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Risk Aversion and Credit Access

Solving Financial Exclusion through Contract Innovation

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Abstract

Credit market failures may reflect voluntary withdrawal by risk-averse borrowers in addition to supply-side constraints. We conduct a randomized trial with 1,517 Bangladeshi households, offering cattle financing through conventional loans or profit-sharing contracts that spread risk between the farmer and the financial partner. Overall, interest in and take-up of the profit-sharing contracts were modestly higher than the conventional loans. However, conventional loan take-up was much lower among risk-averse farmers, and profit-sharing eliminated the take-up gap between risk-averse and non-risk-averse farmers. We find that it is male risk preferences that are associated with these decisions even when contracts explicitly target women. Livestock investment increases under both contracts with no evidence of moral hazard under profit-sharing.

Keywords: Asset-based financing, credit, livestock, Bangladesh

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Risk Aversion and Credit Access: Solving Financial Exclusion through Contract Innovation

1 Introduction

Smallholder farmers in low- and middle-income countries (LMICs) under-invest in productive assets despite apparently profitable opportunities. Credit access remains limited; according to the Global Findex, only 24 percent of all adults in LMICs borrowed formally in the previous 12 months, and borrowing rates are much higher in urban areas and in high middle-income countries (Klapper et al., 2025). The credit access puzzle persists even as microfinance has dramatically expanded, now reaching over 140 million borrowers worldwide (Armendáriz and Morduch, 2010). Moreover, even when credit is available, smallholders do not necessarily borrow. For example, Banerjee et al. (2015) found that only 26.7 percent of eligible households chose to borrow from a partner microfinance institution in India, despite active recruitment and relaxed collateral constraints, suggesting that low credit uptake may sometimes reflect demand-side barriers rather than supply constraints. In this paper, we present the results of a randomized trial that examines two financing models for livestock fattening for smallholder farmers in Bangladesh, which allow us to disentangle demand-side barriers from supply constraints.

Recent evidence indicates that multiple demand-side barriers may operate simultaneously. First, standard microfinance products are poorly designed for agricultural production cycles. Rigid weekly repayment schedules characteristic of traditional microcredit create severe cash flow mismatches for farmers who invest substantially upfront but receive lump sum revenues months later. Experimental evidence confirms that early repayment requirements discourage investment in illiquid projects with delayed returns (Field et al., 2013; Battaglia et al., 2024). Offering repayment schedules that are flexible or designed for agricultural investments can increase uptake and allow farmers to make more profitable investment decisions (Food and Agriculture Organization and Innovations for Poverty Action, 2024).

Beyond design issues, risk exposure has also emerged as a fundamental demand-side constraint. Returns to agricultural credit vary substantially. A review of 17 experimental credit interventions in LMICs found positive impacts in only nine studies (Food and Agriculture Organization and

Innovations for Poverty Action, 2024). Even within successful programs, outcomes vary across borrowers. For example, while average business profits increased 140 percent among microcredit clients in a successful program in Morocco, 25 percent experienced negative returns (Crépon et al., 2015). Large uncertainty about investment returns may dampen credit demand.

As such, fixed debt obligations may expose risk-averse farmers to unacceptable downside risk. Boucher et al. (2008) formalize this “risk rationing” concept: farmers with profitable investment opportunities voluntarily withdraw from credit markets when loan contracts require fixed repayment regardless of outcomes, because lenders shift contractual risk to borrowers.¹ Unlike quantity-rationed borrowers who do not qualify for credit, risk-rationed individuals choose not to borrow because the utility cost of potential default exceeds expected gains. This distinction matters critically for policy. While quantity rationing can be addressed by expanding credit supply and other demand-side barriers can be addressed by fixing design problems such as repayment schedules, risk rationing requires fundamental changes to how contracts allocate risk between borrowers and lenders. The potential for alternative contract structures to address risk rationing has theoretical foundations in Stiglitz (1974), who demonstrated that when agents are risk-averse and effort is unobservable, linear sharing contracts can be optimal despite incentive dilution.

Empirical evidence distinguishing risk rationing from these alternatives is limited, but growing. Battaglia et al. (2024) show that when microfinance borrowers in Bangladesh are offered repayment flexibility, they increase investment in riskier, higher-return activities, consistent with standard contracts deterring risk-averse entrepreneurs from profitable investments. Cordaro et al. (2024) conduct a field experiment in Kenya comparing traditional debt contracts to equity-like and hybrid financing arrangements for micro-distributors, finding that performance-contingent contracts substantially increase take-up and investment. However, neither study directly tests whether risk preferences predict differential take-up across contract types—the core prediction of risk rationing theory. Our experimental design addresses this gap by measuring individual risk preferences at baseline and randomly assigning contract structures, allowing us to directly test whether profit-sharing contracts differentially attract risk-averse farmers who would otherwise be excluded from credit markets.

This paper presents a test of the risk rationing hypothesis conducted through a randomized con-

¹ In some contexts, risk rationing can be avoided through informal institutions, such as the state contingent credit contracts described by Udry (1994).

trolled trial with 1,517 households across 105 villages in Bangladesh. We partnered with WeGro, an "agri fintech" start-up offering profit-sharing contracts for cattle investment. Villages were randomly assigned to receive offers of either conventional loans or profit-sharing contracts. Critically, both contracts allow repayment only at cattle sale, eliminating differences in payment timing and cash flow matching. The sole difference is risk allocation: loans require fixed repayment of principal plus 10 percent interest regardless of outcomes, while profit-sharing splits net proceeds two-thirds to farmers and one-third to WeGro, providing protection against downside risk. This design isolates the risk-sharing mechanism from confounding product design features.

Within treatment households, we randomly assigned whether contracts target husbands or wives, enabling causal identification of gender effects in take-up and in outcomes linked to contract holding. We measured risk preferences at baseline using incentivized lottery choices, allowing direct tests of whether risk aversion is linked to lower credit uptake and whether profit-sharing mitigates this behavior. Implementation through an established financial services provider demonstrates feasibility and builds on emerging experimental work testing performance-contingent microfinance (Battaglia et al., 2024; Cordaro et al., 2024).²

We find that farmers express somewhat greater interest in profit-sharing than conventional loans despite identical repayment timing. Among profit-sharing households, 39 percent express interest compared to 30 percent for loans. This differential persists through actual financing receipt: 24 percent versus 21 percent, though the latter difference is not statistically significant. Since both contracts match cash flows to livestock production cycles, these results provide some initial evidence that risk allocation, not just repayment flexibility, affects credit demand.

We also find strong evidence that risk rationing is occurring. Risk aversion is associated with substantially lower uptake of the conventional loans, and profit-sharing largely eliminates this difference. Take-up of conventional loans is lower in households with risk-averse men—who comprise 65 percent of male respondents—but does not vary by risk aversion under profit-sharing. This mitigation of the risk aversion barrier provides strong support for Boucher et al. (2008)'s risk rationing theory. Because payment timing is identical across contracts, this heterogeneity by risk aversion directly implicates risk allocation as the driving mechanism, ruling out alternative explanations based on liquidity constraints or product design mismatch. While some difference in take-up be-

² Haggag and Osman (2023) are conducting a similar experiment testing profit-sharing versus debt contracts for livestock in Egypt, though results are not yet available.

tween profit sharing and loan contracts could be attributed to differences in returns that depend on the chosen profit share, interest rate, and farmer's expectation of the sales price, variation by risk preferences strongly indicates risk rationing as a key mechanism.

Decisions in this context appear to be driven by men's risk preferences even when the program explicitly targets women. Female risk aversion is not correlated with contract uptake, while male risk preferences strongly predict participation regardless of whether contracts target husbands or wives. Interest and participation rates also do not vary by gender of the intended recipient. This finding suggests that with respect to decisions about livestock finance, men's risk preferences affected the decision of whether to take up a financing product, even if the offer was explicitly made to women, indicating that men in this context hold the decision-making power over this type of financial decision. This is true despite the Bangladeshi context where microfinance projects that target women are common.

Because profit-sharing is designed to spread risk between the farmer and the financier, farmer moral hazard is a concern. However, we find livestock investment increases substantially under both contract types, with no evidence of reduced productivity under profit-sharing despite weaker incentive power. By endline, profit-sharing households show livestock values approximately 8 percent higher than control, with comparable increases among loan households. Profit-sharing cattle exhibit larger weight gains than control animals, while differences between profit-sharing and loan-financed cattle are not statistically distinguishable. These patterns align with emerging evidence that insurance can increase effort when risk and effort are complementary (Meki and Quinn, 2024).

Our findings contribute to several strands of literature. We provide experimental evidence for risk rationing in credit markets. By holding repayment timing constant while varying risk allocation, we isolate the risk-sharing mechanism that Boucher et al. (2008) theorized. The concentration of effects among risk-averse farmers, combined with identical timing across contracts, distinguishes risk rationing from alternative explanations based on expected returns or product design mismatch (Food and Agriculture Organization and Innovations for Poverty Action, 2024).

Furthermore, we add to research on performance-contingent contracts using microequity that share returns between entrepreneurs and financiers. Among experimental papers that study performance-contingent contracts, de Mel et al. (2019) encountered implementation challenges in their Sri Lankan microequity pilot, and Cordaro et al. (2024) find that a contract mixing debt and equity

features dominates in an experiment in Kenya. Here, we demonstrate that pure profit-sharing can be implemented through an existing financial services infrastructure, achieving inclusion without sacrificing efficiency. In this context, the 2/3–1/3 profit split between the smallholder and the lender emerged from WeGro’s market research rather than from researcher design.

The null result on female risk preferences also speaks to ongoing debates about gender-targeted development programs. While many studies examine whether targeting women changes household outcomes and women’s agency (Pitt and Khandker, 1998; Duflo, 2012; Field et al., 2016; Ambler et al., 2026), our examination of risk preferences sheds light onto the question of who makes decisions about take-up of financial products, irrespective of targeting. Our finding that male risk preferences dominate even when contracts target wives and involve livestock care work that women predominantly perform suggests that in this context it may be men who drive take-up decisions.

The paper proceeds as follows. Section 2 describes a theoretical framework generating testable predictions about risk rationing. Section 3 describes the context and experimental design. Section 4 presents results and Section 5 concludes.

2 Theoretical Framework

To compare the loan and profit-sharing contracts, we build on the risk-sharing framework of Stiglitz (1974) and the risk rationing theory of Boucher et al. (2008). Consider a farmer with risk aversion coefficient ρ investing capital k in cattle fattening. Returns follow $R = \lambda k + \varepsilon$, where λ represents expected gross returns and $\varepsilon \sim N(0, \sigma^2)$ captures production risk.

First, consider the loan contract. Under a loan with interest rate r , the farmer’s certainty equivalent is:

$$CE^L \approx \lambda k - (1 + r)k - \frac{\rho\sigma^2}{2} \tag{1}$$

Note that it must be that $CE^L \geq 0$, or the farmer will not take the loan. The certainty equivalent takes on a slightly different form under profit-sharing. If we define the farmer’s share as α , with

$0 < \alpha < 1$, the certainty equivalent is:

$$CE^{PS} \approx \alpha(\lambda - 1)k - \frac{\rho\alpha^2\sigma^2}{2} \quad (2)$$

As with the loan, if only offered the profit sharing contract, the farmer will only accept if $CE^{PS} \geq 0$. There are two key differences between equations (1) and (2). First, note that farmer expected returns are different. For high interest rates, the farmer will tend to prefer the profit-sharing contract, whereas if the farmer share of returns are smaller, then the farmer will prefer the straight loan contract.³ Second, there is a difference in the risk penalty, or the second term in each equation. The risk penalty is unambiguously lower under the profit-sharing contract, since $\rho\alpha^2\sigma^2/2 < \rho\sigma^2/2$ as $\alpha < 1$. The latter component provides the insurance component that [Stiglitz \(1974\)](#) identified as the primary benefit of share contracts.

[Boucher et al. \(2008\)](#) formalize the distinction between quantity rationing, in which lenders deny credit to specific borrowers due to a lack of collateral, and risk rationing, in which borrowers voluntarily withdraw due to contract structure. For a specific value of expected returns, variance of returns, and interest rate, we can easily define an interest rate $\bar{\rho}$ as the risk aversion threshold where farmers are indifferent to obtaining a loan. Farmers with $\rho > \bar{\rho}$ but $\lambda k - (1 + r)k > 0$ are risk-rationed: they refuse loans despite positive expected profits because the utility cost of downside risk exceeds expected gains. For some values of α , the profit sharing contract overcomes risk rationing; some farmers will participate in the profit sharing contract but would not obtain a loan.

Our experimental design directly tests whether alternative contract structures overcome risk rationing. Following directly from the above discussion we are able to test the following two predictions:

Prediction 1 ([Boucher et al., 2008](#)): Loan uptake decreases with risk aversion.

Prediction 2: The negative effect of risk aversion is mitigated under profit-sharing: $\partial[\Pr(PS) - \Pr(Loan)]/\partial\rho > 0$.

³ The profit sharing model is akin to the sharecropping model in [Eswaran and Kotwal \(1985\)](#), but here we abstract away from effort.

To this point, our discussion assumes that individual risk preferences drive uptake decisions. However, these decisions are made in households and spouses may have different risk preferences. In standard collective models of household behavior (Chiappori, 1992; Lundberg and Pollak, 1993), decisions maximize a weighted sum of utilities with Pareto weights depending on relative bargaining power. Though credit offers are made individually, baseline levels of bargaining power may control whose preferences, including risk preferences, are more dominant in decisions around credit uptake.

Prediction 3: The risk preferences of the household member with higher relative bargaining power should have more influence over financial product uptake.

From this prediction, it follows that:

Prediction 4: The gender of the contract recipient does not affect uptake rates.

3 Context and Experimental Design

3.1 Setting: Rural Bangladesh and Livestock Finance

Our study takes place in four northwestern districts of Bangladesh—Joypurhat, Bogura, Gaibandha, and Rangpur—where livestock represents both a primary economic activity and a form of quasi-liquid savings for rural households. These districts exemplify the agricultural finance paradox: cattle fattening yields average returns of 20–30% over six-month cycles, yet formal credit penetration remains below 30% (Bangladesh Bureau of Statistics, 2022). The livestock sector contributes 1.47% to national GDP and 7.6% to agricultural value-added, with smallholders owning 90% of cattle (Department of Livestock Services, 2022). Despite this economic importance, livestock finance comprises less than 5% of agricultural lending portfolios due to perceived risks including disease, price volatility, and moral hazard in animal care (Microcredit Regulatory Authority, 2023).

The microfinance sector in Bangladesh reaches 35 million borrowers through 750 licensed institutions, yet agricultural lending remains limited (Microcredit Regulatory Authority, 2023). Standard microfinance products—characterized by immediate weekly repayments, joint liability, and harsh default penalties—poorly match the cash flow patterns of livestock investment, which requires

substantial upfront expenditure followed by a single large payment at sale. Previous attempts to adapt microfinance for livestock have largely failed: [Khandker and Faruquee \(2003\)](#) document that less than 15% of microfinance borrowers use loans for livestock despite stated intentions, often diverting funds to consumption or less risky investments.

3.2 Partner Organization and Contract Structure

WeGro, established in 2019 as a social enterprise, operates a profit-sharing model explicitly designed to address risk constraints in livestock finance. The organization's standard contract follows principles of Islamic finance, specifically *musharakah* (profit-sharing partnership) and *mudarabah* (capital-labor partnership), avoiding fixed interest charges ([Iqbal and Mirakhor, 2011](#)). Under the profit-sharing arrangement, WeGro purchases cattle (typically 70,000–100,000 Bangladeshi taka (BDT) per animal) while farmers provide labor, shelter, and feed.⁴ After a 5–6 month fattening period, profits from sale are divided with two-thirds going to farmers and one-third to WeGro. Here, profits are defined as the difference in the sale and purchase prices of the cows, less any payments made by farmers for insurance as described.

The 2/3–1/3 split emerged from WeGro's market testing and aligns with traditional agricultural sharing norms in the region. Furthermore, it mirrors sharecropping contracts common in Bangladesh, in which output shares typically range from 50–50 to 75–25 depending on input contributions ([Otsuka and Hayami, 1992](#)). If the venture generates no profit—due to lack of care by the farmer, disease, or market downturn—farmers owe nothing to WeGro, as WeGro bought insurance for cows to provide both with downside protection. Hence, smallholder returns are much less variable under the profit-sharing contract than under a standard loan contract. Farmers are required to invest in feed, medications, and other care items, providing some motivation to cover their investments, addressing potential moral hazard concerns. WeGro periodically makes field visits to monitor the cow's growth, and required farmers to contribute 50% of insurance premiums (approximately 1,250 BDT) that cover the cow in case of death.⁵

For comparison, we designed a conventional loan product with terms representative of semi-formal

⁴ In 2023, the exchange rate was approximately 108 BDT=US\$1.

⁵ This description represents the intended contract. It should be noted that in approximately half of cases, WeGro was not successful in collecting the insurance premium from farmers ([Ambler et al., 2024](#)); however, in all but one case, insurance was purchased.

livestock lending in Bangladesh: principal equal to cattle purchase price, 10% total interest, and repayment due at sale. This interest rate falls between typical microfinance rates (20–30% annually) and bank rates (7–9% annually), reflecting the intermediate risk profile of asset-backed livestock loans (Microcredit Regulatory Authority, 2023). Both contracts include identical insurance requirements and WeGro supervision of cattle purchase and sale.

3.3 Project Design

Prior to a planned expansion of WeGro operations, we helped them identify 105 villages across 15 geographic blocks with adequate market access for cattle trading but no prior WeGro operations. Villages were grouped into blocks of seven based on geographic proximity and market catchment areas. Within each block, we randomly assigned three villages to profit sharing, three to control, and one to conventional loans. This 3:3:1 ratio reflects our primary interest in comparing the profit sharing model to a control group, with the loan arm providing a benchmark for a standard microfinance approach. The imbalanced design was also necessary because WeGro, whose core business is profit sharing, was reluctant to offer conventional loans at scale.

Between February and August 2023, we conducted a comprehensive listing exercise identifying 29,832 livestock-raising households across the 105 study villages. Among these households, 5,149 of them expressed initial interest in cattle financing. WeGro's eligibility criteria required that farmers had: (i) an existing cattle shed with capacity for additional animals, (ii) demonstrated experience in cattle rearing, (iii) no outstanding loans exceeding 50,000 BDT, and (iv) availability of household labor for cattle care. These criteria identified 2,784 eligible households, but a large proportion of households were no longer interested once the baseline survey began. Hence, we ultimately surveyed 1,517 households who provided informed consent and maintained interest, with an average of around 14.5 households per village.

Because the sample recruitment was conducted over several months, the intervention had a rolling start. As a result, the randomization was conducted in blocks of 7 villages. When baseline activities were concluded in all villages in a particular block, the randomization was conducted for that block. In practice, randomization could occur in one or more blocks at once, depending on field progress and availability of WeGro to begin activities. The within block randomization strategy ensured balance across space and time.

Within treatment villages, we implemented a second level of randomization to examine how recipient gender affects contract performance. Households were randomly assigned to have the financing offer directed to either the male household head (50%) or his spouse (50%), stratified by village. This randomization was explained as part of the program’s design to understand household financial management. The designated recipient would hold the contract, own the bank account for profit disbursement, and serve as WeGro’s primary contact.

This design feature helps address longstanding questions about gender targeting in development programs. While women perform approximately 70% of livestock care labor in our study areas, men typically control returns from livestock sales and major financial decisions (Quisumbing et al., 2018). By randomly varying the contract recipient, we can test whether formal ownership rights affect women’s control over resources and household investment decisions. This design is related to the one in Ambler et al. (2026), in which outgrower contracts for sugarcane in Uganda were offered to women, giving them control over resources from sugarcane production.

3.4 Intervention Implementation

Following baseline surveys, WeGro representatives visited treatment households to explain program terms and conduct final eligibility verification. The implementation process followed standardized protocols that included three main components: an explanation of contractual terms, cattle selection and purchase, and the sale process. Agents used visual aids and standardized scripts to explain contract terms. For households in villages assigned to profit-sharing, they emphasized differences between profit-sharing and loans. They also used the analogy of sharecropping—familiar to all farmers—to explain the partnership concept. Sessions included numerical examples with different sale price scenarios to ensure comprehension of profit calculations and risk-sharing features.

After agreeing to terms and conditional on the availability of WeGro capital, participants visited regional cattle markets accompanied by WeGro livestock experts who provided technical advice on breed selection, health assessment, and price negotiation. WeGro purchased cattle directly from sellers, with ownership formally transferred to the household (under loan contracts) or registered

as joint ownership (under profit-sharing).⁶ The average purchase price was 83,000 BDT, with no significant difference between contract types.

After purchasing the animal, WeGro provided identical support across both contract types: monthly monitoring visits and technical advice, access to veterinary services at cost, and if relevant, assistance with insurance claims. This standardization ensures that observed differences stem from contract structure rather than complementary services.

Finally, after 5-6 months of fattening, WeGro coordinated cattle sales, either through their network of buyers offering guaranteed prices or allowing farmers to sell independently at potentially higher prices. Under both contracts, WeGro representatives attended sales to verify prices and calculate payments. Profit-sharing payments were calculated as: $(\text{Sale Price} - \text{Purchase Price} - \text{Insurance Premium}) \times 2/3$. Loan repayments were fixed at: $\text{Purchase Price} \times 1.10$.⁷

3.5 Data Collection

Our analysis relies on four data sources: we conducted a baseline survey, a midline phone survey, an in-person endline survey, and collected administrative data from WeGro.

The baseline data was collected between May and August 2023 across 15 treatment blocks, each consisting of seven selected villages. Data collection began in Joypurhat and subsequently moved to Bogra, Rangpur, and Gaibandha. Survey operations were conducted sequentially by block. Field activities were temporarily paused from 7 June to 16 July due to the Eid al-Adha holidays. During that period, many respondents were occupied with livestock-related activities, particularly preparing and selling cattle in the market.

The baseline survey, administered separately to male and female household heads, collected comprehensive data on household composition, assets, consumption, livestock experience, and finan-

⁶ The original design required the participating household to open a bank account in the designated recipient's name, and for the money for purchase to first be deposited in the account before withdrawing for the purchase. However, in reality rural bank branches often hesitated or refused to open bank accounts for farmers, due to low returns for the bank. So often bank accounts were not opened for recipients, and WeGro livestock experts brought cash for the purchase.

⁷ This description represents intended payouts; the administrative data on sales and farmer payments indicates that farmer payouts sometimes differed from this calculation, as described by [Ambler et al. \(2024\)](#).

cial access. We also measured risk preferences using an incentivized investment game adapted from Binswanger (1980). Participants allocated 10 kg of hypothetical seed between a safe option (guaranteed return of 5 BDT/kg) and a risky option (50% chance of 15 BDT/kg, 50% chance of 0). The amount allocated to the safe option serves as our measure of risk aversion, with 43% of men and 61% of women allocating at least half their endowment to the safe asset.

In June and July 2024, we conducted brief phone interviews with 94.7% of baseline respondents. This survey collected data on livestock inventory, financial access, and women's empowerment. The high response rate reflects our investment in maintaining updated contact information and multiple call attempts.

The endline survey was conducted in person in November and December, 2024. The timing was chosen because two intended cattle fattening cycles could have taken place in all villages. The endline survey achieved a 94.1% response rate. In addition to repeating baseline modules, we collected detailed data on livestock management practices, income sources, consumption, and intra-household decision-making. Attrition was balanced across treatment arms ($p=0.73$) and uncorrelated with baseline characteristics.

We also take advantage of administrative data that was collected during the intervention period. WeGro provided records on contract uptake, cattle purchases, sales, and payments. We also use these measures to consider impacts of the intervention, as these objective measures avoid reporting biases inherent in survey data on sensitive financial topics.

3.6 Summary Statistics and Balance Tests

In Table 1, we display summary statistics for some key descriptive variables and also report balance tests to verify that the randomization was successful in creating balanced groups. In the control group, the average household owns 1.86 cows with a total value of 108,000 BDT (approximately 880 USD), and about 37 percent of those cows are owned by women. The total value of all livestock owned over the past year is 20,883 BDT (approximately 170 USD).

Both the male and female household respondents exhibit risk aversion (Panel B). 65 percent of men and 70 percent of women are classified as risk averse, having allocated at least half of their 10 kg seed endowment to the safe option in the incentivized lottery task. We further illustrate

demographic characteristics of households (Panel C). Men and women both have just over 6 years of education on average; households have around 1.4 members engaged in livestock-related work, and not much access to wage work.

While the sample is overall well balanced we do observe limited imbalance in the correlated measures of cow ownership and some small differences in risk aversion. To account for any possibility that these differences may drive our results, we include robustness checks controlling for baseline variables with imbalance and find no substantive differences in the results.

3.7 Empirical Specifications

We estimate average intent-to-treat effects using several specifications to examine different aspects of our experimental design. We rely on a pre-analysis plan to guide our analysis, published on the American Economic Association RCT registry (Ambler et al., 2025). Because our goal in this paper is to study the predictions related to risk aversion and risk-rationing, we focus on the a subset of the pre-specified outcomes and analyses related to take-up, livestock ownership and value, and livestock financing.

3.7.1 Main Treatment Effects

Defining $T1$ as the offer of the profit-sharing model and $T2$ as offer of the loan to purchase a cow for fattening, our primary specification estimates the effects of each contract type:

$$y_{ijt} = \beta_0 + \beta_1 \cdot T1_{ij} + \beta_2 \cdot T2_{ij} + \gamma \cdot y_{ij0} + \phi_s + \varepsilon_{ijt} \quad (3)$$

where y_{ijt} is an outcome for household i in village j at time t , y_{ij0} is the baseline value when available, ϕ_s are randomization strata (block) fixed effects, and standard errors ε are clustered at the village level. Outcomes include measures of program take-up (e.g. whether interested in receiving finance, whether the household received finance for a cow, and the number of cows financed) and outcomes related to finance effectiveness (e.g. the value of the household livestock inventory). We test equality of treatment effects with $H_0: \beta_1 = \beta_2$. When baseline values of the outcome variable

are available, we estimate the ANCOVA specification.⁸

3.7.2 Risk Aversion Interactions

To examine how risk preferences affect contract uptake, we define an indicator A for individuals who exhibited risk aversion, implying the individual allocated at least half their endowment to the safe asset in our risk measure elicitation at baseline. Limiting the sample to the two treatment groups, we then estimate:

$$\text{Takeup}_{ij} = \alpha_0 + \alpha_1 A_i + \alpha_2 T1_j + \alpha_3 (A_i \times T1_j) + \alpha_4 A_i^{\text{spouse}} + \phi_s + \varepsilon_{ij} \quad (4)$$

As outcomes, we use variables that represent take-up of the contract. We estimate equation (4) separately for male and female risk aversion, controlling for the spouse's risk preference. The coefficient α_3 tests whether profit-sharing differentially affects uptake among risk-averse individuals relative to the loan treatment.

3.7.3 Gender Targeting Effects

To test whether the gender of the household member receiving the contract offer matters, we estimate:

$$y_{ijt} = \theta_0 + \theta_1 \cdot \text{FO}_{ij} + \theta_2 \cdot \text{MO}_{ij} + \phi_s + \varepsilon_{ijt} \quad (5)$$

where FO_{ij} and MO_{ij} are indicator variables for whether the random assignment of the contract offer was made to the female or male respondent, respectively. The coefficients represent average differences in outcomes relative to the control group. We test equality across treatment groups with $H_0 : \theta_1 = \theta_2$.

⁸ Specifically, we include the baseline values of the outcome as an explanatory variable in columns 2, 5, 6, and 7 of Table 4 and Table 5.

4 Results

We first examine whether households expressed interest in finance for cows, whether they received financing, and how these two outcomes vary by the type of financing offered. Table 2, Panel A shows interest and take-up of WeGro financing by type of finance offered. Columns 1, 2, and 3 use the administrative data to report rates of farmer interest in WeGro finance during the initial offer, an indicator for whether or not the household actually received financing from WeGro, and the total number of cows financed by WeGro over the program period. Columns 4 through 7 then examine survey reported measures of the number of cows the farmer had currently financed by WeGro and the total number of cows they had financed by WeGro since the last survey, for the midline and endline surveys respectively.

Beginning with the administrative data, we find that farmers express greater interest in profit-sharing than in conventional loans, and the difference is statistically significant. Among profit-sharing households, 39 percent express interest compared to 30 percent among loan households (p -value on equality of coefficients=0.04), a 30 percent higher rate of interest. Actual receipt of finance is lower than initial farmer interest, due to both supply and demand factors (see [Ambler et al. \(2024\)](#) for a detailed discussion). In column 2 we see some evidence that this differential interest translates into differential finance receipt: 24 percent of profit-sharing households received cows compared to 21 percent of loan households, but this difference is not statistically significant. The average number of financed cows is not different between treatment groups: 0.29 and 0.28 cows were financed in each group. Uptake rates are modest overall, but the evidence of some difference in interest between groups suggests the risk-sharing structure of profit-sharing contracts matters beyond simple credit availability.

The data reported by farmers in the midline survey shows that farmers report holding 0.09 and 0.06 cows financed by WeGro in the profit-sharing and loan groups respectively. However, they report 0.26 cows financed by WeGro since baseline in both groups, a value similar in magnitude to the total cows financed reported in column 3. These figures suggest many farmers who received cows had sold them by midline, and had not received additional finance. The endline data shows farmers reporting very few additional cows financed by WeGro since the midline survey, matching the timing of cow disbursement in the administrative data. While the initial project plan involved WeGro financing multiple cycles of cattle fattening, implementation and financial constraints resulted in

most farmers receiving only one animal, in the earlier period of the project. These findings are consistent with WeGro shifting operational priorities during the project implementation period. The results in this table are robust to the addition of controls for variables that exhibit imbalance at baseline (Appendix Table A1).

4.1 Risk Aversion and Profit-sharing

Our central finding is in Panel A of Table 3 : risk aversion creates a barrier to the uptake of conventional loans, and profit-sharing mitigates it. The table shows the same outcomes as 2, but uses equation (4), which includes control indicators for both male and female risk aversion, and then an interaction term with the profit-sharing treatment. For this analysis we drop the control group, and use the loan group serves as the comparison group.⁹ In column 1 we show that risk-averse men—comprising 65 percent of male respondents—are 15.6 percentage points less likely to express interest in conventional loans ($p = 0.014$), a 40 percent reduction from the 39.5 percent baseline among non-risk-averse men. This penalty persists through financing receipt (-10.8 pp, $p = 0.006$) and translates into 13.4 fewer financed cows per 100 households ($p = 0.035$). This finding confirms prediction 1 from the theoretical framework that loan take-up should decrease with risk aversion. We show additional evidence of this in Appendix Table A3, that indicates that general loan uptake at baseline is also negatively correlated with risk aversion.

Profit-sharing largely eliminates this gap in uptake. The interaction coefficient on expressed interest is 16.4 percentage points ($p = 0.034$), almost exactly offsetting the negative main effect. The coefficients imply that risk-averse men show 39.8 percent uptake under profit-sharing versus 39.0 percent for non-risk-averse men, a statistically and economically negligible difference. Given weaker evidence of take-up in the midline and endline surveys, this pattern is not as strong among those outcomes. However, the coefficients are of the same signs. In the endline survey in particular we note the same pattern, however the magnitude of the coefficients is much reduced. These results confirm Prediction 2, that profit sharing will mitigate the reduced demand for credit among risk averse farmers.

The main result from the administrative data is robust across alternative specifications and selec-

⁹We perform the analysis in this way for ease of interpretation. However, because the preanalysis plan indicated that we would use the whole sample for this analysis, we include that version of the specification as Appendix Table A2.

tion of samples. It holds in the full sample including control villages (Appendix Table A2), without spouse risk aversion controls (Appendix Table A4), when controlling for baseline imbalances (Appendix Table A5), and using continuous rather than binary risk measures (Appendix Table A6). The consistency of this pattern provides strong evidence that contract structure influences financial inclusion for risk-averse farmers.

Table 3, Panel B replaces the interaction with the male risk aversion indicator with the indicator for female risk aversion. In the administrative data female risk aversion is not negatively correlated with contract uptake in the loan group. The coefficient estimates are small and not statistically different than zero, suggesting little influence of risk aversion on contract uptake. There is some evidence in columns 3 and 4 that women's risk aversion is positively associated with loan uptake, but the pattern is noisy and less consistent across outcomes. Across outcomes, women's risk aversion is not associated with uptake in the profit-sharing group.

This null neither reflects measurement error, nor women's inability to manage contracts successfully. Female risk preferences are well-measured. In results not shown we also use the gender of the intended contract recipient (instead of male or female) in the analysis, and do not see the same strong pattern documented for male risk preferences. Rather, this pattern suggests that it is the male risk preference that dominates the choice of whether to accept the finance offer or not. The results suggest that male risk preferences control household credit decisions regardless of who is targeted, consistent with Prediction 3 that the household member with higher relative bargaining power has the most influence over these take-up decisions. Indeed in the baseline data, only 40 percent of women report that their preferences matter at least equally in decisions related to the purchase and sale of livestock, and 43 percent say their preferences do not matter at all.

Returning to Table 2, Panel B reports the analysis of the gender targeting randomization on the same uptake measures. We find that take-up is similar no matter which gender is targeted, confirming Prediction 4. Take-up is most influenced by the male household member, and the identity of the recipient does not matter in this instance. We should note that this finding does not imply that the gender of the recipient cannot have downstream effects on other outcomes. It may also be contextually specific. In Bangladesh, the large microfinance industry commonly targets women, so these households may already be accustomed to considering and managing financial offers made to women.

4.2 Livestock Investment

We document some evidence that both types of contracts successfully increase livestock investment, confirming the existence of a credit constraint. Table 4, Panel A shows that by midline (approximately 12 months post-offer), treatment households are 9–14 percentage points more likely to have both bought and sold cattle ($p < 0.01$), indicating some active market engagement. While there is no effect on total cattle owned at the time of the survey (column 2), households own or have owned 13–34 percentage points more total cattle when including sold animals (column 3), and 14–27 percentage points more improved breed cattle, which are the type encouraged by WeGro (column 4).

There is only suggestive evidence at midline that the total value of cattle currently owned has increased (column 5), but total livestock value (current plus sold) increases by 16,973 BDT for profit-sharing ($p < 0.001$) and 19,090 BDT for loans ($p = 0.023$), representing 11–12 percent gains (column 6). Net capital gains (value minus purchase costs) show positive but imprecise effects at midline: 967 BDT for profit-sharing ($p = 0.842$), and 1,112 BDT for loans ($p = 0.868$).

By endline (12–18 months post-offer), Panel B in Table 4 shows some evidence that the effects on investment are maintained at endline among profit-sharing households. While there are no statistically or economically significant coefficients in columns 1 through 4, current livestock values are 8,559 BDT higher than among the control group ($p = 0.043$), a similar impact to that documented at midline. Total value including sold animals is also similar at 16,099 BDT ($p = 0.002$). Most notably, net capital gains reach 10,304 BDT ($p = 0.046$) compared to only 967 BDT at midline, demonstrating some level of wealth accumulation.

Households in the loan group show similar patterns of stable effect sizes for values and a substantial increase in the net of purchases measure in column 7: current values 7,660 BDT ($p = 0.245$), total values 17,993 BDT ($p = 0.009$), and net gains 20,297 BDT ($p = 0.005$). Despite the large magnitude of the difference in net gains between profit-sharing and loans, it is not statistically significant ($p = 0.17$). The maturation of effects from midline to endline aligns with the biological production cycle of cattle fattening and evidence that households were not purchasing cows in between midline and endline.

On average, we find that profit-sharing generates livestock management outcomes comparable to

or better than the control group, despite reduced incentive power. Appendix Table A7 shows that at endline, profit-sharing cattle gain 6.38 kg more than control animals ($p = 0.044$), while loan-financed cattle gain 2.07 kg more ($p = 0.526$). Byproduct income increases 116 BDT monthly under profit-sharing (31 percent of control, $p = 0.030$) and 55 BDT under loans (15 percent, $p = 0.509$). These results suggest that potential moral hazard concerns under profit-sharing do not materialize.

4.3 Gender Targeting and Asset Accumulation

Table 5 examines whether the gender of the contract recipient affects livestock investment outcomes. At midline (Panel A), outcomes are statistically indistinguishable by gender: female-offer households show 19,640 BDT higher total livestock value ($p < 0.001$) versus 15,318 BDT for male-offer ($p = 0.011$), and the difference not statistically significant ($p = 0.56$). By endline (Panel B), the total value of livestock owned or sold is marginally larger in male-targeted households (12,126 BDT; $p = 0.015$) relative to female-targeted households (4,555 BDT; $p = 0.339$) relative to the control group, though the difference is not significant ($p = 0.15$). Gains net of the purchase price show similar patterns in column 7; both coefficient estimates are positive and significantly different than the control group at the 10 percent level or better, but the difference is not statistically significant.

5 Conclusion

Risk aversion creates a fundamental barrier to financial inclusion that contract innovation can overcome. Through a randomized experiment, we demonstrate that profit-sharing contracts mitigate the credit access barrier for risk-averse farmers who show substantially lower uptake of conventional loans. Under profit-sharing, risk-averse and non-risk-averse farmers participate at identical rates, providing experimental evidence of Boucher et al. (2008)'s risk rationing theory.

Both contracts allow repayment only at sale, which holds timing constant while varying the risk faced by the smallholder. This difference isolates the risk-sharing mechanism from repayment flexibility, addressing concerns that product design rather than risk preferences drives results. We

measure risk preferences at baseline using incentivized choices among both men and women, enabling direct tests of heterogeneous treatment effects by risk aversion. We then show that male risk preferences are the only ones that matter, providing evidence that it is men in this context that make take-up decisions regardless of formal targeting. Though targeting women could still have downstream impacts, if men control take-up of financial products, it suggests that targeting women with credit products may not always be effective.

Addressing concerns about moral hazard, we find no evidence that profit-sharing reduces productivity despite weaker incentive power. Livestock investment increases substantially under both contracts, with profit-sharing cattle showing comparable or larger weight gains than loan-financed animals. These patterns align with emerging theory showing that insurance can increase effort when risk and effort are complementary (Meki and Quinn, 2024).

Risk rationing is supported by our findings in Bangladesh, as well as those of Cordaro et al. (2024) in Kenya, and Battaglia et al. (2024) in Bangladesh who use different contractual structures. So it seems like risk rationing exists in several contexts. However, it is important to qualify our findings. The intervention bundled financial contracts with monitoring, help with veterinary service, and guaranteed buyers, potentially overstating pure contract effects. And the expected returns to each contract differ. That said, these services were identical across profit-sharing and loan treatments, so differential effects isolate contract structure. Implementation required partnership with an established financial services provider, raising questions about scalability to areas without institutional infrastructure. The 2/3–1/3 profit split emerged from WeGro’s market experimentation rather than formal optimization, suggesting scope for further refinement. Further research could focus on understanding what profit shares lead to improved demand for loans among the risk rationed, to help increase demand for finance among those who are otherwise financially excluded.

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Tables and Figures

Table 1: Baseline Characteristics and Balance Across Treatment Arms

Variable	(1) Control Mean/(SE)	(2) Profit sharing Mean/(SE)	(3) Loan Mean/(SE)	(1)-(2) Mean difference	(1)-(3) Pairwise t-test Mean difference	(2)-(3) Mean difference
Panel A: Livestock Inventory and Income						
Number of cows owned at the time of interview	1.862 (0.094)	1.713 (0.091)	2.226 (0.182)	0.149	-0.364**	-0.513***
Total value of all cows currently owned (thousands of taka)	108.012 (4.517)	98.898 (5.346)	126.500 (7.209)	9.115	-18.488**	-27.603***
Any cow owned by a woman	0.375 (0.037)	0.363 (0.031)	0.401 (0.052)	0.012	-0.026	-0.037
Value of other livestock owned/have owned in last 12 months (thousands of taka)	20.883 (1.031)	20.070 (0.983)	21.227 (1.816)	0.813	-0.344	-1.157
Panel B: Risk Preferences						
Male: Risk-averse (continuous measure)	0.450 (0.015)	0.418 (0.016)	0.433 (0.039)	0.032	0.017	-0.016
Female: Risk-averse (continuous measure)	0.442 (0.015)	0.410 (0.014)	0.426 (0.029)	0.032*	0.015	-0.017
Male: Risk aversion (dummy measure)	0.648 (0.019)	0.610 (0.019)	0.618 (0.043)	0.037	0.030	-0.007
Female: Risk aversion (dummy measure)	0.698 (0.022)	0.633 (0.023)	0.642 (0.041)	0.065**	0.057	-0.008
Panel C: Demographic information						
Male: Years of education	6.864 (0.201)	6.564 (0.167)	6.528 (0.393)	0.299	0.335	0.036
Female: Years of education	6.475 (0.160)	6.393 (0.141)	6.887 (0.371)	0.082	-0.412	-0.494
Age of male respondent	45.221 (0.494)	44.638 (0.483)	44.005 (1.180)	0.582	1.216	0.633
Age of female respondent	37.939 (0.442)	37.541 (0.452)	37.425 (1.077)	0.397	0.514	0.117
Total household members engaged in livestock-related work	1.447 (0.025)	1.425 (0.030)	1.377 (0.035)	0.022	0.070*	0.047
Total household members engaged in other agricultural work	1.240 (0.035)	1.238 (0.045)	1.250 (0.034)	0.003	-0.010	-0.012
Total household members engaged in wage/salaried work	0.121 (0.021)	0.120 (0.023)	0.090 (0.022)	0.001	0.031	0.030

Notes: This table reports baseline balance tests across treatment groups. Columns (1) - (3) present mean values and standard errors (in parentheses) for the Control, Profit-sharing, and Loan groups, respectively. Columns (4) - (6) report pairwise mean differences and t-tests of equality of means. All specifications include block fixed effects, and standard errors are clustered at the village level. In the risk preference task, each respondent allocated 10 kg of seeds between a *risky* (high-variance, high-return) and a *safe* (low-variance) option. *Risk-averse(continuous measure)* indicates the proportion of seeds allocated to the safe option. *Risk-averse(dummy measure)* constructed using a median cutoff. It equals 1 if the *Risk-averse(continuous measure)* is greater than the median value (0.5), and 0 otherwise. All monetary values are in thousand Bangladeshi Taka (BDT). * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 2: Impact of Profit-Sharing and Loan Contracts on Take-up and Livestock Financing

	Admin data: WeGro finance			ML: financed through WeGro		EL: financed through WeGro	
	(1) Expressed interest in WeGro finance	(2) Received WeGro finance	(3) Total financed cows	(4) Current cows	(5) Total cows since last survey	(6) Current cows	(7) Total cows since last survey
Panel A: Treatment Effects							
Profit-sharing	0.39*** (0.024)	0.24*** (0.023)	0.29*** (0.029)	0.09*** (0.013)	0.26*** (0.025)	0.01** (0.003)	0.00 (0.002)
Traditional loan	0.30*** (0.040)	0.21*** (0.036)	0.28*** (0.051)	0.06*** (0.020)	0.26*** (0.056)	0.01* (0.005)	0.01* (0.006)
R-squared	0.239	0.151	0.149	0.050	0.137	0.014	0.013
p-value: Profit-sharing=Loan	0.04	0.40	0.84	0.19	1.00	0.56	0.29
Control mean	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Observations	1517	1517	1517	1432	1432	1426	1426
Panel B: Gender Effects							
Female Offer	0.36*** (0.026)	0.23*** (0.023)	0.30*** (0.031)	0.10*** (0.017)	0.27*** (0.032)	0.01* (0.004)	0.01 (0.003)
Male Offer	0.37*** (0.029)	0.24*** (0.025)	0.29*** (0.033)	0.07*** (0.013)	0.26*** (0.030)	0.01* (0.004)	0.01 (0.004)
R-squared	0.23	0.15	0.15	0.05	0.14	0.01	0.01
p-value: Female=Male	0.89	0.92	0.83	0.07	0.77	0.99	0.99
Control mean	0	0	0	0	0	0	0
Observations	1517	1517	1517	1432	1432	1426	1426

Notes: Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Panel A reports treatment effects, and Panel B reports gender effects. Administrative data were collected from WeGro for the selected farmers. ML refers to the midline survey, and EL refers to the endline survey. *Expressed interest in WeGro finance* indicates whether a farmer accepted the offer in either the first or second cycle, or both. *Received WeGro finance* indicates whether a farmer actually received financing in either cycle of implementation. *Total financed cows* represent the number of cows a household received through WeGro financing.

Table 3: Risk Aversion as a Barrier to Financial Inclusion: Heterogeneous Treatment Effects by Risk Preferences

	Admin data: WeGro finance			ML: financed through WeGro		EL: financed through WeGro	
	(1) Expressed interest in WeGro finance	(2) Received WeGro finance	(3) Total financed cows	(4) Current cows	(5) Total cows since last survey	(6) Current cows	(7) Total cows since last survey
Panel A: Effect of Male Risk Aversion on Contract Take-up							
Male Risk Averse	-0.156** (0.063)	-0.108*** (0.039)	-0.134** (0.063)	-0.048 (0.035)	-0.068 (0.077)	-0.025* (0.014)	-0.027* (0.014)
Profit-sharing	-0.013 (0.070)	-0.016 (0.059)	-0.046 (0.078)	0.021 (0.038)	-0.003 (0.078)	-0.021* (0.012)	-0.021 (0.013)
Profit-sharing=1 × Male Risk Averse	0.164** (0.077)	0.085 (0.057)	0.097 (0.081)	0.017 (0.044)	0.013 (0.089)	0.029** (0.014)	0.025* (0.014)
Female Risk Averse	0.023 (0.031)	0.020 (0.032)	0.039 (0.045)	0.014 (0.025)	0.010 (0.044)	0.007 (0.006)	0.009** (0.005)
R-squared	0.080	0.068	0.095	0.032	0.094	0.026	0.030
Linear Combination: male RA+PS × male RA	0.008	-0.023	-0.037	-0.031	-0.056	0.004	-0.002
p-value: male RA=PS × male RA	0.856	0.572	0.453	0.295	0.226	0.517	0.654
Loan mean when male risk averse=0	0.395	0.284	0.370	0.090	0.308	0.026	0.026
Observations	864	864	864	810	810	803	803
Panel B: Effect of Female Risk Aversion on Contract Take-up							
Female Risk Averse	0.013 (0.053)	0.056 (0.041)	0.116* (0.067)	0.079*** (0.029)	0.076 (0.062)	0.017 (0.011)	0.018 (0.011)
Profit-sharing	0.077 (0.067)	0.066 (0.051)	0.076 (0.069)	0.085*** (0.031)	0.059 (0.069)	0.005 (0.006)	0.001 (0.004)
Profit-sharing=1 × Female Risk Averse	0.017 (0.065)	-0.047 (0.056)	-0.099 (0.085)	-0.084* (0.043)	-0.086 (0.082)	-0.013 (0.012)	-0.011 (0.011)
Male Risk Averse	-0.033 (0.036)	-0.043 (0.033)	-0.059 (0.041)	-0.033 (0.024)	-0.057 (0.040)	-0.003 (0.007)	-0.008 (0.006)
R-squared	0.075	0.067	0.095	0.035	0.095	0.022	0.026
Linear Combination: female RA+PS × female RA	0.030	0.009	0.016	-0.006	-0.011	0.004	0.007
p-value: female RA=PS × female RA	0.435	0.813	0.767	0.850	0.845	0.619	0.132
Loan mean when female risk averse=0	0.276	0.184	0.224	0.014	0.229	0.000	0.000
Observations	864	864	864	810	810	803	803

Notes: Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Panel A reports treatment effects, and Panel B reports gender effects. Administrative data were collected from WeGro for the selected farmers. ML refers to the midline survey, and EL refers to the endline survey. *Expressed interest in WeGro finance* indicates whether a farmer accepted the offer in either the first or second cycle, or both. *Received WeGro finance* indicates whether a farmer actually received financing in either cycle of implementation. *Total financed cows* represent the number of cows a household received through WeGro financing. *Risk-averse* is an indicator variable constructed using a median cutoff. It equals 1 if the *Risk-averse (continuous measure)* value is greater than the median value (0.5), and 0 otherwise.

Table 4: Impact of Profit-Sharing and Loan Contracts on Livestock Inventory and Value

	Livestock inventory and income						
	(1) Reported buy&sell (since last survey)	(2) Total cows (current)	(3) Total cows (since last survey)	(4) Improved cows (since last survey)	(5) Value of cows (current)	(6) Livestock value (current+sold) (since last survey)	(7) Livestock value (current+sold-purchase) (since last survey)
Panel A: Midline Survey							
Profit-sharing	0.09*** (0.02)	-0.01 (0.06)	0.13* (0.07)	0.14*** (0.05)	7,206.32* (4,168.10)	16,973.37*** (5,628.29)	967.37 (4,859.70)
Traditional loan	0.14*** (0.03)	-0.05 (0.10)	0.34*** (0.12)	0.27*** (0.08)	1,234.41 (8,519.38)	19,089.98** (8,360.80)	1,112.19 (6,696.86)
R-squared	0.046	0.514	0.037	0.030	0.483	0.382	0.272
p-value: Profit-sharing=Loan	0.22	0.75	0.10	0.13	0.49	0.81	0.98
Control mean	0.21	2.01	0.96	0.38	124134.24	154078.46	106968.01
Observations	1432	1432	1432	1432	1432	1432	1432
Panel B: Endline Survey							
Profit-sharing	0.00 (0.01)	0.03 (0.07)	0.07 (0.04)	0.05 (0.03)	8,558.69** (4,229.02)	16,099.19*** (5,248.34)	10,304.38** (5,170.93)
Traditional loan	0.00 (0.01)	0.09 (0.11)	0.08 (0.07)	-0.00 (0.05)	7,659.62 (6,585.73)	17,992.54** (6,888.00)	20,297.20*** (7,169.97)
R-squared	0.019	0.481	0.023	0.022	0.438	0.379	0.239
p-value: Profit-sharing=Loan	0.85	0.57	0.84	0.38	0.89	0.80	0.17
Control mean	0.07	2.00	0.45	0.18	110121.19	123828.73	111547.83
Observations	1426	1426	1426	1426	1426	1426	1426

Notes: Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Panel A reports treatment effects from the midline survey; Panel B from the endline survey. All values are winsorized at the 5% level (both tails). Livestock refers only to cows. “Reported buy & sell (since last survey)” equals 1 if the household both bought and sold at least one cow since the previous survey. “Total cows (current)” refers to the total number of cows owned by the household at the time of the survey. “Total cows (since last survey)” includes all cows currently owned as well as cows sold after the previous survey. “Improved cows (since last survey)” indicates the number of hybrid or crossbred cows that were owned by the household since the previous survey. “Value of cows (current)” is the total self-reported value of all cows currently owned by the household. “Total livestock value (current + sold)” is defined as the sum of the value of cows currently owned and the value of cows sold since the previous survey. “Value (current + sold - purchase)” subtracts total purchase costs from the combined value of cows currently owned and cows sold since the previous survey. In columns 2 and 5-7, we use an ANCOVA specification, controlling for the baseline value of the outcome variable on the right-hand side.

Table 5: Gender Targeting and Livestock Investment Outcomes

	Livestock inventory and income						
	(1) Reported buy&sell (since last survey)	(2) Total cows (current)	(3) Total cows (since last survey)	(4) Improved cows (since last survey)	(5) Value of cows (current)	(6) Livestock value (current+sold) (since last survey)	(7) Livestock value (current+sold-purchase) (since last survey)
Panel A: Midline Survey							
Female Offer	0.10*** (0.02)	-0.05 (0.08)	0.21** (0.08)	0.17*** (0.05)	6,090.62 (5,400.03)	19,639.50*** (6,717.74)	286.90 (5,868.85)
Male Offer	0.11*** (0.03)	0.01 (0.08)	0.16* (0.08)	0.18*** (0.06)	5,432.34 (5,161.56)	15,317.81** (5,994.73)	1,723.35 (5,119.95)
R-squared	0.045	0.514	0.035	0.028	0.483	0.382	0.272
p-value: Female=Male	0.88	0.53	0.58	0.85	0.92	0.56	0.82
Control mean	0.21	2.01	0.96	0.38	124134.24	154078.46	106968.01
Observations	1432	1432	1432	1432	1432	1432	1432
Panel B: Endline Survey							
Female Offer	0.01 (0.02)	-0.03 (0.08)	0.06 (0.05)	0.04 (0.03)	4,554.72 (4,766.63)	15,788.75*** (5,779.26)	10,988.01* (5,924.08)
Male Offer	-0.01 (0.01)	0.12 (0.08)	0.08 (0.05)	0.03 (0.03)	12,125.90** (4,953.79)	17,359.09*** (5,572.69)	14,602.08** (5,624.21)
R-squared	0.020	0.482	0.024	0.021	0.439	0.379	0.239
p-value: Female=Male	0.40	0.06	0.80	0.87	0.15	0.80	0.57
Control mean	0.07	2.00	0.45	0.18	110121.19	123828.73	111547.83
Observations	1426	1426	1426	1426	1426	1426	1426

Notes: Standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Panel A reports treatment effects estimated using the midline survey, while Panel B reports treatment effects from the endline survey. “Reported buy & sell (since last survey)” equals 1 if the household both bought and sold at least one cow since the previous survey. “Total cows (current)” refers to the total number of cows owned by the household at the time of the survey. “Total cows (since last survey)” includes all cows currently owned as well as cows sold after the previous survey. “Improved cows (since last survey)” indicates the number of hybrid or crossbred cows that were owned by the household since the previous survey. “Value of cows (current)” is the total self-reported value of all cows currently owned by the household. “Total livestock value (current + sold)” is defined as the sum of the value of cows currently owned and the value of cows sold since the previous survey. “Value (current + sold - purchase)” subtracts total purchase costs from the combined value of cows currently owned and cows sold since the previous survey. In columns 2 and 5-7, we use an ANCOVA specification, controlling for the baseline value of the outcome variable on the right-hand side.

Appendix A: Tables

Table A1: Treatment Effects on Take-up Controlling for Baseline Imbalances

	Admin data: WeGro finance			ML: financed through WeGro		EL: financed through WeGro	
	(1) Expressed interest in WeGro finance	(2) Received WeGro finance	(3) Total financed cows	(4) Current cows	(5) Total cows since last survey	(6) Current cows	(7) Total cows since last survey
Profit-sharing	0.39*** (0.024)	0.24*** (0.023)	0.30*** (0.030)	0.09*** (0.013)	0.26*** (0.026)	0.01** (0.003)	0.00* (0.003)
Traditional loan	0.30*** (0.039)	0.21*** (0.036)	0.29*** (0.051)	0.07*** (0.021)	0.27*** (0.057)	0.01** (0.006)	0.01* (0.006)
Female: Risk aversion (dummy measure)	0.01 (0.019)	0.01 (0.018)	0.02 (0.026)	0.00 (0.014)	-0.00 (0.026)	0.00 (0.003)	0.00** (0.002)
Number of cows owned at the time of interview	-0.01 (0.011)	-0.01 (0.009)	-0.01 (0.011)	-0.01* (0.005)	-0.02 (0.011)	-0.00** (0.002)	-0.00* (0.002)
Total value in taka of all cows currently owned	0.00 (0.000)	0.00 (0.000)	0.00 (0.000)	0.00 (0.000)	0.00 (0.000)	0.00 (0.000)	0.00 (0.000)
Total household members engaged in livestock-related work	0.01 (0.015)	0.01 (0.013)	0.02 (0.018)	0.01 (0.008)	0.02 (0.016)	0.01 (0.003)	0.00 (0.003)
R-squared	0.241	0.152	0.151	0.053	0.139	0.021	0.021
p-value: Profit-sharing=Loan	0.05	0.43	0.90	0.24	0.93	0.44	0.23
Control mean	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Observations	1517	1517	1517	1432	1432	1426	1426

Notes: Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Administrative data were collected from WeGro for the selected farmers. ML refers to the midline survey, and EL refers to the endline survey. *Expressed interest in WeGro finance* indicates whether a farmer accepted the offer in either the first or second cycle, or both. *Received WeGro finance* indicates whether a farmer actually received financing in either cycle of implementation. *Total financed cows* represent the number of cows a household received through WeGro financing.

Table A2: Risk Aversion Barrier Persists with Traditional Loans but Not Profit-Sharing: Full Sample Results

	Admin data: WeGro finance			ML: financed through WeGro		EL: financed through WeGro	
	(1) Expressed interest in WeGro finance	(2) Received WeGro finance	(3) Total financed cows	(4) Current cows	(5) Total cows since last survey	(6) Current cows	(7) Total cows since last survey
Male: Risk aversion	-0.002 (0.007)	0.001 (0.006)	0.004 (0.009)	-0.005 (0.007)	0.002 (0.010)	-0.000 (0.001)	-0.001 (0.001)
Profit-sharing	0.379*** (0.036)	0.253*** (0.031)	0.313*** (0.041)	0.106*** (0.023)	0.291*** (0.037)	0.004 (0.004)	0.005 (0.004)
Traditional loan	0.394*** (0.064)	0.278*** (0.053)	0.368*** (0.073)	0.084*** (0.030)	0.302*** (0.074)	0.026* (0.013)	0.026* (0.014)
Profit-sharing=1 × Male: Risk aversion	0.019 (0.042)	-0.014 (0.041)	-0.027 (0.048)	-0.023 (0.028)	-0.046 (0.045)	0.005 (0.006)	-0.001 (0.005)
Traditional loan=1 × Male: Risk aversion	-0.155** (0.065)	-0.111*** (0.041)	-0.135* (0.071)	-0.038 (0.038)	-0.065 (0.088)	-0.025* (0.014)	-0.025* (0.014)
Female: Risk aversion	0.015 (0.018)	0.009 (0.018)	0.018 (0.027)	0.007 (0.015)	0.001 (0.026)	0.004 (0.004)	0.005** (0.003)
R-squared	0.244	0.155	0.153	0.053	0.139	0.020	0.023
Linear Combination: PS+PS × Risk	0.398	0.240	0.286	0.083	0.245	0.009	0.004
p-value: PS+PS × Risk	0.000	0.000	0.000	0.000	0.000	0.033	0.179
Linear Combination: TL+TL × Risk	0.239	0.168	0.233	0.047	0.237	0.001	0.000
p-value: TL+TL × Risk	0.000	0.000	0.000	0.079	0.001	0.707	0.803
p-value: PS × Risk ≠ TL × Risk	0.027	0.097	0.213	0.756	0.847	0.052	0.103
Control mean when male risk averse=0	0	0	0	0	0	0	0
Observations	1517	1517	1517	1432	1432	1426	1426

Notes: Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Baseline male risk aversion is measured as a binary indicator of risk-averse preferences from incentivized lottery choices. All regressions are estimated among all households (including control), absorbing block fixed effects and clustering standard errors at the village level. PS = Profit-sharing treatment. TL = Traditional loan treatment. ML and EL refer to midline and endline survey rounds, respectively. The linear combination rows test whether risk-averse males have different outcomes within each treatment arm. The p-value in the second-to-last row tests whether the profit-sharing and traditional loan interactions with risk aversion are significantly different.

Table A3: Pre-Intervention Relationship Between Risk Aversion and Credit Market Access

	(1) Household took any loan	(2) Total number of loans	(3) Total amount received (Taka)	(4) Total outstanding loans
Male: Risk aversion	-0.05** (0.02)	-0.06* (0.03)	-4,918.13** (2,203.06)	-0.06* (0.03)
Female: Risk aversion	-0.01 (0.03)	-0.02 (0.04)	83.62 (2,632.05)	-0.02 (0.04)
R-squared	0.036	0.047	0.044	0.047
Mean when male risk averse=0	0.63	0.75	41,641.59	0.75
Observations	1517	1517	1517	1517

Notes: Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Male risk aversion is measured as a binary indicator of risk-averse preferences from incentivized lottery choices. All regressions include block fixed effects and cluster standard errors at the village level. The sample includes all households in the study at baseline, prior to any intervention. Total number of loans refers to loans received in the last year before the intervention. Total amount received is measured in Bangladeshi Taka.

Table A4: Risk Aversion as Barrier to Financial Inclusion: Robustness Without Spouse Risk Aversion Controls

	Admin data: WeGro finance			ML: financed through WeGro		EL: financed through WeGro	
	(1) Expressed interest in WeGro finance	(2) Received WeGro finance	(3) Total financed cows	(4) Current cows	(5) Total cows since last survey	(6) Current cows	(7) Total cows since last survey
Panel A: Effect of Male Risk Aversion on Contract Take-up							
Male Risk Averse	-0.155** (0.063)	-0.107*** (0.039)	-0.131** (0.063)	-0.047 (0.035)	-0.067 (0.077)	-0.024* (0.014)	-0.026* (0.014)
Profit-sharing	-0.014 (0.070)	-0.017 (0.058)	-0.049 (0.077)	0.020 (0.038)	-0.004 (0.078)	-0.021* (0.012)	-0.021 (0.013)
Profit-sharing=1 × Male Risk Averse	0.166** (0.077)	0.087 (0.056)	0.100 (0.080)	0.019 (0.044)	0.013 (0.089)	0.030** (0.015)	0.025* (0.015)
R-squared	0.079	0.068	0.094	0.031	0.094	0.025	0.026
Linear Combination: male RA+PS × male RA	0.011	-0.020	-0.031	-0.028	-0.054	0.005	-0.001
p-value: male RA=PS × male RA	0.791	0.618	0.516	0.318	0.230	0.392	0.873
Loan mean when male risk averse=0	0.395	0.284	0.370	0.090	0.308	0.026	0.026
Observations	864	864	864	810	810	803	803
Panel B: Effect of Female Risk Aversion on Contract Take-up							
Female Risk Averse	0.012 (0.055)	0.055 (0.043)	0.113 (0.068)	0.077** (0.029)	0.073 (0.064)	0.016 (0.010)	0.017 (0.011)
Profit-sharing	0.080 (0.067)	0.070 (0.051)	0.081 (0.068)	0.087*** (0.030)	0.063 (0.069)	0.005 (0.006)	0.001 (0.004)
Profit-sharing=1 × Female Risk Averse	0.013 (0.065)	-0.053 (0.056)	-0.107 (0.083)	-0.088** (0.042)	-0.093 (0.081)	-0.013 (0.012)	-0.012 (0.012)
R-squared	0.074	0.065	0.093	0.032	0.093	0.022	0.022
Linear Combination: female RA+PS × female RA	0.024	0.002	0.006	-0.011	-0.020	0.003	0.006
p-value: female RA=PS × female RA	0.524	0.958	0.905	0.704	0.703	0.638	0.177
Loan mean when female risk averse=0	0.276	0.184	0.224	0.014	0.229	0.000	0.000
Observations	864	864	864	810	810	803	803

Notes: Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Panel A reports treatment effects, and Panel B reports gender effects. Administrative data were collected from WeGro for the selected farmers. ML refers to the midline survey, and EL refers to the endline survey. This table replicates Table 3 but here we did not control the risk aversion measure for soupse. *Expressed interest in WeGro finance* indicates whether a farmer accepted the offer in either the first or second cycle, or both. *Received WeGro finance* indicates whether a farmer actually received financing in either cycle of implementation. *Total financed cows* represent the number of cows a household received through WeGro financing. Risk averse indicator equals 1 if individual allocated 5kg or more endowment to safe asset.

Table A5: Risk Aversion as a Barrier to Financial Inclusion (with controls for current imbalanced variables)

	Admin data: WeGro finance			ML: financed through WeGro		EL: financed through WeGro	
	(1) Expressed interest in WeGro finance	(2) Received WeGro finance	(3) Total financed cows	(4) Current cows	(5) Total cows since last survey	(6) Current cows	(7) Total cows since last survey
Panel A: Effect of Male Risk Aversion on Contract Take-up							
Male Risk Averse	-0.150** (0.065)	-0.105** (0.042)	-0.126* (0.068)	-0.044 (0.035)	-0.061 (0.080)	-0.023* (0.013)	-0.025* (0.014)
Profit-sharing	-0.021 (0.071)	-0.020 (0.059)	-0.051 (0.080)	0.019 (0.038)	-0.009 (0.079)	-0.022* (0.012)	-0.021* (0.012)
Profit-sharing=1 × Male Risk Averse	0.160** (0.078)	0.082 (0.059)	0.090 (0.084)	0.013 (0.044)	0.006 (0.092)	0.027** (0.014)	0.023* (0.014)
Female Risk Averse	0.021 (0.031)	0.019 (0.032)	0.038 (0.045)	0.014 (0.024)	0.009 (0.044)	0.006 (0.006)	0.009* (0.005)
Number of cows owned at the time of interview	-0.012 (0.024)	-0.010 (0.017)	-0.018 (0.023)	-0.020** (0.010)	-0.029 (0.022)	-0.007** (0.013)	-0.006* (0.003)
Total value in taka of all cows currently owned	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Total household members engaged in livestock-related work	0.029 (0.026)	0.017 (0.024)	0.041 (0.032)	0.022 (0.015)	0.037 (0.030)	0.008 (0.006)	0.007 (0.005)
R-squared	0.085	0.070	0.098	0.037	0.099	0.035	0.039
Linear Combination: male RA+PS × male RA	0.009	-0.022	-0.036	-0.031	-0.055	0.004	-0.002
p-value:male RA=PS × male RA	0.825	0.590	0.477	0.300	0.239	0.529	0.642
Loan mean when male risk averse=0	0.395	0.284	0.370	0.090	0.308	0.026	0.026
Observations	864	864	864	810	810	803	803
Panel B: Effect of Female Risk Aversion on Contract Take-up							
Female Risk Averse	0.012 (0.051)	0.056 (0.040)	0.117* (0.065)	0.080*** (0.029)	0.076 (0.059)	0.017 (0.011)	0.018 (0.011)
Profit-sharing	0.067 (0.064)	0.061 (0.050)	0.069 (0.069)	0.082** (0.031)	0.051 (0.068)	0.004 (0.006)	0.000 (0.005)
Profit-sharing=1 × Female Risk Averse	0.016 (0.064)	-0.048 (0.056)	-0.102 (0.083)	-0.087** (0.042)	-0.089 (0.080)	-0.014 (0.013)	-0.012 (0.012)
Male Risk Averse	-0.030 (0.037)	-0.042 (0.034)	-0.056 (0.043)	-0.032 (0.025)	-0.055 (0.041)	-0.002 (0.007)	-0.008 (0.006)
Number of cows owned at the time of interview	-0.012 (0.024)	-0.010 (0.017)	-0.018 (0.023)	-0.020** (0.010)	-0.029 (0.022)	-0.008** (0.004)	-0.007* (0.003)
Total value in taka of all cows currently owned	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Total household members engaged in livestock-related work	0.032 (0.026)	0.019 (0.023)	0.043 (0.031)	0.023 (0.015)	0.037 (0.030)	0.009 (0.006)	0.008 (0.005)
R-squared	0.080	0.069	0.099	0.040	0.100	0.031	0.036
Linear Combination: female RA+PS × female RA	0.028	0.008	0.015	-0.007	-0.013	0.003	0.007
p-value:female RA=PS × female RA	0.467	0.836	0.788	0.822	0.813	0.680	0.156
Loan mean when female risk averse=0	0.276	0.184	0.224	0.014	0.229	0.000	0.000
Observations	864	864	864	810	810	803	803

Notes: Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Panel A reports treatment effects, and Panel B reports gender effects. Administrative data were collected from WeGro for the selected farmers. ML refers to the midline survey, and EL refers to the endline survey. This table replicates Table 3 but additionally controls for baseline imbalanced variables. *Expressed interest in WeGro finance* indicates whether a farmer accepted the offer in either the first or second cycle, or both. *Received WeGro finance* indicates whether a farmer actually received financing in either cycle of implementation. *Total financed cows* represent the number of cows a household received through WeGro financing. Risk averse indicator equals 1 if individual allocated 5kg or more endowment to safe asset.

Table A6: Risk Aversion as a Barrier to Financial Inclusion: Heterogeneous Treatment Effects by Risk Preferences, Continuous Measure

	Admin data: WeGro finance			ML: financed through WeGro		EL: financed through WeGro	
	(1) Expressed interest in WeGro finance	(2) Received WeGro finance	(3) Total financed cows	(4) Current cows	(5) Total cows since last survey	(6) Current cows	(7) Total cows since last survey
Panel A: Effect of Male Risk Aversion on Contract Take-up							
Male: Risk-averse (0-1)	-0.195** (0.082)	-0.126*** (0.046)	-0.172** (0.082)	-0.069 (0.048)	-0.080 (0.099)	-0.036* (0.020)	-0.038* (0.021)
Profit-sharing	0.007 (0.064)	0.001 (0.053)	-0.037 (0.074)	0.022 (0.036)	-0.002 (0.073)	-0.021* (0.012)	-0.021 (0.013)
Profit-sharing=1 × Male: Risk-averse (0-1)	0.190* (0.101)	0.083 (0.070)	0.117 (0.105)	0.022 (0.059)	0.014 (0.113)	0.042** (0.021)	0.035* (0.020)
Female: Risk-averse (0-1)	0.035 (0.051)	0.027 (0.049)	0.049 (0.062)	0.005 (0.036)	0.012 (0.063)	0.007 (0.012)	0.013 (0.010)
R-squared	0.079	0.067	0.094	0.032	0.094	0.025	0.029
Linear Combination: male RA+PS × male RA	-0.005	-0.043	-0.055	-0.047	-0.066	0.007	-0.003
p-value: male RA=PS × male RA	0.931	0.429	0.397	0.229	0.224	0.555	0.603
Loan mean when male risk averse=0	0.415	0.308	0.415	0.097	0.339	0.032	0.032
Observations	864	864	864	810	810	803	803
Panel B: Effect of Female Risk Aversion on Contract Take-up							
Female: Risk-averse (0-1)	0.067 (0.073)	0.065 (0.064)	0.165 (0.107)	0.094** (0.038)	0.068 (0.093)	0.009 (0.007)	0.010 (0.008)
Profit-sharing	0.105 (0.069)	0.056 (0.056)	0.077 (0.074)	0.080*** (0.030)	0.035 (0.070)	-0.002 (0.006)	-0.007 (0.005)
Profit-sharing=1 × Female: Risk-averse (0-1)	-0.040 (0.098)	-0.048 (0.088)	-0.152 (0.127)	-0.117** (0.058)	-0.074 (0.120)	-0.003 (0.015)	0.004 (0.014)
Male: Risk-averse (0-1)	-0.050 (0.047)	-0.062 (0.043)	-0.081 (0.054)	-0.051 (0.032)	-0.068 (0.048)	-0.004 (0.011)	-0.012 (0.008)
R-squared	0.075	0.067	0.095	0.035	0.094	0.020	0.024
Linear Combination: female RA+PS × female RA	0.027	0.016	0.013	-0.023	-0.006	0.006	0.014
p-value: female RA=PS × female RA	0.679	0.790	0.859	0.610	0.937	0.690	0.247
Loan mean when female risk averse=0	0.263	0.175	0.211	0.019	0.208	0.000	0.000
Observations	864	864	864	810	810	803	803

Notes: Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Panel A reports treatment effects, and Panel B reports gender effects. Administrative data were collected from WeGro for the selected farmers. ML refers to the midline survey, and EL refers to the endline survey. This table replicates Table 3 but here *Risk averse* is measured as the portion of a 10 kg seed endowment allocated to the safe option (1 = all safe, 0.5 = half, 0 = none). *Expressed interest in WeGro finance* indicates whether a farmer accepted the offer in either the first or second cycle, or both. *Received WeGro finance* indicates whether a farmer actually received financing in either cycle of implementation. *Total financed cows* represent the number of cows a household received through WeGro financing. Risk averse indicator equals 1 if individual allocated 5kg or more endowment to safe asset.

Table A7: Livestock Quality and Management Practices: Weight Gain and Byproduct Income

	(1) Weight gained (ML)	(2) Weight gained (EL)	(3) byproduct income (last 12 months)
Profit-sharing	-4.34 (3.79)	6.38** (3.16)	116.10** (53.53)
Traditional loan	2.77 (4.59)	2.07 (3.26)	55.33 (83.74)
R-squared	0.070	0.182	0.229
p-value: Profit-sharing=Loan	0.12	0.14	0.47
Control mean	44.94	31.58	377.43
Observations	381	312	1426

Notes: Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. All values have been winsorized at the 5% level (both tails). ML and EL refer to midline and endline survey rounds, respectively. Weight gained is defined as the difference between the weight at purchase and the weight at sale, and is constructed based on cows sold within the last 12 months. "By-product income" includes revenue from milk, manure, and other livestock products earned in the last 12 months. In column 3, we use an ANCOVA specification, controlling for the baseline value of the outcome variable on the right-hand side.

Appendix B. Risk Preference Elicitation Script

Respondents completed an incentivized investment task allocating 10 kg of seed between a safe and a risky option. The exact script is provided below.

Risk Preference Module

We will now do an activity where I ask you some questions about your preferences for investing in your business when the outcome is uncertain, for example if you are a farmer planting seeds, and the outcome depends on whether the weather is good or bad. We are interested in your *personal preference*. Different people have different preferences. There is no correct answer, so please do not worry about right or wrong responses.

In this investment, there are two steps:

- (i). In the first step, we will give you an idea about the seed so that you can make a decision according to your preference.
- (ii). In the second step, we will decide on the weather conditions. Generally, we do not know how the weather will be. Therefore, we will make a decision through a coin toss to determine whether the weather was good or bad. If the coin lands on heads (flower), we will understand that the weather was good.

Imagine that you are a grain farmer and we offer you 10 kg of seed. You can choose between two types of seed:

- **Seed A (risky seed):** Risky. If the weather is bad, the yield is zero. If the weather is good, the yield is three times as high, giving 15 taka per kilogram.
- **Seed B (safe seed):** Not risky. The yield is the same whether the weather is good or bad. Profit is 5 taka per kilogram.

We will assume that the chance of good weather is 50%, and the chance of bad weather is 50%. The decision that you must make is how much of seed type A you would take, and how much of seed type B. The total seed you can take is 10 kg. At the end of this

activity, we will pay you based on the Tk amounts of profit (i.e., you will not receive any actual seed, but you may get the profits based on the decisions you make).

Some examples:

- (i). If you say that you would invest nothing in the risky seed A, then you would take all 10 kg in seed B, and you would get a profit of $10 \times 5 = 50$ Tk for sure, with no uncertainty (it DOES NOT depend on the weather / no risk).
- (ii). If you choose to take all 10 kg of your seed as risky seed A, then we will flip a coin. If heads comes up, then this will be like good weather, and you will get 15 Tk profit for every kilogram of seed A that you took, which is a total of $15 \times 10 = 150$ Tk. If tails comes up, then this will be like bad weather, and you will get zero.
- (iii). If you choose to take half of your seed as Seed A (5 kg) and half of your seed as Seed B (5 kg), then we will flip the coin again. If heads comes up, this will be like good weather, and you will get $(5 \times 15) + (5 \times 5) = 100$ Tk. If tails comes up, then this will be like bad weather, and you will get nothing from Seed A, but you will get $(5 \times 5) = 25$ Tk from Seed B.

After confirming your decision, we will let you toss the coin. Based on the outcome, you will be paid according to the profit amounts described above.

Enumerator instructions:

- Ask the respondent how many kilograms (out of 10 kilograms) they would invest in Seed A.
- Record the answer.
- Allow the respondent to toss the coin.
- Record the outcome (1 = heads; 2 = tails).
- Calculate and state the resulting payment.

Construction of the Risk Preference Measures

Let A_i denote the kilograms of *risky seed* (Seed A) chosen by respondent i . Since the total endowment is 10 kg, the kilograms of *safe seed* (Seed B) chosen is:

$$B_i = 10 - A_i.$$

We use these choices to construct continuous indices of risk tolerance and risk aversion:

$$\textbf{Risk Tolerance: } RT_i = \frac{A_i}{10},$$

$$\textbf{Risk Aversion: } RA_i = \frac{B_i}{10}.$$

Thus:

- $RA_i = 1$ indicates full allocation to the safe asset (10 kg of Seed B).
- $RA_i = 0.5$ indicates a 50–50 allocation.
- $RA_i = 0$ indicates full allocation to the risky asset (10 kg of Seed A).

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