.6)
Cow × rd 3 - 4		−9417.1	−9289.9	−8991.9*		−540.9	−547.8	−53.9
		(5890.6)	(5794.3)	(5344.1)		(370.8)	(371.0)	(384.1)
FloodInRd1			−1811.4**	−996.7			−53.8	556.3*
			(867.5)	(1178.3)			(120.7)	(314.5)
Head literate			507.1	−1385.2			−140.1**	182.6
			(1326.7)	(3409.1)			(70.7)	(254.7)
6M repayment				−6842.9*				398.1
				(4033.2)				(638.5)
6M net saving				28300.2				−1351.8
				(21629.7)				(2575.7)
6M other member net saving				−25104.7				−1289.8
				(39253.7)				(2003.0)
6M other member Repaid				2139.0				−253.3
				(3933.7)				(568.4)
$T = 2$	16	16	16	23	16	16	16	23
$T = 3$	53	53	50	611	53	53	50	611
$T = 4$	666	666	666	0	666	666	666	0
$\bar{R}^2$	−0.001	0.018	0.018	0.029	−0.001	0.003	0.002	−0.002
$\hat{\rho}$	0.073	0.086	0.079	−0.030	−0.081	−0.137	−0.132	0.477
$\Pr[\hat{\rho} = 0]$	0.014	0.002	0.004	0.260	0.000	0.000	0.000	0.000
N	2120	2120	2114	1245	2120	2120	2114	1245

Source: Estimated with GUK administrative and survey data.

Notes: 1. First-difference estimates using administrative and survey data. First-differenced ($\Delta x_{t+1} \equiv x_{t+1} - x_t$) regressands are regressed on categorical and time-variant covariates. Head age and literacy are from baseline survey data. ρ indicates the AR(1) coeffcient of first-difference residuals as suggested by Wooldridge (2010, 10.71) and $\Pr[\rho = 0]$ is its p value. 6M repayment, 6M net saving are mean lagged 6 month repayment and net saving. 6M other repayment, 6M other net saving are mean lagged 6 month repayment and net saving of other members in a group.

2. ***, **, * indicate statistical significance at 1%, 5%, 10%, respetively. Standard errors are clustered at group (village) level.

Table D7: FD estimation of assets by attributes

	Household asset amount (Tk)				Productive asset amount (Tk)			
covariates	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(Intercept)	6395.1***	8078.7***	8843.5***	8764.5***	−191.0***	128.1	168.6	−508.7*
	(999.1)	(1397.3)	(1491.6)	(2638.5)	(53.1)	(241.5)	(261.3)	(303.8)
Upfront	2141.7	2205.9	2501.5	3303.5	143.2	591.4*	599.1*	−572.7
	(2043.1)	(1843.8)	(1842.1)	(3156.8)	(150.2)	(335.7)	(342.1)	(671.9)
WithGrace	−1184.8	−917.8	−1381.8	993.0	−231.9	−430.7	−445.6	450.1
	(2060.1)	(1933.8)	(1903.9)	(3446.0)	(173.5)	(417.1)	(427.8)	(708.7)
InKind	−742.3	365.9	602.3	−4555.1	246.6**	77.5	92.6	202.5
	(1587.7)	(2379.1)	(2352.4)	(2989.0)	(121.8)	(284.7)	(283.7)	(374.6)
rd 2 - 3		1078.7	1071.5			−688.4	−689.8	
		(2284.8)	(2315.3)			(511.4)	(512.7)	
Upfront × rd 2 - 3		3514.7	3577.1			−2328.1	−2330.6	
		(4634.4)	(4635.5)			(1546.7)	(1550.5)	
WithGrace × rd 2 - 3		353.1	359.0			1523.7	1525.7	
		(5021.3)	(5022.4)			(1827.5)	(1832.7)	
InKind × rd 2 - 3		−9724.0	−9945.5			421.5	419.2	
		(7749.2)	(7884.0)			(1148.7)	(1151.6)	
rd 3 - 4		−7762.4***	−7707.7***	−9211.1***		−881.3**	−884.1**	−41.3
		(1887.0)	(1864.8)	(2206.2)		(417.9)	(419.7)	(255.5)
Upfront × rd 3 - 4		−2824.9	−2838.2	−9134.0		−2367.3**	−2373.5**	181.8
		(3374.9)	(3387.8)	(5923.4)		(1091.7)	(1094.3)	(912.1)
WithGrace × rd 3 - 4		−3183.3	−3234.8	−7334.4		558.7	553.6	−1144.3
		(4190.9)	(4203.5)	(6015.8)		(1547.8)	(1555.8)	(1088.8)
InKind × rd 3 - 4		−3409.0	−3216.9	7476.5		1267.7	1272.1	908.6
		(6393.1)	(6301.6)	(5532.6)		(1158.2)	(1167.3)	(643.1)
FloodInRd1			−1811.4**	−996.7			−53.8	556.3*
			(867.5)	(1178.3)			(120.7)	(314.5)
Head literate			507.1	−1385.2			−140.1**	182.6
			(1326.7)	(3409.1)			(70.7)	(254.7)
6M repayment				−6842.9*				398.1
				(4033.2)				(638.5)
6M net saving				28300.2				−1351.8
				(21629.7)				(2575.7)
6M other member net saving				−25104.7				−1289.8
				(39253.7)				(2003.0)
6M other member Repaid				2139.0				−253.3
				(3933.7)				(568.4)
$T = 2$	16	16	16	23	16	16	16	23
$T = 3$	53	53	50	611	53	53	50	611
$T = 4$	666	666	666	0	666	666	666	0
$\bar{R}^2$	−0.001	0.018	0.018	0.029	−0.001	0.003	0.002	−0.002
$\hat{\rho}$	0.073	0.086	0.079	−0.030	−0.081	−0.137	−0.132	0.477
$\Pr[\hat{\rho} = 0]$	0.014	0.002	0.004	0.260	0.000	0.000	0.000	0.000
N	2120	2120	2114	1245	2120	2120	2114	1245

Source: Estimated with GUK administrative and survey data.

Notes: 1. First-difference estimates using administrative and survey data. First-differenced ($\Delta x_{t+1} \equiv x_{t+1} - x_t$) regressands are regressed on categorical and time-variant covariates. Head age and literacy are from baseline survey data. ρ indicates the AR(1) coeffcient of first-difference residuals as suggested by Wooldridge (2010, 10.71) and $\Pr[\rho = 0]$ is its p value. 6M repayment, 6M net saving are mean lagged 6 month repayment and net saving. 6M other repayment, 6M other net saving are mean lagged 6 month repayment and net saving of other members in a group. LargeSize is an indicator function if the arm is of large size, WithGrace is an indicator function if the arm is with a grace period, InKind is an indicator function if the arm provides a cow.

2. ***, **, * indicate statistical significance at 1%, 5%, 10%, respetively. Standard errors are clustered at group (village) level.

Table D8: FD estimation of assets, round 2 and 4 comparison

	Household asset amount (Tk)				Productive asset amount (Tk)			
covariates	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(Intercept)	11157.3***	13142.2***	13142.2***	13923.1***	−180.8	−698.7*	−698.7*	−1016.2**
	(2520.6)	(2894.9)	(2894.9)	(3558.2)	(207.8)	(364.6)	(364.6)	(482.0)
Large	5165.8	5545.8	5545.8	1987.6	−1290.1	−1415.3*	−1415.3*	−872.0
	(5262.0)	(5274.4)	(5274.4)	(3770.3)	(794.7)	(800.2)	(800.2)	(834.9)
LargeGrace	2247.5	1846.8	1846.8	2826.8	−1093.1	−975.7	−975.7	−663.3
	(3836.9)	(3814.5)	(3814.5)	(4303.4)	(703.0)	(682.1)	(682.1)	(633.2)
Cow	−4429.7	−4327.5	−4327.5	−3778.1	7.3	−21.3	−21.3	214.6
	(4385.9)	(4274.9)	(4274.9)	(4339.1)	(349.7)	(351.1)	(351.1)	(472.6)
FloodInRd1		−3132.3	−3132.3	−1261.7		980.6*	980.6*	947.1
		(2308.3)	(2308.3)	(2341.5)		(573.6)	(573.6)	(609.3)
Head literate		−4167.5	−4167.5	−3034.6		433.7	433.7	418.7
		(6823.4)	(6823.4)	(7032.5)		(510.6)	(510.6)	(524.2)
6M repayment				−6206.3*				1394.5**
				(3736.8)				(664.9)
6M net saving				38975.2				−1360.8
				(31351.8)				(4083.2)
6M other member net saving				35164.3				−5083.2
				(49992.8)				(8220.3)
6M other member Repaid				228.4				−448.5
				(4210.9)				(598.5)
$\bar{R}^2$	0.005	0.005	0.005	0.004	0.002	0.003	0.003	−0.001
N	666	666	666	611	666	666	666	611

Source: Estimated with GUK administrative and survey data.

Notes: 1. First-difference estimates between round 2 and 4. A first-difference is defined as $\Delta x_{t+k} \equiv x_{t+k} - x_t$ for $k = 1, 2, \ldots$. Saving and repayment misses are taken from administrative data and merged with survey data at Year-Month of survey interviews. Intercept terms are omitted in estimating equations. Sample is continuing members and replacing members of early rejecters and received loans prior to 2015 Janunary. Household assets do not include livestock. Regressions (1)-(3), (5)-(6) use only arm and calendar information. (4) and (7) use previous six month repayment and saving information which is lacking in rd 1, hence starts from rd 2.

2. ***, **, * indicate statistical significance at 1%, 5%, 10%, respetively. Standard errors are clustered at group (village) level.

Table D9: FD estimation of assets, loan recipients vs. pure control

	Household asset amount (Tk)			Productive asset amount (Tk)		
covariates	(1)	(2)	(3)	(4)	(5)	(6)
(Intercept)	6656.9***	9287.1***	9988.5***	−174.4***	200.6	239.5
	(1598.0)	(2104.0)	(2158.7)	(66.4)	(339.0)	(354.6)
Large	1961.1	1661.0	1990.1	131.7	564.0*	571.2*
	(2715.9)	(2482.7)	(2493.9)	(142.5)	(329.9)	(337.1)
LargeGrace	728.5	592.2	472.9	−103.2	124.4	117.5
	(1785.7)	(1866.0)	(1809.6)	(115.4)	(284.9)	(284.3)
Cow	61.8	1201.7	1299.2	148.3*	213.3	221.0
	(1654.8)	(2239.4)	(2223.2)	(85.7)	(150.5)	(148.8)
PureControl	−556.6	−3604.1	−3497.9	−35.4	−232.5	−231.6
	(2708.8)	(2669.9)	(2678.9)	(65.0)	(534.9)	(533.9)
rd 2 - 3		82.2	69.2		−821.8	−823.1
		(2822.2)	(2865.1)		(612.7)	(614.2)
Large × rd 2 - 3		5135.4	5204.6		−2112.9	−2116.3
		(4709.1)	(4714.9)		(1473.6)	(1477.2)
LargeGrace × rd 2 - 3		5917.6	5993.5		−535.1	−536.4
		(5728.5)	(5737.3)		(1143.4)	(1146.2)
Cow × rd 2 - 3		−4519.0	−4668.0		−207.0	−210.8
		(6985.9)	(7106.4)		(639.4)	(639.9)
PureControl × rd 2 - 3		4688.1	4711.6		625.3	623.6
		(3306.7)	(3344.5)		(696.0)	(696.8)
rd 3 - 4		−8586.8***	−8530.8***		−877.6*	−879.8*
		(2118.2)	(2086.2)		(459.9)	(461.8)
Large × rd 3 - 4		−1488.3	−1507.4		−2364.3**	−2370.8**
		(4642.9)	(4652.2)		(1185.1)	(1187.4)
LargeGrace × rd 3 - 4		−4305.6	−4377.2		−1806.4	−1818.3
		(3578.2)	(3567.0)		(1169.9)	(1178.4)
Cow × rd 3 - 4		−8300.5	−8175.2		−544.9	−552.1
		(5518.4)	(5430.0)		(454.4)	(454.3)
PureControl × rd 3 - 4		3918.8	3922.9		−46.7	−48.6
		(5531.0)	(5515.2)		(934.6)	(935.5)
FloodInRd1			−1789.0**			−50.5
			(859.1)			(120.6)
Head literate			511.2			−140.9*
			(1260.3)			(71.9)
$T = 2$	16	16	16	16	16	16
$T = 3$	53	53	50	53	53	50
$T = 4$	666	666	666	666	666	666
$\bar{R}^2$	−0.001	0.017	0.017	−0.002	0.002	0.001
$\hat{\rho}$	0.071	0.076	0.075	−0.080	−0.145	−0.141
$\Pr[\hat{\rho} = 0]$	0.016	0.005	0.007	0.000	0.000	0.000
N	2120	2120	2114	2120	2120	2114

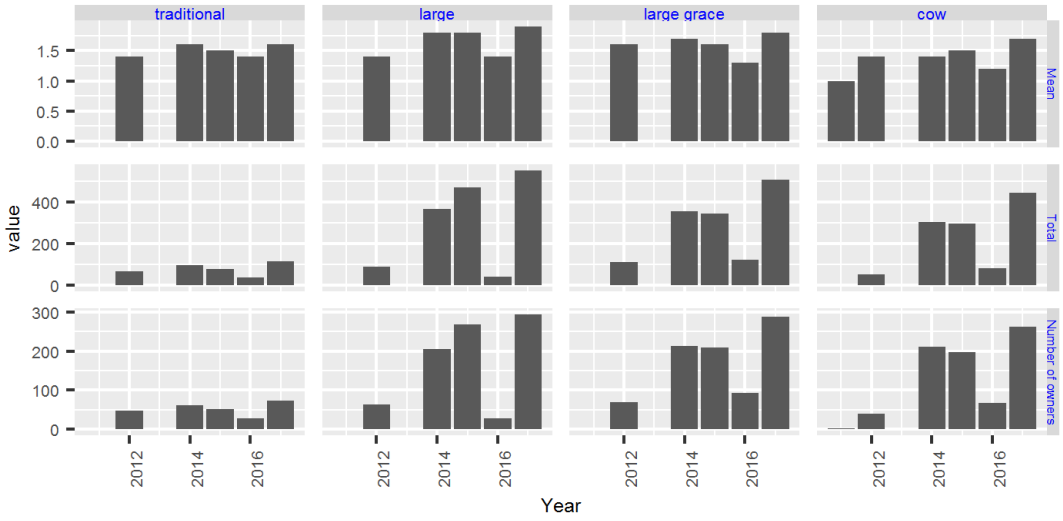
Source: Estimated with GUK administrative and survey data.

Notes: 1. First-difference estimates between round 2 and 4. A first-difference is defined as $\Delta x_{t+k} \equiv x_{t+k} - x_t$ for $k = 1, 2, \ldots$. Saving and repayment misses are taken from administrative data and merged with survey data at Year-Month of survey interviews. Pure control is members not receiving loans while they were put on a wait list. Sample is continuing members and replacing members of early rejecters. Household assets do not include livestock. Regressions (1)-(2), (4)-(5) use only arm and calendar information. (3) and (6) information if the household was exposed to the flood in round 1. Pure controls are households who rejected to receive a loan.

2. ***, **, * indicate statistical significance at 1%, 5%, 10%, respetively. Standard errors are clustered at group (village) level.

D.4 Livestock

FIGURE D3: NUMBER OF COWS/OXEN BY YEAR



Source: Survey data.

Note:

Table D10: FD estimation of livestock holding values

covariates	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(Intercept)	5541.6***	12466.3***	12448.9***	13256.0***	14027.1***	14247.5***	13242.8***
	(578.9)	(1127.1)	(1184.2)	(1170.8)	(1176.1)	(1248.0)	(1168.7)
Large	3010.3***	4638.3***	4620.0***	4932.0***	5043.1***	4015.9***	4987.5***
	(1020.0)	(1364.4)	(1380.9)	(1405.3)	(1420.6)	(1327.1)	(1420.8)
LargeGrace	1971.0**	2617.3*	2642.4*	2781.8**	2835.8**	2842.2**	2828.1**
	(996.0)	(1344.9)	(1353.4)	(1293.4)	(1288.6)	(1323.9)	(1262.2)
Cow	2361.9***	3236.3***	3269.8***	3268.4***	3329.6***	3362.3***	3198.5***
	(850.9)	(1235.0)	(1221.2)	(1097.5)	(1065.8)	(1167.9)	(1076.8)
rd 2 - 3		−11013.2***	−10891.0***	−10890.1***	−11682.1***	−11622.2***	−10887.2***
		(1637.7)	(1646.7)	(1649.8)	(1616.1)	(1609.8)	(1648.9)
Large × rd 2 - 3		−9236.3*	−8803.1*	−8881.9*	−9180.6*	−8571.6	−8893.0*
		(5252.9)	(5286.9)	(5300.7)	(5333.3)	(5381.8)	(5297.1)
LargeGrace × rd 2 - 3		−3544.8	−3550.1	−3576.8	−3712.0	−1770.9	−3602.5
		(3901.2)	(3903.5)	(3907.6)	(3882.0)	(3519.9)	(3906.1)
Cow × rd 2 - 3		−6639.0	−6625.9	−6668.9	−6728.5	−8574.1**	−6684.5
		(4200.7)	(4203.3)	(4204.8)	(4130.6)	(4025.8)	(4204.5)
rd 3 - 4		−12416.6***	−12520.7***	−12531.9***	−14298.5***	−14252.4***	−12548.3***
		(1235.1)	(1228.6)	(1225.9)	(1146.9)	(1141.7)	(1220.5)
Large × rd 3 - 4		−5060.0	−5469.4*	−5583.9*	−6128.0*	−4689.6	−5586.9*
		(3247.0)	(3206.6)	(3227.5)	(3222.3)	(3286.9)	(3225.7)
LargeGrace × rd 3 - 4		−639.5	−629.7	−681.4	−925.5	−388.9	−697.7
		(2726.8)	(2737.4)	(2749.7)	(2589.4)	(2491.1)	(2748.5)
Cow × rd 3 - 4		−908.2	−914.0	−1100.5	−1030.9	−1596.3	−1178.0
		(3117.4)	(3114.5)	(3090.3)	(2914.6)	(3050.9)	(3067.3)
HadCows				−5111.5***	−9600.6***	−11880.0**	
				(1163.1)	(2633.6)	(5395.9)	
Large × HadCows						7373.6	
						(7380.8)	
LargeGrace × HadCows						−3861.6	
						(7035.9)	
Cow × HadCows						−3447.0	
						(6896.6)	
HadCows × rd 2 - 3					4228.0	5057.4	
					(3721.2)	(7298.6)	
Large × HadCows × rd 2 - 3						−2895.0	
						(9623.8)	
LargeGrace × HadCows × rd 2 - 3						−7504.4	
						(9987.2)	
Cow × HadCows × rd 2 - 3						10742.9	
						(10011.1)	
HadCows × rd 3 - 4					9499.0***	11659.0**	
					(3020.9)	(5847.0)	
Large × HadCows × rd 3 - 4						−7017.2	
						(7919.4)	
LargeGrace × HadCows × rd 3 - 4						3794.9	
						(8097.1)	
Cow × HadCows × rd 3 - 4						3099.9	
						(8309.3)	
NumCowsOwnedAtRd1							−3897.2***
							(996.8)
FloodInRd1			227.1	199.7	217.8	204.0	288.2
			(644.1)	(632.2)	(632.6)	(627.8)	(657.1)
Head literate			−867.7	−506.1	−499.0	−396.7	−472.2
			(858.0)	(869.1)	(867.9)	(856.1)	(889.8)
$T = 2$	17	17	16	16	16	16	16
$T = 3$	53	53	51	51	51	51	51
$T = 4$	665	665	665	665	665	665	665
$\bar{R}^2$	0.002	0.083	0.083	0.093	0.098	0.101	0.098
$\hat{\rho}$	−0.205	−0.213	−0.225	−0.246	−0.251	−0.252	−0.251
$\Pr[\hat{\rho} = 0]$	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N	2118	2118	2113	2113	2113	2113	2113

Source: Estimated with GUK administrative and survey data.

Notes: 1. First-difference estimates using administrative and survey data. First-differenced ($\Delta x_{t+1} \equiv x_{t+1} - x_t$) regressands are regressed on categorical and time-variant covariates. Head age and literacy are from baseline survey data. ρ indicates the AR(1) coeffcient of first-difference residuals as suggested by Wooldridge (2010, 10.71) and $\Pr[\rho = 0]$ is its p value. 6M repayment, 6M net saving are mean lagged 6 month repayment and net saving. 6M other repayment, 6M other net saving are mean lagged 6 month repayment and net saving of other members in a group. Saving and repayment information is taken from administrative data. Time invariant household characteristics are taken from household survey data. Administrative data are merged with survey data by the dating the survey rounds in administrative data. Net saving is saving - withdrawal. Excess repayment is repayment - due amount. extsfLY2, LY3, LY4 are dummy variables for second, third, and fourth year into borrowing. Sample is continuing members and replacing members of early rejecters and received loans prior to 2015 Janunary. Regressand is TotalImputedValue, a sum of all livestock holding values evaluated at respective median market prices in the same year.

2. ***, **, * indicate statistical significance at 1%, 5%, 10%, respetively. Standard errors are clustered at group (village) level.

Table D11: FD estimation of livestock holding values by attributes

covariates	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(Intercept)	5541.6***	12466.3***	12448.9***	13256.0***	14046.6***	13986.4***	13242.8***
	(578.9)	(1127.1)	(1184.2)	(1170.8)	(1173.5)	(1180.7)	(1168.7)
Upfront	3010.3***	4638.3***	4620.0***	4932.0***	4999.7***	4947.0***	4987.5***
	(1020.0)	(1364.4)	(1380.9)	(1405.3)	(1401.7)	(1341.7)	(1420.8)
WithGrace	−1039.2	−2021.0	−1977.6	−2150.2	−2184.3	−2061.8	−2159.4
	(1167.2)	(1573.1)	(1606.7)	(1630.8)	(1638.0)	(1557.3)	(1635.0)
InKind	390.8	619.0	627.3	486.7	471.0	456.4	370.3
	(1022.8)	(1462.4)	(1448.1)	(1329.9)	(1281.1)	(1276.6)	(1290.0)
rd 2 - 3		−11013.2***	−10891.0***	−10890.1***	−11654.6***	−11622.2***	−10887.2***
		(1637.7)	(1646.7)	(1649.8)	(1605.8)	(1609.8)	(1648.9)
Upfront × rd 2 - 3		−9236.3*	−8803.1*	−8881.9*	−8947.6*	−9106.0*	−8893.0*
		(5252.9)	(5286.9)	(5300.7)	(5331.4)	(5340.8)	(5297.1)
WithGrace × rd 2 - 3		5691.5	5253.0	5305.1	5344.3	5415.6	5290.5
		(4845.6)	(4882.3)	(4896.2)	(4933.0)	(4918.1)	(4892.3)
InKind × rd 2 - 3		−3094.2	−3075.7	−3092.2	−2863.6	−2900.6	−3082.0
		(3678.7)	(3681.9)	(3684.5)	(3427.1)	(3452.7)	(3683.8)
rd 3 - 4		−12416.6***	−12520.7***	−12531.9***	−14285.4***	−14252.4***	−12548.3***
		(1235.1)	(1228.6)	(1225.9)	(1143.1)	(1141.7)	(1220.5)
Upfront × rd 3 - 4		−5060.0	−5469.4*	−5583.9*	−6003.8*	−5984.9*	−5586.9*
		(3247.0)	(3206.6)	(3227.5)	(3206.1)	(3182.7)	(3225.7)
WithGrace × rd 3 - 4		4420.4	4839.7	4902.5	5134.6	5001.2	4889.2
		(3604.1)	(3573.5)	(3585.1)	(3546.5)	(3468.4)	(3580.5)
InKind × rd 3 - 4		−268.7	−284.3	−419.2	−46.1	−40.3	−480.3
		(3487.7)	(3493.9)	(3464.9)	(3182.9)	(3174.5)	(3443.8)
HadCows				−5111.5***	−9706.0***	−9863.3***	
				(1163.1)	(2555.6)	(2463.5)	
HadCows × rd 2 - 3					4455.7	4425.7	
					(3571.7)	(3523.4)	
HadCows × rd 3 - 4					9578.8***	9723.2***	
					(2971.7)	(2904.0)	
NumCowsOwnedAtRd1							−3897.2***
							(996.8)
FloodInRd1			227.1	199.7	208.7	204.0	288.2
			(644.1)	(632.2)	(633.4)	(627.8)	(657.1)
Head literate			−867.7	−506.1	−505.4	−396.7	−472.2
			(858.0)	(869.1)	(869.4)	(856.1)	(889.8)
HadCows × InKind					−2236.1	−345.4	
					(2387.4)	(2706.3)	
HadCows × InKind × rd 2 - 3					15340.1*	21142.2**	
					(8021.1)	(10361.3)	
HadCows × InKind × rd 3 - 4					7003.3	6322.3	
					(6822.0)	(8476.9)	
HadCows × Upfront						5043.7	
						(4107.2)	
HadCows × Upfront × rd 2 - 3						−2895.0	
						(9623.8)	
HadCows × Upfront × rd 3 - 4						−7017.2	
						(7919.4)	
HadCows × WithGrace						−4810.9	
						(3903.0)	
HadCows × WithGrace × rd 2 - 3						−7504.4	
						(9987.2)	
HadCows × WithGrace × rd 3 - 4						3794.9	
						(8097.1)	
$T = 2$	17	17	16	16	16	16	16
$T = 3$	53	53	51	51	51	51	51
$T = 4$	665	665	665	665	665	665	665
$\bar{R}^2$	0.002	0.083	0.083	0.093	0.1	0.101	0.098
$\hat{\rho}$	−0.205	−0.213	−0.225	−0.246	−0.253	−0.252	−0.251
$\Pr[\hat{\rho} = 0]$	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N	2118	2118	2113	2113	2113	2113	2113

Source: Estimated with GUK administrative and survey data.

Notes: 1. First-difference estimates using administrative and survey data. First-differenced ($\Delta x_{t+1} \equiv x_{t+1} - x_t$) regressands are regressed on categorical and time-variant covariates. Head age and literacy are from baseline survey data. ρ indicates the AR(1) coeffcient of first-difference residuals as suggested by Wooldridge (2010, 10.71) and $\Pr[\rho = 0]$ is its p value. 6M repayment, 6M net saving are mean lagged 6 month repayment and net saving. 6M other repayment, 6M other net saving are mean lagged 6 month repayment and net saving of other members in a group. LargeSize is an indicator function if the arm is of large size, WithGrace is an indicator function if the arm is with a grace period, InKind is an indicator function if the arm provides a cow. Saving and repayment information is taken from administrative data. Time invariant household characteristics are taken from household survey data. Administrative data are merged with survey data by the dating the survey rounds in administrative data. Net saving is saving - withdrawal. Excess repayment is repayment - due amount. extsfLY2, LY3, LY4 are dummy variables for second, third, and fourth year into borrowing. Sample is continuing members and replacing members of early rejecters and received loans prior to 2015 Janunary. Regressand is TotalImputedValue, a sum of all livestock holding values evaluated at respective median market prices in the same year.

2. ***, **, * indicate statistical significance at 1%, 5%, 10%, respetively. Standard errors are clustered at group (village) level.

TABLE D12: FD ESTIMATION OF LIVESTOCK HOLDING VALUES, ULTRA VS. MODERATELY POOR

covariates	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(Intercept)	7302.9***	15316.5***	15220.6***	16071.8***	16830.7***	16830.7***	16050.6***
	(554.4)	(1421.8)	(1431.1)	(1395.3)	(1345.6)	(1345.6)	(1379.7)
UltraPoor	244.7	−280.6	−312.4	−253.3	−253.6	−253.6	−218.0
	(601.0)	(988.3)	(982.5)	(960.4)	(956.6)	(956.6)	(939.8)
rd 2 - 3		−10909.4***	−10788.3***	−10785.6***	−11483.5***	−11483.5***	−10782.0***
		(1677.0)	(1681.9)	(1685.8)	(1646.5)	(1646.5)	(1685.1)
UltraPoor × rd 2 - 3		1957.8	2134.4	2129.5	2100.3	2100.3	2120.8
		(3759.0)	(3748.0)	(3755.5)	(3760.1)	(3760.1)	(3754.6)
rd 3 - 4		−12372.6***	−12479.4***	−12485.7***	−14132.5***	−14132.5***	−12501.5***
		(1227.3)	(1223.6)	(1222.1)	(1151.9)	(1151.9)	(1216.8)
UltraPoor × rd 3 - 4		4858.6*	4698.7*	4740.7*	4633.3*	4633.3*	4793.3*
		(2629.1)	(2641.4)	(2624.5)	(2606.6)	(2606.6)	(2606.0)
HadCows				−4977.1***	−9104.6***	−9104.6***	
				(1266.8)	(2861.0)	(2861.0)	
HadCows × rd 2 - 3					3748.1	3748.1	
					(3779.4)	(3779.4)	
HadCows × rd 3 - 4					8880.9***	8880.9***	
					(3163.3)	(3163.3)	
NumCowsOwnedAtRd1							−3822.4***
							(1075.1)
FloodInRd1			436.9	432.1	451.2	451.2	519.6
			(607.0)	(585.6)	(586.5)	(586.5)	(592.6)
Head literate			−816.3	−467.6	−461.4	−461.4	−435.0
			(920.6)	(939.4)	(938.6)	(938.6)	(963.1)
$T = 2$	17	17	16	16	16	16	16
$T = 3$	53	53	51	51	51	51	51
$T = 4$	665	665	665	665	665	665	665
$\bar{R}^2$	0	0.078	0.079	0.088	0.092	0.092	0.092
$\hat{\rho}$	−0.139	−0.178	−0.218	−0.234	−0.240	−0.240	−0.238
$\Pr[\hat{\rho} = 0]$	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N	2118	2118	2113	2113	2113	2113	2113

Source: Estimated with GUK administrative and survey data.

Notes: 1. First-difference estimates using administrative and survey data. First-differenced ($\Delta x_{t+1} \equiv x_{t+1} - x_t$) regressands are regressed on categorical and time-variant covariates. Head age and literacy are from baseline survey data. ρ indicates the AR(1) coeffcient of first-difference residuals as suggested by Wooldridge (2010, 10.71) and $\Pr[\rho = 0]$ is its p value. 6M repayment, 6M net saving are mean lagged 6 month repayment and net saving. 6M other repayment, 6M other net saving are mean lagged 6 month repayment and net saving of other members in a group. UltraPoor is an indicator function if the household is classified as the ultra poor. Sample is continuing members and replacing members of early rejecters and received loans prior to 2015 Janunary. Regressand is TotalImputedValue, a sum of all livestock holding values evaluated at respective median market prices in the same year.

2. ***, **, * indicate statistical significance at 1%, 5%, 10%, respetively. Standard errors are clustered at group (village) level.

Table D13: FD estimation of cattle holding by attributes

covariates	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(Intercept)	1.0***	0.8***	0.8***	0.7***	0.6***	0.6***	0.7***
	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)
Upfront	0.6***	0.5***	0.5***	0.5***	0.5***	0.5***	0.5***
	(0.2)	(0.2)	(0.2)	(0.1)	(0.1)	(0.1)	(0.1)
WithGrace	−0.2	−0.2	−0.2	−0.2	−0.2	−0.1	−0.2
	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)
InKind	−0.1	−0.1	−0.1	− 0.0	− 0.0	− 0.0	− 0.0
	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)
rd 2 - 3		0.2***	0.2***	0.2***	0.2***	0.2***	0.2***
		(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
Upfront × rd 2 - 3		−0.1	−0.1	− 0.0	− 0.0	− 0.0	− 0.0
		(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)
WithGrace × rd 2 - 3		0.0	0.0	0.0	0.0	0.0	0.0
		(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)
InKind × rd 2 - 3		−0.1	−0.1	−0.1	−0.1	−0.1	−0.1
		(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)
rd 3 - 4		0.3***	0.3***	0.3***	0.3***	0.3***	0.3***
		(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)
Upfront × rd 3 - 4		0.0	0.0	0.0	0.0	0.0	0.0
		(0.2)	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)
WithGrace × rd 3 - 4		0.0	0.1	0.0	0.0	0.0	0.0
		(0.2)	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)
InKind × rd 3 - 4		− 0.0	− 0.0	− 0.0	− 0.0	− 0.0	− 0.0
		(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)
HadCows				0.7***	0.8***	0.8***	
				(0.1)	(0.1)	(0.1)	
HadCows × rd 2 - 3					−0.1	−0.2	
					(0.1)	(0.1)	
HadCows × rd 3 - 4					−0.2*	−0.3**	
					(0.1)	(0.1)	
NumCowsOwnedAtRd1							0.4***
							(0.1)
FloodInRd1			0.0	0.0	0.0	0.0	0.0
			(0.1)	(0.1)	(0.1)	(0.1)	(0.1)
Head literate			− 0.0	−0.1	−0.1	−0.1	−0.1
			(0.1)	(0.1)	(0.1)	(0.1)	(0.1)
HadCows × InKind					−0.3*	−0.2	
					(0.2)	(0.2)	
HadCows × InKind × rd 2 - 3					0.2	0.4	
					(0.2)	(0.3)	
HadCows × InKind × rd 3 - 4					0.3	0.7*	
					(0.3)	(0.3)	
HadCows × Upfront						0.6	
						(0.4)	
HadCows × Upfront × rd 2 - 3						0.3	
						(0.3)	
HadCows × Upfront × rd 3 - 4						0.4	
						(0.4)	
HadCows × WithGrace						−0.5	
						(0.4)	
HadCows × WithGrace × rd 2 - 3						−0.4	
						(0.3)	
HadCows × WithGrace × rd 3 - 4						−0.7	
						(0.4)	
$T = 2$	15	15	14	14	14	14	14
$T = 3$	53	53	51	51	51	51	51
$T = 4$	665	665	665	665	665	665	665
$\bar{R}^2$	0.033	0.042	0.041	0.103	0.105	0.112	0.104
$\hat{\rho}$	0.607	0.579	0.582	0.576	0.574	0.571	0.574
$\Pr[\hat{\rho} = 0]$	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N	2049	2049	2044	2044	2044	2044	2044

Source: Estimated with GUK administrative and survey data.

Notes: 1. First-difference estimates using administrative and survey data. First-differenced ($\Delta x_{t+1} \equiv x_{t+1} - x_t$) regressands are regressed on categorical and time-variant covariates. Head age and literacy are from baseline survey data. ρ indicates the AR(1) coeffcient of first-difference residuals as suggested by Wooldridge (2010, 10.71) and $\Pr[\rho = 0]$ is its p value. 6M repayment, 6M net saving are mean lagged 6 month repayment and net saving. 6M other repayment, 6M other net saving are mean lagged 6 month repayment and net saving of other members in a group. LargeSize is an indicator function if the arm is of large size, WithGrace is an indicator function if the arm is with a grace period, InKind is an indicator function if the arm provides a cow. Saving and repayment information is taken from administrative data. Time invariant household characteristics are taken from household survey data. Administrative data are merged with survey data by the dating the survey rounds in administrative data. Net saving is saving - withdrawal. Excess repayment is repayment - due amount. extsfLY2, LY3, LY4 are dummy variables for second, third, and fourth year into borrowing. Sample is continuing members and replacing members of early rejecters and received loans prior to 2015 Janunary. Regressand is NumCows, number of cattle holding.

2. ***, **, * indicate statistical significance at 1%, 5%, 10%, respetively. Standard errors are clustered at group (village) level.

Table D14: FD estimation of cattle holding, ultra vs. moderately poor

covariates	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(Intercept)	1.3***	1.1***	1.1***	1.0***	0.9***	0.9***	1.0***
	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)
UltraPoor	−0.0	−0.0	−0.0	−0.0	−0.0	−0.0	−0.0
	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)
rd 2 - 3		0.2***	0.2***	0.2***	0.2***	0.2***	0.2***
		(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
UltraPoor × rd 2 - 3		−0.0	−0.0	−0.0	−0.0	−0.0	−0.0
		(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)
rd 3 - 4		0.3***	0.3***	0.3***	0.3***	0.3***	0.3***
		(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)
UltraPoor × rd 3 - 4		0.1	0.1	0.1	0.1	0.1	0.1
		(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)
HadCows				0.7***	0.8***	0.8***	
				(0.2)	(0.1)	(0.1)	
HadCows × rd 2 - 3					−0.2	−0.2	
					(0.1)	(0.1)	
HadCows × rd 3 - 4					−0.3*	−0.3*	
					(0.1)	(0.1)	
NumCowsOwnedAtRd1							0.5***
							(0.1)
FloodInRd1			0.1	0.1	0.1	0.1	0.1
			(0.1)	(0.1)	(0.1)	(0.1)	(0.1)
Head literate			−0.0	−0.1	−0.1	−0.1	−0.1
			(0.1)	(0.1)	(0.1)	(0.1)	(0.1)
$T = 2$	15	15	14	14	14	14	14
$T = 3$	53	53	51	51	51	51	51
$T = 4$	665	665	665	665	665	665	665
$\bar{R}^2$	0	0.011	0.011	0.077	0.078	0.078	0.079
$\hat{\rho}$	0.588	0.518	0.578	0.571	0.567	0.567	0.590
$\Pr[\hat{\rho} = 0]$	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N	2049	2049	2044	2044	2044	2044	2044

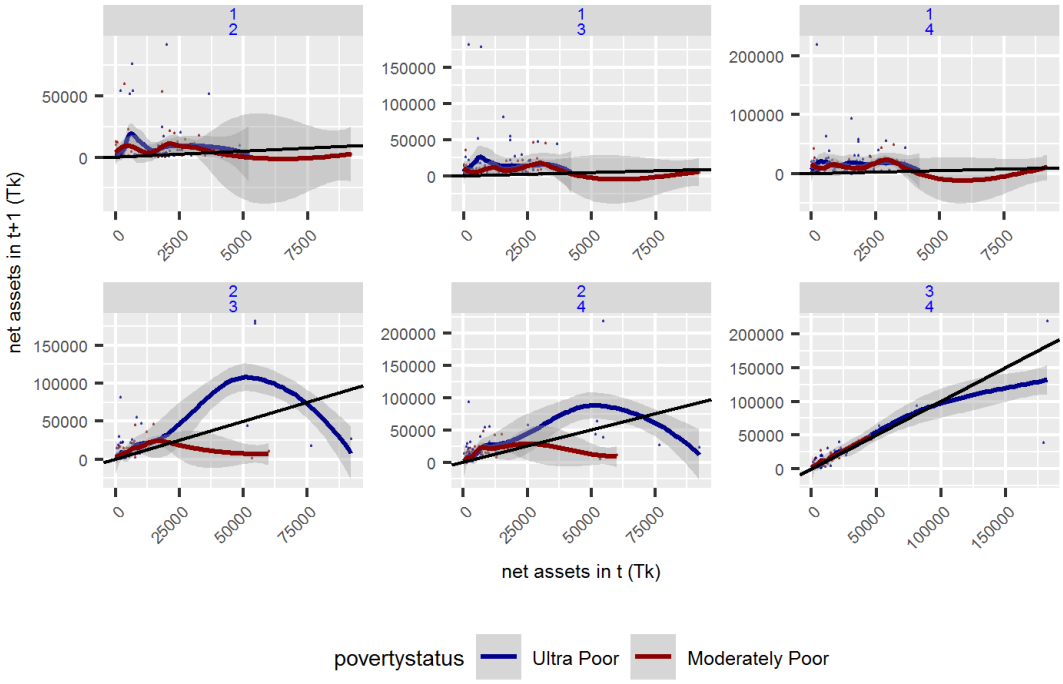
Source: Estimated with GUK administrative and survey data.

Notes: 1. First-difference estimates using administrative and survey data. First-differenced ($\Delta x_{t+1} \equiv x_{t+1} - x_t$) regressands are regressed on categorical and time-variant covariates. Head age and literacy are from baseline survey data. ρ indicates the AR(1) coeffcient of first-difference residuals as suggested by Wooldridge (2010, 10.71) and $\Pr[\rho = 0]$ is its p value. 6M repayment, 6M net saving are mean lagged 6 month repayment and net saving. 6M other repayment, 6M other net saving are mean lagged 6 month repayment and net saving of other members in a group. LargeSize is an indicator function if the arm is of large size, WithGrace is an indicator function if the arm is with a grace period, InKind is an indicator function if the arm provides a cow. Saving and repayment information is taken from administrative data. Time invariant household characteristics are taken from household survey data. Administrative data are merged with survey data by the dating the survey rounds in administrative data. Net saving is saving - withdrawal. Excess repayment is repayment - due amount. extsfLY2, LY3, LY4 are dummy variables for second, third, and fourth year into borrowing. Sample is continuing members and replacing members of early rejecters and received loans prior to 2015 Janunary. Regressand is NumCows, number of cattle holding.

2. ***, **, * indicate statistical significance at 1%, 5%, 10%, respetively. Standard errors are clustered at group (village) level.

D.5 Net assets

FIGURE D4: TOTAL ASSET DYNAMICS OF NONBORROWERS



Source: Survey data.

Note: Only for nonborrowers. Scatter plots contrast t vs. $t+1$ comparison where t and $t+1$ are given in strip ribbons of each panel.

Table D15: FD estimation of net assets, original HHs

covariates	(1)	(2)	(3)	(4)	(5)	(6)
(Intercept)	10994.2***	14009.9***	14855.4***	15435.1***	16725.2***	15357.6***
	(1117.8)	(1785.7)	(1917.5)	(1908.8)	(1935.3)	(1896.4)
Large	6189.6***	6660.8***	6968.5***	7192.6***	7275.7***	7201.0***
	(2093.7)	(2465.4)	(2472.1)	(2482.9)	(2503.5)	(2479.0)
LargeGrace	4018.1**	2594.3	2421.9	2521.8	2709.1	2539.2
	(1766.5)	(1865.4)	(1823.6)	(1801.5)	(1799.7)	(1782.4)
Cow	3573.7**	3760.9	3869.8	3870.4	3987.4	3825.9
	(1800.1)	(2635.1)	(2602.8)	(2542.7)	(2503.3)	(2542.8)
rd 2 - 3		575.9	674.7	676.1	−2207.3	677.8
		(2734.4)	(2754.0)	(2755.3)	(2967.8)	(2754.6)
Large × rd 2 - 3		1488.2	1984.5	1928.0	629.5	1927.7
		(6979.8)	(6957.6)	(6973.9)	(6873.1)	(6973.1)
LargeGrace × rd 2 - 3		15028.8**	15049.2**	15030.0**	14471.1**	15016.0**
		(6175.1)	(6170.3)	(6171.8)	(6323.7)	(6170.2)
Cow × rd 2 - 3		433.2	272.3	244.5	−5.6	237.7
		(7920.2)	(8047.4)	(8052.1)	(7961.3)	(8052.7)
rd 3 - 4		−9331.3***	−9379.7***	−9387.0***	−10780.2***	−9396.6***
		(2327.4)	(2311.5)	(2312.4)	(2216.2)	(2309.3)
Large × rd 3 - 4		−3819.5	−4264.9	−4347.1	−4763.7	−4339.2
		(6095.8)	(6108.5)	(6132.4)	(5680.6)	(6127.9)
LargeGrace × rd 3 - 4		2197.5	2154.3	2117.2	1668.0	2111.3
		(3299.8)	(3293.8)	(3297.7)	(3141.7)	(3298.4)
Cow × rd 3 - 4		−1415.1	−1296.0	−1427.1	−1497.1	−1460.9
		(6641.4)	(6555.3)	(6555.5)	(6249.4)	(6546.4)
HadCows				−3670.0**	−11954.6***	
				(1560.9)	(3430.6)	
HadCows × rd 2 - 3					15762.0***	
					(5075.5)	
HadCows × rd 3 - 4					8768.4	
					(5525.5)	
NumCowsOwnedAtRd1						−2464.7*
						(1260.1)
FloodInRd1			−1811.3	−1832.1	−1847.4	−1773.5
			(1128.1)	(1123.2)	(1135.9)	(1137.6)
Head literate			−270.9	−11.9	191.8	−21.3
			(1543.7)	(1547.4)	(1540.4)	(1564.2)
HadCows × Large					7347.4	
					(4468.3)	
HadCows × LargeGrace					814.7	
					(3648.4)	
HadCows × Large × rd 2 - 3					−3161.1	
					(11746.4)	
HadCows × LargeGrace × rd 2 - 3					−27220.9**	
					(12581.0)	
HadCows × Large × rd 3 - 4					−21894.4	
					(15534.7)	
HadCows × LargeGrace × rd 3 - 4					−20640.0*	
					(10622.1)	
$T = 2$	16	16	16	16	16	16
$T = 3$	52	52	50	50	50	50
$T = 4$	665	665	665	665	665	665
$\bar{R}^2$	0.002	0.02	0.02	0.021	0.028	0.021
$\hat{\rho}$	−0.173	−0.161	−0.162	−0.156	−0.174	−0.151
$\Pr[\hat{\rho} = 0]$	0.000	0.000	0.000	0.000	0.000	0.000
N	2115	2115	2111	2111	2111	2111

Source: Estimated with GUK administrative and survey data.

Notes: 1. First-difference estimates using administrative and survey data. First-differenced ($\Delta x_{t+1} \equiv x_{t+1} - x_t$) regressands are regressed on categorical and time-variant covariates. Head age and literacy are from baseline survey data. ρ indicates the AR(1) coeffcient of first-difference residuals as suggested by Wooldridge (2010, 10.71) and $\Pr[\rho = 0]$ is its p value. 6M repayment, 6M net saving are mean lagged 6 month repayment and net saving. 6M other repayment, 6M other net saving are mean lagged 6 month repayment and net saving of other members in a group. Sample is continuing members and replacing members of early rejecters and received loans prior to 2015 Janunary. Household assets do not include livestock. Regressions (1)-(3), (5)-(6) use only arm and calendar information. (4) and (7) use previous six month repayment and saving information which is lacking in rd 1, hence starts from rd 2.

2. ***, **, * indicate statistical significance at 1%, 5%, 10%, respetively. Standard errors are clustered at group (village) level.

Table D16: FD estimation of net assets by attributes

covariates	(1)	(2)	(3)	(4)	(5)	(6)
(Intercept)	10994.2***	14009.9***	14855.4***	15435.1***	16773.0***	15357.6***
	(1117.8)	(1785.7)	(1917.5)	(1908.8)	(1969.9)	(1896.4)
Upfront	6189.6***	6660.8***	6968.5***	7192.6***	7244.0***	7201.0***
	(2093.7)	(2465.4)	(2472.1)	(2482.9)	(2510.0)	(2479.0)
WithGrace	−2171.5	−4066.5	−4546.6*	−4670.8*	−4568.4*	−4661.8*
	(2237.3)	(2528.4)	(2586.7)	(2583.9)	(2622.4)	(2577.6)
InKind	−444.4	1166.5	1448.0	1348.6	1260.3	1286.7
	(1965.2)	(2694.1)	(2699.4)	(2645.1)	(2576.1)	(2642.4)
rd 2 - 3		575.9	674.7	676.1	−2235.7	677.8
		(2734.4)	(2754.0)	(2755.3)	(2980.1)	(2754.6)
Upfront × rd 2 - 3		1488.2	1984.5	1928.0	844.9	1927.7
		(6979.8)	(6957.6)	(6973.9)	(6858.5)	(6973.1)
WithGrace × rd 2 - 3		13540.6*	13064.6*	13102.1*	13841.7**	13088.3*
		(7153.8)	(7124.3)	(7133.9)	(6974.0)	(7129.0)
InKind × rd 2 - 3		−14595.6*	−14776.8*	−14785.5*	−14364.8*	−14778.3*
		(8073.9)	(8194.5)	(8195.5)	(7866.0)	(8194.3)
rd 3 - 4		−9331.3***	−9379.7***	−9387.0***	−10794.2***	−9396.6***
		(2327.4)	(2311.5)	(2312.4)	(2225.6)	(2309.3)
Upfront × rd 3 - 4		−3819.5	−4264.9	−4347.1	−4675.3	−4339.2
		(6095.8)	(6108.5)	(6132.4)	(5703.9)	(6127.9)
WithGrace × rd 3 - 4		6017.0	6419.2	6464.3	6431.7	6450.4
		(5898.6)	(5909.8)	(5921.3)	(5544.5)	(5916.2)
InKind × rd 3 - 4		−3612.6	−3450.3	−3544.2	−3172.9	−3572.2
		(6460.9)	(6371.5)	(6360.2)	(5980.9)	(6352.2)
HadCows				−3670.0**	−11966.9***	
				(1560.9)	(3426.1)	
HadCows × rd 2 - 3					15826.8***	
					(5044.2)	
HadCows × rd 3 - 4					8732.0	
					(5517.5)	
NumCowsOwnedAtRd1						−2464.7*
						(1260.1)
FloodInRd1			−1811.3	−1832.1	−1854.3	−1773.5
			(1128.1)	(1123.2)	(1139.2)	(1137.6)
Head literate			−270.9	−11.9	184.4	−21.3
			(1543.7)	(1547.4)	(1542.9)	(1564.2)
HadCows × Upfront					6337.8	
					(4968.5)	
HadCows × Upfront × rd 2 - 3					6114.5	
					(11668.1)	
HadCows × Upfront × rd 3 - 4					−19671.7	
					(16779.7)	
HadCows × WithGrace					−6532.2	
					(4859.2)	
HadCows × WithGrace × rd 2 - 3					−24060.1*	
					(13095.5)	
HadCows × WithGrace × rd 3 - 4					1254.4	
					(15267.2)	
HadCows × InKind					−1655.4	
					(4293.7)	
HadCows × InKind × rd 2 - 3					35010.7**	
					(16007.3)	
HadCows × InKind × rd 3 - 4					22307.7*	
					(13545.5)	
$T = 2$	16	16	16	16	16	16
$T = 3$	52	52	50	50	50	50
$T = 4$	665	665	665	665	665	665
$\bar{R}^2$	0.002	0.02	0.02	0.021	0.028	0.021
$\hat{\rho}$	−0.173	−0.161	−0.162	−0.156	−0.170	−0.151
$\Pr[\hat{\rho} = 0]$	0.000	0.000	0.000	0.000	0.000	0.000
N	2115	2115	2111	2111	2111	2111

Source: Estimated with GUK administrative and survey data.

Notes: 1. First-difference estimates using administrative and survey data. First-differenced ($\Delta x_{t+1} \equiv x_{t+1} - x_t$) regressands are regressed on categorical and time-variant covariates. Head age and literacy are from baseline survey data. ρ indicates the AR(1) coeffcient of first-difference residuals as suggested by Wooldridge (2010, 10.71) and $\Pr[\rho = 0]$ is its p value. 6M repayment, 6M net saving are mean lagged 6 month repayment and net saving. 6M other repayment, 6M other net saving are mean lagged 6 month repayment and net saving of other members in a group. LargeSize is an indicator function if the arm is of large size, WithGrace is an indicator function if the arm is with a grace period, InKind is an indicator function if the arm provides a cow. Sample is continuing members and replacing members of early rejecters and received loans prior to 2015 Janunary. Household assets do not include livestock. Regressions (1)-(3), (5)-(6) use only arm and calendar information. (4) and (7) use previous six month repayment and saving information which is lacking in rd 1, hence starts from rd 2.

2. ***, **, * indicate statistical significance at 1%, 5%, 10%, respetively. Standard errors are clustered at group (village) level.

Table D17: FD estimation of net assets by attributes, round 2 and 4 comparison

covariates	(1)	(2)	(3)	(4)	(5)	(6)
(Intercept)	16160.3***	16442.3***	18355.9***	18282.2***	18186.4***	17618.3***
	(2817.3)	(2971.2)	(3433.4)	(3534.2)	(3519.8)	(3467.8)
Upfront	13126.8**	13109.8**	13636.6**	13614.9**	13344.4**	13368.0**
	(5395.2)	(5435.3)	(5462.2)	(5409.9)	(5354.9)	(5360.9)
WithGrace	2622.0	2617.4	1624.7	1637.5	2114.0	1766.6
	(5894.4)	(5915.9)	(6035.1)	(5993.8)	(6064.9)	(5944.5)
InKind	−7966.6	−7934.0	−7345.8	−7327.5	−7171.1	−7014.3
	(5014.7)	(4963.5)	(4858.2)	(4852.1)	(4902.0)	(4829.1)
HadCows				433.9	520.1	
				(4829.3)	(4388.9)	
NumCowsOwnedAtRd1						3307.3
						(3629.4)
Head literate		−2372.9	−2368.0	−2397.4	−1626.9	−2689.2
		(7891.7)	(7887.4)	(7928.7)	(7944.1)	(7878.3)
FloodInRd1			−4025.3	−4022.6	−4074.7	−4047.5
			(3223.0)	(3227.0)	(3267.6)	(3192.4)
HadCows × Upfront					8973.3	
					(12988.0)	
HadCows × WithGrace					−25832.3**	
					(12932.2)	
HadCows × InKind					29303.1***	
					(10759.1)	
$\bar{R}^2$	0.013	0.012	0.012	0.011	0.017	0.013
N	665	665	665	665	665	665

Source: Estimated with GUK administrative and survey data.

Notes: 1. First-difference estimates between round 2 and 4. A first-difference is defined as $\Delta x_{t+k} \equiv x_{t+k} - x_t$ for $k = 1, 2, \ldots$. Saving and repayment misses are taken from administrative data and merged with survey data at Year-Month of survey interviews. Intercept terms are omitted in estimating equations. Sample is continuing members and replacing members of early rejecters and received loans prior to 2015 Janunary. Household assets do not include livestock. Regressions (1)-(3), (5)-(6) use only arm and calendar information. (4) and (7) use previous six month repayment and saving information which is lacking in rd 1, hence starts from rd 2.

2. ***, **, * indicate statistical significance at 1%, 5%, 10%, respetively. Standard errors are clustered at group (village) level.

D.6 Consumption

TABLE D18: FD ESTIMATION OF CONSUMPTION

	Per capita consumption (Tk)				Per capita hygiene consumption (Tk)		
covariates	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(Intercept)	289.8***	482.7***	484.1***	529.6***	175.4***	213.5***	201.5***
	(34.8)	(50.6)	(51.0)	(71.0)	(20.0)	(30.3)	(37.8)
Large	52.1	82.8	87.3	21.5	31.1	57.3*	53.6
	(49.1)	(60.7)	(59.8)	(75.4)	(28.0)	(33.9)	(40.8)
LargeGrace	−1.1	−4.7	−7.3	−68.3	3.0	−5.0	8.5
	(47.8)	(56.3)	(54.6)	(70.6)	(30.0)	(32.0)	(36.2)
Cow	35.6	94.7	77.7	−2.3	9.5	46.4	38.1
	(51.5)	(59.4)	(57.3)	(76.6)	(30.7)	(35.4)	(39.3)
rd 3 - 4		−438.9***	−415.5***	−405.4***		−108.0**	−57.5
		(78.3)	(76.5)	(84.0)		(42.0)	(43.5)
Large × rd 3 - 4		−105.6	−96.8	20.7		−140.4	−95.8
		(200.9)	(201.4)	(264.4)		(101.6)	(136.0)
LargeGrace × rd 3 - 4		84.2	87.5	233.4		48.2	96.4
		(234.1)	(233.9)	(267.9)		(132.1)	(152.7)
Cow × rd 3 - 4		−317.2	−242.0	−50.6		−219.5*	−140.4
		(210.0)	(199.2)	(239.7)		(114.9)	(136.4)
FloodInRd1			−35.7	−50.1			−30.6
			(28.2)	(36.1)			(22.8)
Head literate			68.5	51.6			36.5
			(43.2)	(46.0)			(34.2)
6M repayment				126.2			116.4
				(137.0)			(81.7)
6M net saving				−697.2			−254.5
				(428.9)			(172.7)
6M other member net saving				−432.6			494.0
				(1488.9)			(609.6)
6M other member Repaid				−63.1			−43.4
				(177.9)			(96.0)
$T = 2$	50	50	50	23	50	50	23
$T = 3$	668	668	665	611	668	668	611
$\bar{R}^2$	−0.001	0.064	0.062	0.06	−0.002	0.017	0.011
$\hat{\rho}$	−0.471	−0.412	−0.408	−0.406	−0.322	−0.270	−0.285
$\Pr[\hat{\rho} = 0]$	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N	1386	1386	1380	1245	1386	1386	1245

Source: Estimated with GUK administrative and survey data.

Notes: 1. First-difference estimates using administrative and survey data. First-differenced ($\Delta x_{t+1} \equiv x_{t+1} - x_t$) regressands are regressed on categorical and time-variant covariates. Head age and literacy are from baseline survey data. ρ indicates the AR(1) coeffcient of first-difference residuals as suggested by Wooldridge (2010, 10.71) and $\Pr[\rho = 0]$ is its p value. 6M repayment, 6M net saving are mean lagged 6 month repayment and net saving. 6M other repayment, 6M other net saving are mean lagged 6 month repayment and net saving of other members in a group. Sample is continuing members and replacing members of early rejecters and received loans prior to 2015 Janunary. Consumption is annualised values.

2. ***, **, * indicate statistical significance at 1%, 5%, 10%, respetively. Standard errors are clustered at group (village) level.

Table D19: FD estimation of consumption by attributes

	Per capita consumption (Tk)				Per capita hygiene consumption (Tk)		
covariates	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(Intercept)	289.8***	482.7***	484.1***	529.6***	175.4***	213.5***	201.5***
	(34.8)	(50.6)	(51.0)	(71.0)	(20.0)	(30.3)	(37.8)
Upfront	52.1	82.8	87.3	21.5	31.1	57.3*	53.6
	(49.1)	(60.7)	(59.8)	(75.4)	(28.0)	(33.9)	(40.8)
WithGrace	−53.1	−87.5	−94.5	−89.9	−28.1	−62.4**	−45.1
	(47.7)	(61.2)	(59.8)	(71.4)	(29.7)	(31.5)	(35.7)
InKind	36.6	99.4*	85.0	66.0	6.5	51.5	29.6
	(50.2)	(60.0)	(57.5)	(57.7)	(32.3)	(33.1)	(30.5)
rd 3 - 4		−438.9***	−415.5***	−405.4***		−108.0**	−57.5
		(78.3)	(76.5)	(84.0)		(42.0)	(43.5)
Upfront × rd 3 - 4		−105.6	−96.8	20.7		−140.4	−95.8
		(200.9)	(201.4)	(264.4)		(101.6)	(136.0)
WithGrace × rd 3 - 4		189.8	184.2	212.8		188.5	192.1*
		(229.4)	(229.7)	(234.1)		(122.6)	(109.9)
InKind × rd 3 - 4		−401.4*	−329.5	−284.1		−267.7**	−236.8*
		(237.4)	(227.6)	(229.8)		(133.8)	(128.1)
FloodInRd1			−35.7	−50.1			−30.6
			(28.2)	(36.1)			(22.8)
Head literate			68.5	51.6			36.5
			(43.2)	(46.0)			(34.2)
6M repayment				126.2			116.4
				(137.0)			(81.7)
6M net saving				−697.2			−254.5
				(428.9)			(172.7)
6M other member net saving				−432.6			494.0
				(1488.9)			(609.6)
6M other member Repaid				−63.1			−43.4
				(177.9)			(96.0)
$T = 2$	50	50	50	23	50	50	23
$T = 3$	668	668	665	611	668	668	611
$\bar{R}^2$	−0.001	0.064	0.062	0.06	−0.002	0.017	0.011
$\hat{\rho}$	−0.471	−0.412	−0.408	−0.406	−0.322	−0.270	−0.285
$\Pr[\hat{\rho} = 0]$	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N	1386	1386	1380	1245	1386	1386	1245

Source: Estimated with GUK administrative and survey data.

Notes: 1. First-difference estimates using administrative and survey data. First-differenced ($\Delta x_{t+1} \equiv x_{t+1} - x_t$) regressands are regressed on categorical and time-variant covariates. Head age and literacy are from baseline survey data. ρ indicates the AR(1) coeffcient of first-difference residuals as suggested by Wooldridge (2010, 10.71) and $\Pr[\rho = 0]$ is its p value. 6M repayment, 6M net saving are mean lagged 6 month repayment and net saving. 6M other repayment, 6M other net saving are mean lagged 6 month repayment and net saving of other members in a group. LargeSize is an indicator function if the arm is of large size, WithGrace is an indicator function if the arm is with a grace period, InKind is an indicator function if the arm provides a cow. Sample is continuing members and replacing members of early rejecters and received loans prior to 2015 Janunary. Consumption is annualised values.

2. ***, **, * indicate statistical significance at 1%, 5%, 10%, respetively. Standard errors are clustered at group (village) level.

Table D20: FD estimation of consumption, moderately poor vs. ultra poor

	Per capita consumption (Tk)				Per capita hygiene consumption (Tk)		
covariates	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(Intercept)	314.2***	529.1***	512.5***	498.6***	197.4***	253.0***	226.5***
	(30.6)	(51.7)	(47.0)	(54.2)	(18.8)	(28.6)	(30.5)
UltraPoor	−1.8	−1.2	13.5	24.4	−16.2	−21.9	4.6
	(32.9)	(39.7)	(37.6)	(36.0)	(22.2)	(24.0)	(23.0)
rd 3 - 4		−437.1***	−413.7***	−406.7***		−106.0**	−61.8
		(79.7)	(77.3)	(87.2)		(43.5)	(45.0)
UltraPoor × rd 3 - 4		35.6	−13.5	−6.2		43.7	−0.5
		(119.5)	(110.3)	(121.9)		(64.6)	(68.8)
FloodInRd1			−26.8	−41.4			−28.5
			(29.6)	(34.8)			(22.5)
Head literate			72.8*	54.4			36.0
			(43.4)	(45.1)			(34.0)
6M repayment				113.1			97.1
				(132.3)			(83.7)
6M net saving				−690.2*			−298.0*
				(410.4)			(176.6)
6M other member net saving				−407.1			494.3
				(1234.6)			(531.5)
6M other member Repaid				−97.3			−51.3
				(172.7)			(86.0)
$T = 2$	50	50	50	23	50	50	23
$T = 3$	668	668	665	611	668	668	611
$\bar{R}^2$	−0.001	0.059	0.058	0.059	0	0.009	0.005
$\hat{\rho}$	−0.471	−0.407	−0.401	−0.403	−0.323	−0.294	−0.302
$\Pr[\hat{\rho} = 0]$	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N	1386	1386	1380	1245	1386	1386	1245

Source: Estimated with GUK administrative and survey data.

Notes: 1. First-difference estimates using administrative and survey data. First-differenced ($\Delta x_{t+1} \equiv x_{t+1} - x_t$) regressands are regressed on categorical and time-variant covariates. Head age and literacy are from baseline survey data. ρ indicates the AR(1) coeffcient of first-difference residuals as suggested by Wooldridge (2010, 10.71) and $\Pr[\rho = 0]$ is its p value. 6M repayment, 6M net saving are mean lagged 6 month repayment and net saving. 6M other repayment, 6M other net saving are mean lagged 6 month repayment and net saving of other members in a group. UltraPoor is an indicator function if the household is classified as the ultra poor. Sample is continuing members and replacing members of early rejecters and received loans prior to 2015 Janunary. Consumption is annualised values.

2. ***, **, * indicate statistical significance at 1%, 5%, 10%, respetively. Standard errors are clustered at group (village) level.

D.7 Labour income

TABLE D21: FD ESTIMATION OF INCOMES

	Labour income (Tk)				Farm income (Tk)		
covariates	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(Intercept)	5.85***	−0.45	−4.32	0.09	−8.30	−16.04	−14.75**
	(1.33)	(3.27)	(3.80)	(4.38)	(6.97)	(9.68)	(6.88)
Large	5.19	0.05	−1.30	16.37	8.71	10.69	14.53
	(5.58)	(3.98)	(3.52)	(13.27)	(7.16)	(7.78)	(9.53)
LargeGrace	−5.81	−15.41	−14.76	1.04	8.90	3.20	−16.55
	(5.21)	(12.98)	(12.54)	(5.37)	(7.08)	(10.24)	(20.01)
Cow	−0.97	−2.91	−3.60	6.15	3.60	4.39	−1.24
	(3.88)	(3.98)	(3.77)	(5.95)	(8.73)	(9.38)	(10.50)
rd 2 - 3		14.99***	15.07***	0.21		17.14	25.42
		(5.21)	(5.19)	(5.83)		(15.98)	(16.74)
Large × rd 2 - 3		6.30	6.12	−17.26		8.71	−1.87
		(5.81)	(5.78)	(14.99)		(12.40)	(35.81)
LargeGrace × rd 2 - 3		24.88	24.64	−3.08		100.34	50.89
		(19.42)	(19.32)	(8.28)		(65.08)	(47.95)
Cow × rd 2 - 3		4.54	4.99	−11.75		18.90	−58.04
		(7.47)	(7.45)	(8.98)		(11.76)	(77.08)
rd 3 - 4		15.59**	15.75**				
		(6.58)	(6.61)				
Large × rd 3 - 4		18.81	19.12				
		(14.81)	(14.89)				
LargeGrace × rd 3 - 4		20.74	21.07				
		(19.73)	(19.84)				
Cow × rd 3 - 4		5.07	5.81				
		(9.82)	(9.95)				
FloodInRd1			8.89***	5.90			−10.84
			(3.37)	(5.04)			(9.61)
Head literate			−1.81	−5.29			3.35
			(3.12)	(3.94)			(7.01)
6M repayment				1.82			48.51
				(15.56)			(57.54)
6M net saving				−46.21			122.38
				(41.67)			(119.02)
6M other member net saving				−71.38			−758.52
				(45.64)			(604.36)
6M other member Repaid				2.52			−44.82
				(16.13)			(60.82)
$T = 2$	108	108	107	110	30	30	29
$T = 3$	137	137	135	516	21	21	20
$T \geq 4$	523	523	523	0	0	0	0
$\bar{R}^2$	0	0.004	0.006	−0.004	−0.042	0.035	0.007
$\hat{\rho}$	−0.216	−0.237	−0.215	−0.225	−0.062	−0.648	−0.549
$\Pr[\hat{\rho} = 0]$	0.000	0.000	0.000	0.000	0.777	0.000	0.001
N	1951	1951	1946	1142	72	72	69

Source: Estimated with GUK administrative and survey data.

Notes: 1. First-difference estimates using administrative and survey data. First-differenced ($\Delta x_{t+1} \equiv x_{t+1} - x_t$) regressands are regressed on categorical and time-variant covariates. Head age and literacy are from baseline survey data. ρ indicates the AR(1) coeffcient of first-difference residuals as suggested by Wooldridge (2010, 10.71) and $\Pr[\rho = 0]$ is its p value. 6M repayment, 6M net saving are mean lagged 6 month repayment and net saving. 6M other repayment, 6M other net saving are mean lagged 6 month repayment and net saving of other members in a group. Sample is continuing members and replacing members of early rejecters and received loans prior to 2015 Janunary. Labour income is in 1000 Tk unit andis sum of all earned labour incomes. Farm revenue is total of agricultural produce sales.

2. ***, **, * indicate statistical significance at 1%, 5%, 10%, respetively. Standard errors are clustered at group (village) level.

Table D22: FD estimation of incomes by attributes

	Labour income (Tk)				Farm income (Tk)		
covariates	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(Intercept)	5.85***	−0.45	−4.32	0.09	−8.30	−16.04	−14.75**
	(1.33)	(3.27)	(3.80)	(4.38)	(6.97)	(9.68)	(6.88)
Upfront	5.19	0.05	−1.30	16.37	8.71	10.69	14.53
	(5.58)	(3.98)	(3.52)	(13.27)	(7.16)	(7.78)	(9.53)
WithGrace	−11.00	−15.46	−13.47	−15.32	0.18	−7.49	−31.08
	(7.40)	(13.06)	(12.30)	(11.72)	(2.03)	(6.90)	(23.46)
InKind	4.85	12.49	11.16	5.11	−5.30	1.19	15.31
	(6.22)	(13.06)	(12.47)	(6.40)	(5.39)	(8.67)	(19.58)
rd 2 - 3		14.99***	15.07***	0.21		17.14	25.42
		(5.21)	(5.19)	(5.83)		(15.98)	(16.74)
Upfront × rd 2 - 3		6.30	6.12	−17.26		8.71	−1.87
		(5.81)	(5.78)	(14.99)		(12.40)	(35.81)
WithGrace × rd 2 - 3		18.58	18.52	14.17		91.63	52.77
		(19.09)	(18.97)	(13.17)		(64.24)	(38.61)
InKind × rd 2 - 3		−20.34	−19.64	−8.67		−81.44	−108.94
		(19.65)	(19.46)	(7.53)		(64.12)	(86.93)
rd 3 - 4		15.59**	15.75**				
		(6.58)	(6.61)				
Upfront × rd 3 - 4		18.81	19.12				
		(14.81)	(14.89)				
WithGrace × rd 3 - 4		1.93	1.95				
		(23.54)	(23.52)				
InKind × rd 3 - 4		−15.67	−15.26				
		(20.76)	(20.65)				
FloodInRd1			8.89***	5.90			−10.84
			(3.37)	(5.04)			(9.61)
Head literate			−1.81	−5.29			3.35
			(3.12)	(3.94)			(7.01)
6M repayment				1.82			48.51
				(15.56)			(57.54)
6M net saving				−46.21			122.38
				(41.67)			(119.02)
6M other member net saving				−71.38			−758.52
				(45.64)			(604.36)
6M other member Repaid				2.52			−44.82
				(16.13)			(60.82)
$T = 2$	108	108	107	110	30	30	29
$T = 3$	137	137	135	516	21	21	20
$T = 4$	523	523	523	0	0	0	0
$\bar{R}^2$	0	0.004	0.006	−0.004	−0.042	0.035	0.007
$\hat{\rho}$	−0.216	−0.237	−0.215	−0.225	−0.062	−0.648	−0.549
$\Pr[\hat{\rho} = 0]$	0.000	0.000	0.000	0.000	0.777	0.000	0.001
N	1951	1951	1946	1142	72	72	69

Source: Estimated with GUK administrative and survey data.

Notes: 1. First-difference estimates using administrative and survey data. First-differenced ($\Delta x_{t+1} \equiv x_{t+1} - x_t$) regressands are regressed on categorical and time-variant covariates. Head age and literacy are from baseline survey data. ρ indicates the AR(1) coeffcient of first-difference residuals as suggested by Wooldridge (2010, 10.71) and $\Pr[\rho = 0]$ is its p value. 6M repayment, 6M net saving are mean lagged 6 month repayment and net saving. 6M other repayment, 6M other net saving are mean lagged 6 month repayment and net saving of other members in a group. LargeSize is an indicator function if the arm is of large size, WithGrace is an indicator function if the arm is with a grace period, InKind is an indicator function if the arm provides a cow. Sample is continuing members and replacing members of early rejecters and received loans prior to 2015 Janunary. Labour income is in 1000 Tk unit andis sum of all earned labour incomes. Farm revenue is total of agricultural produce sales.

2. ***, **, * indicate statistical significance at 1%, 5%, 10%, respetively. Standard errors are clustered at group (village) level.