Equity-based microfinance and risk preferences*

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Abstract

I explore the impact of equity-like microfinance contracts that directly link required payments to client income. I conduct artefactual field experiments with microenterprise owners who were part of field experiments in Kenya and Pakistan that had provided their businesses with large capital injections. I find that equity-like contracts lead to more profitable investment choices, particularly for the most risk-averse individuals. Loss-averse individuals particularly value equity contracts, which provide downside protection in return for upside profit sharing. However, individuals who exhibit non-linear probability weighting prefer debt contracts, especially in the presence of a skewed profits distribution. I structurally estimate these three distinct dimensions of risk preferences using a prospect-theoretic model to show that relatively simple tweaks to contract design can improve the feasibility of microequity contracts. Microfinance institutions, by expanding the suite of products offered to include equity-like contracts, can significantly improve client welfare.

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1 Introduction

The first wave of microfinance impact evaluations identified modest average impacts of microcredit on microenterprise profits and growth (Banerjee, Karlan, and Zinman, 2015). This inspired a growing recent literature that adapts the structure of the classic microcredit contract to better align repayments with income streams (Field, Pande, Papp, and Rigol, 2013; Barboni and Agarwal, 2018; Battaglia, Gulesci, and Madestam, 2021; Crepon, De Haas, Devoto, and Parriente, 2022). In this paper, I investigate a more direct way to link repayments to income: equity-like contracts with performance-contingent repayments. Such contracts may be more appropriate for financing the investments of microenterprises with high but volatile returns, and especially for the most risk-averse microenterprise owners (Fischer, 2013; De Mel, McKenzie, and Woodruff, 2019).

I explore the impact of equity-like contracts (henceforth, 'microequity') on microenterprise investment behaviour, with a focus on the role of risk preferences as a mechanism. To do this, I work with a policy-relevant sample at a very important time for their business decision making: microenterprise owners who had expressed an interest in expanding their business and were participating in two separate field experiments (in Kenya and Pakistan) that offered them a relatively large amount of financing. In the first part of this paper, I use artefactual field experiments to explore preferences for microequity and the impacts of microequity on investment behaviour. I show that microequity contracts lead to microenterprise owners choosing more profitable investments than under debt financing (a 0.35 standard deviation increase in expected return). Using incentivised behavioural measures, I also show that the increase in expected return is greatest for the most risk-averse and the most loss-averse microenterprise owners, which suggests the benefit of the implicit insurance and downside protection provided by microequity contracts. I also validate the predictive power of the risk preference measures "outside of the lab", by showing that they are strongly correlated with take-up of the actual microfinance product in each of the two broader field experiments from which participants are drawn.

In the second part of the paper, I propose a novel demand-side explanation for why we do not observe microequity contracts being implemented in practice, despite the positive investment effects.[1] This is also surprising given the extensive literature documenting that many microenterprises do have high but volatile expected returns, suggesting that

[1] Traditionally, there are a number of supply-side challenges to implementation of microequity contracts, related to issues of monitoring and costly state verification. Recent developments in financial technology and mobile money (Suri, 2017; Higgins, 2019) mitigate some of those risks and increase the feasibility of implementing microequity contracts , which I discuss further in the conclusion.

such contracts should be valuable for those clients and profitable for MFIs (De Mel et al., 2019; De Mel, McKenzie, and Woodruff, 2008; Fafchamps, McKenzie, Quinn, and Woodruff, 2014). I use data from the artefactual field experiments to structurally estimate the three risk preference parameters of a prospect-theoretic model, which I then use to conduct counterfactual contract analysis. This provides a new perspective on the constraints to implementation of microequity contracts that would not be observed with a simpler expected utility model where risk preferences are fully captured by the curvature of the utility function. The prospect-theoretic model demonstrates that, as one would expect from a standard expected utility model, individuals with greater utility curvature do have a greater preference for microequity contracts, and also choose higher-risk, higher-return investments when financed with equity rather than debt contracts. The more nuanced result comes from the two other dimensions of risk preferences in the prospect-theoretic framework: loss aversion and probability weighting. I find that most microenterprise owners are loss-averse, with a loss aversion parameter of 2.04, within the range of 2 – 2.25 that has been estimated in the literature (DellaVigna, 2018; Kremer, Rao, and Schilbach, 2019). Loss aversion provides another strong motivation for microequity contracts: loss-averse individuals are particularly sensitive to losses than to gains, and they value the downside protection of equity contracts, in return for which they are more willing to share the upside.

However, the third dimension of risk preferences — probability weighting — which has received relatively little attention in the development economics and microfinance literature, works in the opposite direction. I estimate a bimodal distribution for probability weighting, with a large group of individuals who exhibit an "inverse-S-shaped" probability weighting function that leads to them significantly overweighting small probabilities and underweighting large probabilities, and a smaller group of individuals with close to "standard" (linear) probability weighting. Individuals who exhibit non-linear probability weighting have *lower* demand for equity contracts compared to debt contracts, especially when they face a positively skewed distribution of business profits (which is the distribution observed in the data from the field experiment, and likely the case in many other settings). Specifically, they underweight the (objectively high) probability of relatively low-profit outcomes, which is where the downside protection of equity contracts would be most valuable. Importantly, they also overweight the (objectively low) probability of obtaining very high profits, which they would have to share with the MFI under a microequity contract. I then propose a relatively simple solution to this problem. I use counterfactual contract simulations to show that a hybrid contract that contains both debt- and equity-like features can mitigate this problem by capping the upside for the capital provider in the high-profit state of the world, which is subjectively overweighted by clients with non-linear probability weighting but not so by a more sophisticated financial institution. In the conclusion, I discuss the potential for implementing such contracts on a large scale, especially in light of the significant uptake of digital financial technology in low-income countries during Covid-19 (Sahay, von Allmen, Lahreche, Khera, Ogawa, Bazarbash, and Beaton, 2020; Machasio, 2020).

This paper contributes by drawing together two distinct strands of research: microfinance and behavioural finance. There is an extensive theoretical and empirical literature investigating the impact of microcredit contracts, recently summarised by Cai, Meki, Quinn, Field, Kinnan, Morduch, de Quidt, and Said (2021). In their summary of the first wave of microcredit impact evaluations, Banerjee et al. (2015) identify the following key challenges for the next generation of microfinance studies: (i) investigating how innovations to microfinance contract structure can improve take-up rates and effectiveness; (ii) addressing the limited evidence on graduated borrowers; and (iii) broadening our understanding of non-credit microfinance activities. Further, De Mel, Mckenzie, and Woodruff (2019) highlight the lack of conceptual work on microequity contracts. I contribute to these objectives, by investigating the viability of equity-like contracts, using a highly relevant sample of existing microenterprises who are looking to expand their businesses through the purchase of a fixed asset, and thinking explicitly about the distinct impact of a broader conception of risk preferences than is mostly taken in the development economics and microfinance literature.[2]

My paper is close in spirit to Fischer (2013), who uses a lab-in-field experiment to overlay profit sharing on top of joint liability credit arrangements, and finds that the inclusion of equity-like features can incentivise higher risk-return investments, especially for the most risk-averse. He measures risk aversion using a simple elicitation exercise based on an expected utility framework, as is common in field experiments (Harrison and Rutström, 2008; Harrison, Humphrey, and Verschoor, 2010; Charness, Gneezy, and Imas, 2013). I go deeper in exploring risk preferences, and show that the result is more nuanced when allowing for prospect-theoretic preferences. Specifically, the effects of loss aversion and probability weighting work in opposite directions, which can be taken into account when designing more effective microfinance contracts. While I offer a preference-based explanation for why many clients may not take up the potentially very beneficial microequity contracts, I do not argue for a costly and "game-able" strategy of making loan decisions on the basis of behavioural games implemented with clients. Rather, I suggest a relatively small tweak to contractual structure that would mitigate such risks, specifically in capping the upside in such contracts. Such hybrid contracts, while novel in this context, are increasingly being

[2] An exception to this is Jack, Kremer, De Laat, and Suri (2016) and Carney, Lin, Kremer, and Rao (2018), who discuss the benefits of asset-collateralised loans for loss-averse microfinance clients.

used in high-income settings. For example, digital payments firms in many countries provide income-contingent loans through their point of sales system (Rishabh and Schäublin, 2021), and some private equity investors now finance higher education for high-potential students (Hahn, 2008).

In taking a prospect-theoretic approach to investigating investment behaviour under microfinance, I draw upon insights from a growing literature in behavioural finance that has thus far focused almost exclusively on high-income countries (Verschoor and D'Exelle, 2020). Important contributions on the role of reference-dependent preferences for investment behaviour include Benartzi and Thaler (1995); Barberis, Jin, and Wang (2019); Imas (2016). A smaller literature has shown the importance of the often neglected second component of non-expected-utility models, probability weighting (Polkovnichenko and Zhao, 2013; De Giorgi and Legg, 2012; Fehr-Duda and Epper, 2012). In particular, the novel results in this paper are entirely consistent with recent work by Dimmock, Kouwenberg, Mitchell, and Peijnenburg (2021), who show that individuals with non-linear probability weighting have a "preference for skewness" in investment choices. Spalt (2013) shows that overweighting of small probabilities leads individuals to overvalue deeply out-of-the-money options, which employers can exploit in designing compensation packages. I demonstrate the flipside of this: small business owners with non-linear probability weighting are much less likely to "*sell* skewness" by entering into equity contracts that share profits in overweighted high-profit states of the world. I also provide what to my knowledge is the first piece of evidence that loss-averse entrepreneurs have a greater preference for equity financing and choose more profitable investments under equity contracts compared to debt financing.

In Section 2, I describe the setting of the studies in Kenya and Pakistan. Section 3 outlines the experimental design, with reduced form results presented in Section 4. In Section 5, I structurally estimate risk preference parameters and explore welfare under different counterfactual contract structures. Section 6 concludes.

2 Study setting

I use artefactual field experiments with microenterprise owners that took part in two separate microfinance field experiments in Kenya and Pakistan.[3] The experimental data for this paper, using a series of investment games, was collected during a workshop with microenterprise owners before they were randomly assigned to microfinance contracts in the

[3] The experiments are described in more detail in Bari, Malik, Meki, and Quinn (2021) and Cordaro, Fafchamps, Mayer, Meki, Quinn. and Roll (2022).

broader field experiments. This sample of business owners – at a moment when they are looking to expand their operations through the financing of a large asset – provides an ideal setting to explore the preference for and effect of microequity contracts, since equity-based contracts are unlikely to be appropriate for subsistence-level microenterprises who have little intention in expanding their business operations.

The first experiment was implemented in Pakistan between 2016 and 2020, with over 700 microenterprise owners who were clients of one of the countries largest and fastest growing microfinance institutions, Akhuwat. Clients who had expressed an interest in expanding their business with the purchase of a fixed asset were invited to a baseline workshop, where enumerators conducted a detailed household survey and incentivised behavioural games to elicit risk preferences. The investment games used in this paper took place during this workshop, which lasted approximately half a day, and before any of the sample was randomly assigned to be offered the microfinance contract. Detailed summary statistics are presented in the appendix. The average participant was 38 years old, with eight years of formal education, and ten years of experience in their current business. The mean number of employees was just above one, with a median of zero. The most popular business sector was rickshaw driving (20%), followed by clothing and footwear production (11%), food and drink sales (10%), and retail trade in the form of fabric and garment sales (7%). Average monthly business profits were US$245 (median $219), and average monthly household consumption expenditure was $211 (median $180), which puts the average household in the second quintile of the overall distribution for household consumption in Pakistan. As a comparison to two of the most prominent studies on capital returns in microenterprises, average microenterprise profits in De Mel, McKenzie, and Woodruff (2008) and Fafchamps, McKenzie, Quinn, and Woodruff (2014) were approximately $25. The average microenterprise owner in this sample is much larger in terms of business profits, which is unsurprising given that the target population was graduated microenterprise borrowers.

The second experiment took place in Kenya between 2017 and 2020, in collaboration with one of the largest multinational food companies in the world, and working with 161 micro-distributors within their supply supply chain who expressed an interest in purchasing a fixed asset for their business. In Kenya, this was a single type of transportation asset – a bicycle – compared to the Pakistan experiment, where microenterprise sector of operation and asset choice was much more heterogeneous. The unique setting of the experiment, in particular the availability of administrative data on microenterprise performance, permitted the implementation of performance-contingent financing contracts in the broader field experiment (described further in the appendix). The average participant in the sample was

31 years old, with 20% having a post-secondary education. Mean monthly sales from all micro-distribution activities was US$995 (median $418), with mean profits of $133 (median $107). Very few had any business employees (mean 0.16, median 0). Total household income was $198 on average (median $142), and total household expenditure was $196 on average (median $174). The artefactual field experiments used in this paper were intentionally implemented using exactly the same procedure as the Pakistan experiment: the detailed household survey, risk preference elicitation exercises and investment games took place during the baseline workshop to the broader field experiment, lasting approximately half a day, and before any of the sample was randomly assigned to be offered microfinance contracts.

3 Experimental design

3.1 Measuring risk preferences

Participants in the Kenyan and Pakistani experiments were each asked 44 questions to measure risk preferences. This included domain-specific self-reported measures of risk attitudes as well as incentivised elicitation exercises involving choices over different investment options (binary lotteries that varied in payoffs and probabilities). This allows the construction of simple indices of general risk aversion, loss aversion and probability weighting, as well as structural estimation of parameters imposing specific functional forms for utility, which is I use later for counterfactual contract simulations and welfare analysis.

The self-reported measure of risk attitudes involved each microenterprise owner rating on a scale of 1 to 10 their willingness to take risks in the following domains: (i) their financial matters; (ii) their occupation; (iii) having faith in other people; and (iv) their general perception about whether they were a person fully willing to take risks or more likely to avoid risks.[4] I complemented these self-reported measures with a more narrowly focused incentivised activity, using a certainty-equivalent method that provided the best trade-off between comprehension and quality of data for this population of microenterprise owners, as discovered through extensive piloting.[5] Respondents were posed a series of 30 questions, where they were required to choose between a certain amount of money or an uncertain investment prospect, with two possible outcomes: (i) zero; or (ii) 1,000 units of local cur-

[4] The questions were adapted from Dohmen, Falk, Huffman, Sunde, Schupp, and Wagner (2011), who show using a large sample that these measures were strongly correlated with risk taking in incentivised tasks. The authors also argue for the merit of such measures given their relative ease for participant understanding and implementation in the field. In my setting, I also find a strong correlation between the two measures.

[5] See the appendix for a detailed discussion of the different methods considered, drawing upon the work of Barr and Packard (2002) , Vieider, Lefebvre, Bouchouicha, Chmura, Hakimov, Krawczyk, and Martinsson (2015), Binswanger (1981), Harrison and Rutström (2008), and Holt and Laury (2002).

rency.[6] Further details on the script used to explain the activity (using business terminology and framing to aid comprehension), the diagrams displaying the investment choices, and the physical instruments used to explain probabilities are provided in the appendix. To allow for estimation of non-linear probability weights, the 30 questions were split into three sets of ten, with variation in the probability of the good outcome in the uncertain investment prospect. In each set of ten questions, the participant had to choose between a risky prospect with probability of good outcome $p_g \in \{0.25, 0.50, 0.75\}$ and a certain amount of money, with the certain payment increasing from zero (a test of comprehension, since all of the risky prospects had non-zero expected value) up to 1,000, in increments of 100. For each set of ten questions, one is then able to calculate the certainty equivalent of the particular risky prospect offered in that set. I follow the method of Dimmock et al. (2021) and calculate a non-parametric measure of probability weighting as the difference in risk premium observed between the set of questions with $p_g = 0.25$ and those with $p_g = 0.75$, where the risk premium is defined as the difference between the certainty equivalent and the expected value of the prospect (where the expected value is 250 for the prospect with $p_g = 0.25$ and 750 for the prospect with $p_g = 0.75$). A bigger difference indicates a more pronounced inverse-S shape for the probability weighting function.

Finally, to measure loss aversion, microenterprise owners were asked ten questions, based on the method used in Bartling, Fehr, and Herz (2014). In each question, they could accept or reject (walking away with zero) an equal-probability binary-outcome prospect that either paid 1,000 or incurred a loss of x, with x beginning at 0 and gradually increasing to a loss of 1,000, in increments of 100.[7] Before conducting all activities, participants were informed that at the end of the behavioural games session one of the incentivised activities would be selected for payment by physically drawing a ball from a bag, thereby requiring attentive responses to all questions, and allowing the use of relatively large amounts for payoffs (approximately three times median daily business profits for microenterprises in the sample).[8]

A natural question arises as to whether these risk measures that were elicited in the more artificial "lab-in-field" setting have predictive power for actual business decisions made

[6] All numerical quantities were displayed in Kenyan schillings or Pakistani rupees respectively, which happened to have a very similar exchange rate at the time of approximately one US dollar to 100 local currency.

[7] If a loss was incurred in the activity, then the amount would be taken from the participation fee of 1,000 that all microenterprise owners received for taking part in the broader survey and workshop for the field experiment i.e. it was a real loss.

[8] Charness, Gneezy, and Halladay (2016) show that paying for only a randomly selected subset of all activities is at least as effective as paying for all of them, and can actually be more effective by avoiding wealth effects and hedging within the behavioural games session.

by microenterprise owners. In the appendix, I present evidence from "outside of the lab", which demonstrates the predictive power of these risk measures in the actual decisions taken by microenterprise owners in the broader field experiments from which the sample is drawn. Specifically, in the Pakistani experiment, where the two financing contracts on offer featured either a fixed repayment schedule or a more flexible repayment schedule, I find that the pre-specified certainty-equivalent risk measure is highly predictive of outcomes. Using that measure, the most risk-averse individuals had significantly higher take-up of the flexible repayment contract compared to the fixed repayment contract, they are more likely to use the flexible repayment option when faced with business shocks, and eventually they benefit more from the flexible contract in terms of business and household outcomes (compared to similarly risk-averse individuals who were only offered the fixed repayment contract). In the Kenyan experiment, where a number of different contracts were offered, including a fixed-repayment debt contract and an equity-like contracts involving a 10% share of gross profits (which in that case were observable due to the availability of administrative data on stock purchases), the risk preference measures also have strong predictive power. Specifically, individuals with above-median values of the risk aversion measure had a significantly greater take-up of the equity contract compared to the debt contract. Similarly, individuals with an above-median value of the loss aversion measure also had relatively greater take-up of equity contracts compared to debt. Finally, we see the opposite effect for individuals with non-linear probability weighting: they have relatively *lower* selection into equity contracts compared to their selection into debt contracts. In summary, the three risk preference measured used in this paper do have predictive power outside of the field using actual take-up data from the broader field experiments, with patterns of take-up that are consistent with the results that I describe in the following sections.

3.2 Microequity investment game

Following the risk preference elicitation activities, microenterprise owners were carefully introduced to the microequity investment game. The game was designed to mirror key aspects of real-world microenterprise investment behaviour, with the aim of understanding the impact of different financing contract structures on investment choice, and the role of risk preferences. The game was calibrated using pilot data and simulations from a simple model, described in the appendix. The microequity game was explained to participants using business-related vignettes, after which they were asked a number of questions to test understanding. The basic structure of the game involved each participant being given 200 units of local currency as initial capital.[9] There were two decision rounds, and in each round

[9] I used real currency throughout, to maximise comprehension and avoid the artificial feel of tokens.

participants had a choice of five binary-outcome investment options. The 'bad' outcome for each of the investment options was a payoff of $x_b = 0$, and there were five possible 'good' outcomes $x_g \in \{100, 400, 700, 1000, 1300\}$. Each of the five outcomes had an associated cost: $c \in \{0, 100, 200, 300, 400\}$. The five investment options, illustrated in Table 1, therefore monotonically increased in expected return (and risk). In each decision round, the participant was required to choose one of the investment options, conditional on it being affordable. Affordability for the first-round decision was determined by an initial amount of capital that was provided in the activity (the use of outside funds were not permitted). The second-round choice was a function of the first-round capital as well as the return from the realisation of the investment option chosen in the first round (that is, first-round proceeds were carried forward to second-round decisions, after which the game ended). Further details of the protocol, script and explanatory diagrams and instruments are provided in the appendix.

Figure 1: INVESTMENT OPTIONS

Investment Option	Cost	Bad Payoff	Good Payoff	Expected Payoff	Net Expected Return
1	0	0	100	50	50
2	100	0	400	200	100
3	200	0	700	350	150
4	300	0	1000	500	200
5	400	0	1300	650	250

The experiment comprised of three types of treatment, with each microenterprise owner receiving each of the treatments (i.e. a within-subject experiment), with the order of treatments randomised:[10]

1. **Control Treatment (CT):** The participant was provided with an initial capital endowment of 200, thereby limiting the choice of investment in the first round to the first three options (as investment options 4 and 5 cost above 200, though they may be affordable to the participant in the second round, conditional on round 1 outcomes).

2. **Debt Treatment (CT):** In additional to the initial capital endowment of 200, participants received 500 as a zero-interest loan, to be repaid at the end of the two-round game. This mimics 'external debt capital' that the participant can use to finance higher risk-reward investment options if they wish (specifically, it opens up the possibility of choosing investment options 4 and 5).

[10] It is important to note that, when communicating with participants, the word 'treatment' was never used, nor were the words 'debt' or 'equity'; instead the more neutral words 'loan contract' and 'sharing contract' were used (in the local language). The purpose of the experiment was to study the effect of the contractual structure on investment behaviour, rather than any effect driven by using those possibly emotive terms.

3. **Equity Treatment (ET):** Like DT, the participant receives an initial endowment of 200 and external financing of 500, which in this treatment is in the form of equity-like performance-contingent financing. Specifically, the participant was required to share whatever wealth remained at the end of the second round, net of all gains and losses arising from the realisation of the investment choices. This treatment was also implemented twice, once with a sharing ratio of 25%, and once with a sharing ratio of 50%.

The following equation nests the different treatments and summarises the net payoff to microenterprise owners at the end of the investment game:

$$Y_T = W_T(1 - \alpha.ET) - DT.k, \tag{1}$$

where Y_T is the final payoff, W_T is final wealth after realisation of round 1 and round 2 investment outcomes, k is the amount of external financing provided in DT and ET, and $\alpha \in \{0.5, 0.25\}$ controls the sharing ratio for ET.

The game was designed using simulations from a simple theoretical model with an expected utility maximiser choosing investment options over multiple rounds to maximise terminal profits, variations of which were then tested in the field. To summarise the model predictions, agents are more likely to choose investment options with the highest expected return under the equity contract, compared to the debt contract, and the effect is greater for agents that are more risk-averse (which, in the expected utility framework, is fully captured by the curvature of the utility function; in analysis later in the paper I expand this framework to allow for a broader conception of risk preference that includes loss aversion and probability weighting). The appendix provides further details of the model and simulations, including a number of robustness checks to demonstrate that the main predictions are not highly sensitive to a particular choice of initial capital level W_0, the amount of external capital k, or the number of rounds in the game T. The final parameters were chosen after piloting with the aim of a simple design that would allow an understanding of the implication of differences in contractual structure on investment behaviour, including the role of risk preferences.[11]

[11] As mentioned, piloting revealed that a two-round activity would capture the main conceptual elements, while mitigating the risk of overburdening the participants given the length of the workshop. Further, I used a strategy method to elicit second-round investment decisions, rather than taking first-round decisions and drawing balls from a bag to realise the outcomes. This mitigated the risk of participants making second-round decisions because they felt that a particular investment option had good or bad luck based on the first-round realisation. The strategy method also permitted the elicitation of two data points: the second-round decision conditional on a: (i) bad outcome of their first-round choice; (ii) a good first-round outcome.

4 Results

In this section, I present results from the artefactual field experiments in Pakistan and in Kenya. The main empirical specifications, outcome variable and variables for heterogeneity analysis were pre-specified.[12] The sample consists of just over 3,000 observations, representing one decision per respondent for each of the four treatment arms, with the order of financing treatments randomised within subjects.

Result 1: Equity leads to more profitable investment choices

Table 1 presents results from the following specification, estimated by OLS:

$$y_i = \beta_0 + \beta_1 DT_i + \beta_2 ET_i + \varepsilon_i, \quad (2)$$

where y_i is the expected return of the investment option chosen by individual i, DT_i is a dummy for assignment to debt financing and ET_i is a dummy indicating assignment to equity financing (initially pooling the contracts with 25% and 50% sharing ratios, and then splitting them). Standard errors are clustered at the individual level. β_0 represents the average expected return of investments chosen by individuals in the control group, whilst β_1 and β_2 represent the additional risk taken by debt-financed and equity-financed individuals relative to the control group, respectively.

Table 1 reports results. In each column, the dependent variable is the expected profit of the chosen investment option in that particular round. Column 1 displays results for just the Pakistani sample, with 2,392 observations, revealing that equity-financed entrepreneurs chose investment options in the first round of the game that were 0.35 standard deviations higher in expected return than the investments chosen by debt-financed entrepreneurs (with a $p-$value from a cross-coefficient test of less than 0.005). Column 2 repeats the exercise for the Kenyan sample, with 668 observations, and very similar results: an effect size of 0.37 standard deviations ($p < 0.0005$ for the difference between equity and debt). Column 3 pools the two samples, and unsurprisingly reveals a statistically significant and economically meaningful difference between investment choice under equity and debt, with a pooled effect size of 0.35 standard deviations (or a 6.2% increase in absolute expected return, again with $p < 0.0005$ for the difference).

[12] See https://www.socialscienceregistry.org/trials/2224. The pre-analysis plan refers to the Pakistan experiment; the Kenyan experiment was a later replication built into the wider field experiment, which was again pre-specified (see https://www.socialscienceregistry.org/trials/4789).

Column 4 investigates choices in the second round of the investment game, conditional on a loss in the first round, and finds that equity-financed entrepreneurs chose investment that were 0.49 standard deviations higher in expected return ($p < 0.0005$). Column 5 illustrates second-round decisions conditional on a *good* outcome in the first round, with a smaller but still significantly different effect size of 0.15 standard deviations ($p < 0.0005$). In columns 6 to 8, I test whether there is a differential impact between the 25% sharing contract or the 50% sharing contract — the magnitudes are almost identical and I cannot reject the null that there is no difference in effects ($p = 0.640$, $p = 0.650$, and $p = 0.178$ respectively across the three columns). In the next section, I proceed with the pooled equity indicator, and first-round investment decisions.

Result 2: Equity is most impactful for risk-averse and loss-averse entrepreneurs, and least impactful for those with non-linear probability weighting

Risk-averse microenterprise owners may particularly benefit from the insurance-like features of microequity, which provides greater risk sharing than fixed-repayment debt contracts. There may also be a distinct benefit for individuals with reference-dependent preferences, with loss-averse entrepreneurs valuing the downside protection of equity contracts: lower payments after a negative shock and the reduced risk of ending up below their utility reference point, compared to a fixed-repayment debt contract. In return for that downside protection, they may be willing to share in the upside, so equity contracts may be ideally designed for individuals who are more sensitive to losses than gains. In the investment game, a natural reference point is the participation fee that was promised to all participants at the end of the workshop, which is a standard assumption in much of the literature. Table 2 presents results from estimation of the following specification:

$$y_i = \beta_0 + \beta_1 DT_i + \beta_2 ET_i + \beta_3 HighX_i + \beta_4 DT_i * HighX_i + \beta_5 ET_i * HighX_i + \varepsilon_i, \qquad (3)$$

where $HighX_i$ is a dummy for individuals with an above-median value of the heterogeneity variable X_i. A test of $H_0 : \beta_4 = \beta_5$ indicates whether individuals with higher values of X_i are differentially affected by the equity and debt treatments. The heterogeneity variables tested are non-parametric indices that capture the three distinct dimensions of risk preferences that have been identified in the literature: (i) risk aversion (which is synonymous with utility curvature in expected utility models), (ii) loss aversion, and (iii) non-linear probability weighting. For (i), I aggregate the responses from the two sets of risk preference elicitation exercises (the domain-specific self-reported measures and the decisions in the certainty equivalent task). For (ii), I aggregate the number of decisions for which each microenterprise owner rejected a prospect that contained an outcome in the loss domain. For (iii), I follow the methodology of Dimmock et al. (2021) and use the difference in risk premiums inferred from certainty equivalent elicitation questions where the probability of the good outcome p_g was equal to 0.25 compared to $p_g = 0.75$. I then apply a median split to all indices, so that individuals with above-median values of X_i have: (i) higher risk aversion; (ii) higher loss aversion; (iii) more non-linear probability weighting, respectively.

Column 1 of Table 2 shows that, in the control group, more risk-averse individuals choose investment options with a lower expected profit than more risk-tolerant individuals, as one would expect (a coefficient on *Risk averse* of -10.74, compared to the constant of 113.48). The coefficient on $Debt * Risk\,averse$ of +1.10 does not indicate a significant differential impact of the debt contract on the investment of risk-averse individuals compared to risk-tolerant individuals, while the coefficient of +10.05 on $Equity * Risk\,averse$ indicates that the most risk-averse entrepreneurs were significantly more likely to choose higher expected profit investments than the most risk-tolerant individuals under equity financing. This is confirmed using a cross-coefficient test of equality between $Debt * Risk\,averse$ and $Equity * Risk\,averse$ (p = 0.015).

Column 2 explores a similar question, using loss aversion. The coefficient of -6.87 on *Loss averse* indicates that more loss-averse microenterprise owners chose investment options with a lower expected return than less loss-averse individuals in the control group. Like in the case of risk aversion, The coefficient on $Debt * Loss\,averse$ of -1.25 does not indicate a significant differential impact of the debt contract on the investment of loss-averse individuals, while the coefficient of +8.36 on $Equity * Loss\,averse$ indicates that the most loss-averse entrepreneurs were significantly more likely to choose higher expected return investments under equity financing. This is confirmed using a cross-coefficient test of equality between $Debt * Loss\,averse$ and $Equity * Loss\,averse$ ($p-$value = 0.013). As a robustness check, column 3 controls for both risk aversion and loss aversion at the same time, with similar patterns of greater differential impact on profitable investment for the most risk-averse and the most loss-averse entrepreneurs only under the equity contract, though the statistical significance of the tests is a little weaker in the pooled model (now significant at the 10% level).

Finally, column 4 explores the impact of probability weighting, with results in the opposite direction to those for risk aversion and loss aversion. Specifically, individuals with greater probability weighting (an overweighting of small probabilities) are *less* likely to make profitable investments under equity. The coefficient on $Debt * Probability\,weighting$ is +7.38 and on $Equity * Probability\,weigthing$ it is -3.70, with a $p-$value of 0.003 for the cross-coefficient test.

Table 3 explores selection into contracts. At the end of the investment games, after each participant had made their choices under debt and equity (and before the outcomes had been realised using a physical randomisation device), they were asked about their preferred contract. Their choice increased the probability of that contract being selected for payment in the final randomisation for payment at the end of the workshop, and so it provides a direct and incentivised measure of preference over debt and equity contracts. It also complement the results in the appendix that reveal the strong predictive power of the risk measures for take-up of the microfinance contracts "outside of the lab". I estimate a simple linear probability model, where the dependent variable in all columns is a dummy for whether the microenterprise owner chose to take an equity contract over debt for the final contract choice. Column 1 shows that risk-averse entrepreneurs are 9.5 percentage points more likely to choose an equity contract ($p-$value = 0.010), compared to more risk-tolerant individuals (of whom 40.4% chose to take equity contracts). Column 2 shows that loss-averse entrepreneurs are 10.8 percentage points more likely to choose equity ($p-$value = 0.004), compared to less loss-averse individuals (of whom 39.3% chose equity).

Column 3 reveals that individuals with greater probability weighting have less preference for equity contracts. The negative coefficient is particularly large, at -18.3 percentage points ($p-$value < 0.0005), compared to an equity take-up rate of 54.4% for individuals with closer-to-linear probability weighting. In column 4, I control for all three dimensions of risk preferences in the same specification. The results are consistent in magnitude and significance with the three previous columns, revealing a greater preference for equity contracts for the most risk-averse and most loss-averse microenterprise owners (coefficients of +7.8 and +9.5 percentage points respectively, with p-values of 0.040 and 0.013 respectively), and much lower preference among those with non-linear probability weighting (a coefficient of -19.4 percentage points, $p-$value < 0.0005). Results are therefore consistent with the previous findings in Table 2 on investment choice conditional on assignment to contract, and also consistent with the results for take-up of the actual microfinance contract in the broader field experiments: equity contracts are preferred by the most risk-averse and the most loss-averse entrepreneurs, whereas for those with non-linear probability weighting debt is preferred.

5 Structural estimation of risk preference parameters, counterfactual contract analysis and welfare

The reduced form results in the previous section align with a simple intuitive prediction: that equity contracts incentivise more profitable investment and can be particularly beneficial for the most risk-averse entrepreneurs. However, a more complex relationship emerges when allowing for an expended view of risk preferences: loss aversion reveals an additional value to equity contracts, whereas non-linear probability weighting suggests a preference for debt contracts. This merits further exploration of the welfare implications of introducing microequity contracts contracts. I proceed by formally estimating a prospect-theoretic model following the methodology of Harrison and Rutström (2009) and Harrison et al. (2010), allowing for three distinct parameters that together capture risk preferences: (i) utility function curvature, (ii) loss aversion, and (iii) probability weighting. Recalling the experimental implementation, participants were asked a series of questions that elicited different aspects of risk preferences. Each decision can be modelled as a binary choice between two "prospects".[13] Each prospect has an associated utility, and one can define an index based on latent preferences of microenterprise owners to model the difference in utility between the two prospects under consideration, $PU = PU_1 - PU_2$. The utility of prospect i is the probability-weighted utility of each of the prospect's outcomes:

$$PU_i = \sum_{k=1}^{n} w(p_k) \cdot U(x_k), \tag{4}$$

where x are the monetary outcomes, of which there are n possible outcomes for each prospect, and $w(p)$ is a transformation of the experimentally induced probabilities p, using the commomly-used probably weighting function based on Tversky and Kahneman (1992):

$$w(p) = \frac{p^\gamma}{(p^\gamma + (1-p)^\gamma)^{1/\gamma}}, \tag{5}$$

where γ controls the shape of the (potentially non-linear) probability weighting function, which is assumed to be separable in outcomes. The utility function takes a simple power

[13] These are often referred to as "lotteries" in the literature, with many being degenerate when a fixed amount of money is offered; henceforth I adopt the more general term prospect, as used in the behavioural literature (Tversky and Kahneman, 1992; Wakker, Thaler, and Tversky, 1997).

utility form, defined separately over gains and losses:

$$U(x) = \begin{cases} x^{\alpha} & \text{if } x \geq 0 \\ -\lambda(-x^{\alpha}) & \text{if } x < 0, \end{cases} \tag{6}$$

where α controls the curvature of the utility function and λ allows for the possibility of reference-dependent preferences.

I calculate the utility of each prospect under consideration in the 44 decisions made by each microenterprise owner, based on candidate values of the parameters α, λ, and γ, and then linking the latent index $\nabla PU = PU_1 - PU_2$ to the observed choices in the experiment using a standard cumulative distribution function $\Phi(\nabla PU)$. α, λ, and γ are estimated using maximum likelihood, also allowing the parameters to be functions of observable characteristics, for which I have data from the field experiments. Intuitively, identification of the loss aversion parameter λ comes from the set of questions that offered participants a choice that included prospects where one of the outcomes was in the loss domain, and identification of the probability weighting parameter γ comes from variation of the probability of the good outcome $p_g \in \{0.25, 0.50, 0.75\}$ in the certainty equivalent exercises.

Figure 2 illustrates the results. I estimate a utility curvature parameter with a bell-shaped curve around a mean of $\alpha = 0.74$ and a loss aversion parameter with a mean of $\lambda = 2.04$, which is remarkably close to the "classic" range of λ = 2 – 2.25 that is estimated in much of the literature (DellaVigna, 2018; Kremer et al., 2019). For probability weighting, I estimate a bimodal distribution, with a mass at almost-linear probability weighting (γ close to 1), and a mass with a non-linear probability weighting parameter of between $\gamma = 0.5$ and $\gamma = 0.8$, which is also consistent with estimates in the literature from high-income countries (Dimmock et al., 2021). The fourth panel of the graph illustrates the implications of the mean value of $\gamma = 0.73$: overweighting of small probabilities and underweighting of large probabilities. Overweighting of small probabilities has particularly significant implications for the choice between debt and equity contracts when faced with a positively skewed profits distribution, as such entrepreneurs overestimate the small probability of very high business profits (a scenario in which they would have to share a large amount of money with the capital provider under an equity contract). Further, they underestimate the (objectively much larger) probability of low business profits, where equity contracts can be very beneficial in terms of loss-sharing (and where debt contracts can lead to inability to meet fixed repayments and potential default).

I then use the estimated risk parameters to explore the welfare implications of different contractual designs, using the previous results on investment behaviour under equity and the estimated risk preference parameters. One way to define welfare is for a social planner who cares about all aspects of microfinance borrower risk preferences, and who seeks to maximise the sum of borrower welfare and MFI profits. One can then investigate the change in total welfare from the introduction of microequity contracts, compared to a situation in which only debt contracts are offered. To begin, the prospective utility for an equity-financed individual i who faces n possible states of the world s is defined as:

$$PU_i^{equity} = \sum_{k=1}^{n} w(p_k) \cdot U\left[(1-\tau) \cdot x_s\right]), \tag{7}$$

where τ is the proportion of final wealth that is shared with the MFI, using the same utility and probability weighting functions in equations 6 and 5 respectively. To calculate client welfare under equity contracts, I solve for a measure of compensating variation (Hicks, 1939), defined as the monetary amount T that would need to be paid to a debt-financed individual to make their utility equal to that under the equity contract:

$$PU_i^{equity} = PU_i^{debt} = \sum_{k=1}^{n} w(p_k) \cdot U(x_s - d + T), \tag{8}$$

where d represents the non-state-contingent fixed payment required under the debt contract. I assume that all individuals face an identical stochastic distribution of business profits,[14] which I take as the baseline distribution of actual business profits from the data in the field experiment (after subtracting an estimate of monthly wage payment to the owner-manager, and annualising the net monthly business profits). For simplicity, I then discretise the distribution into five possible states of the world, and assume a 50% return on the large capital injection, which is a plausible estimate given the returns to capital shown in the microenterprise capital grant literature (De Mel et al., 2008; Fafchamps et al., 2014). Further details of the underlying distribution of profits is provided in the appendix. A key point to note is that, for individuals with non-linear probability weighting, the two most likely states of the world (which have the lowest payoffs) are significantly under-weighted (for example, by 10.6 percentage points for individuals with the mean probability weighting parameter of $\gamma = 0.73$), while the highest-payoff states are *over*-weighted (by 4.4 and 1.0 percentage points respectively, despite the objective probabilities being very low). Therefore, individuals with

[14] I therefore do not allow for any permanent heterogeneity in microenterprise profitability. It is not unreasonable to assume that if an MFI were to undertake such a simulation exercise, they would not be able to observe individual microenterprise profitability, but they may have a reasonable view about the distribution of profits in their population of potential clients, and may even take as given the distribution of elicited risk preference parameters, which as mentioned are in line with previous literature.

non-linear probability weighting would not find desirable an equity contract that provides risk-sharing in low-profit states of the world in return for upside sharing in high-profit states.

I solve for individual-specific valuations of equity contracts (T) for different possible sharing ratios, using the individually-estimated preference parameters α, λ, and γ and three different models: expected utility (EU) and prospect utility with and without probability weighting (PU1 and PU2, respectively). The financing amount is \$1,500, the required repayment rate on debt contracts is 30%, and the debt is unlimited liability, meaning that borrowers must pay from savings if their business profits are low (I incorporate data on actual savings for each individual). I calculate three welfare measures: (i) the value to each microenterprise owner of the equity contract, averaged over the total sample; (ii) MFI profits per client, assuming clients optimally choosing the contract that maximises their utility (iii) total surplus (the sum of (i) and (ii)).

Results are illustrated in Figure 3, where the sharing ratio is on the horizontal axis and surplus is on the vertical axis (in US\$ equivalent). In all three models, beginning at low sharing ratios (10%), all borrowers have very high utility from the equity contract (since it provides the same capital amount as debt and requires only a very small amount of profits shared in expectation), but the MFI makes a big loss on average. As the sharing ratio approaches 55% in panel 1 (the EU model), the MFI begins to make a profit, and there is still some value to equity for clients up until a sharing ratio of around 70% (which is the point at which the total surplus is maximised). Comparing panel 2 to panel 1, total surplus increases when allowing for reference-dependent preferences, which reflects the fact that loss-averse clients value the downside protection in equity. The region of feasibility — the range of sharing ratios where the MFI is making profits and clients are getting value from equity — is also larger in panel 2. However, the pattern reverses in panel 3, where total surplus decreases, consistent with the earlier reduced-form finding that individuals with non-linear probability weighting actually prefer debt.

Finally, I introduce a 'hybrid' contract that contains both debt- and equity-like features. The contract works by providing the same performance-contingent payment structure as the equity contract, with the difference being that the upside is capped: once payments under the hybrid contract reach a maximum amount, the contract terminates. As such, individuals with non-linear probability weighting, who overestimate the low probability of high-profit scenarios, benefit from such a contract. In the illustrated simulation, the hybrid cap is set such that the client can never pay more than double the financing amount (that is, total payments are capped at \$3,000). The first panel of Figure 4 displays the higher take-up rate for the hybrid contract compared to the equity contract; for sharing ratios greater than 60%, take-up of the equity contract begins to drop sharply relative to the hybrid. The lower panel displays results for surplus. While the total surplus decreases, the feasibility range of the contract has increases compared to the third panel of Figure 3, and total surplus is more evenly distributed between clients and the MFI (with the MFI earning lower but still positive profits).

6 Conclusions

An unresolved puzzle in the finance and development literature is how to jointly interpret the high returns documented in microenteprise capital grant studies and the modest returns documented in microcredit studies. This has inspired a new wave of research that adapts the classic microcredit contract to better match loan repayments to client cashflows. In this paper, I explore a more direct method of linking payments to client income: microequity contracts with performance-contingent payments. I use artefactual field experiments with microenterprise owners who were part of field experiments in Kenya and Pakistan that had provided their businesses with large capital injections. I find that microequity leads to more profitable investment choices, particularly for the most risk-averse individuals. Loss-averse individuals particularly value equity contracts, which provide downside protection in return for upside profit sharing. However, individuals who exhibit non-linear probability weighting prefer debt contracts, especially in the presence of a skewed profits distribution. I structurally estimate these three distinct dimensions of risk preferences using a prospect-theoretic model to show that relatively simple tweaks to contract design can improve the feasibility of microequity contracts. Microfinance institutions (MFIs), by expanding the suite of products offered to include equity-like contracts, can significantly improve client welfare. An equity-based product, though not restricted to any one particular religion or group, does also have the potential to reach hundreds of millions of poor Muslim business owners who reject interest-based loans on religious grounds (IMF, 2015; World Bank, 2017; El-Gamal, El-Komi, Karlan, and Osman, 2014; Nimrah, Michael, and Xavier, 2008).

There are several supply-side reasons why MFIs do not currently include equity-like contracts in their suite of offered products (which often does include microinsurance and savings products). First, the challenge in observing profits for informal microenterprises ("costly state verification") suggests that non-state-contingent debt contracts may be optimal (Townsend, 1979). Second, the skillset of traditional microfinance loan officers may be quite different to the venture-capital-like skills required to identify high-potential firms for equity financing. Microcredit loan officer pay is typically linked to their portfolio's default rate, so there is little incentive for loan officers to identify microenterprises with higher-risk, higher-reward investment opportunities, or to lose their most promising existing clients by allowing them to graduate to a more sophisticated form of financing (Rigol and Roth, 2021). Finally, there are many legal challenges to enforcement of ownership claims if the MFI or its investors were to take an equity stake in small firms in low-income countries, and the exit options for investors in underdeveloped financial markets are unclear (De Mel et al., 2019). In demonstrating the role of non-standard preferences, and specifically non-linear probability weighting, I propose a novel demand-side explanation for why we do not observe microequity contracts being implemented in practice, despite the positive investment effects. I also propose a relatively simple solution to this problem: a hybrid contract that contains both debt- and equity-like features can mitigate this problem by capping the upside for the capital provider in the high-profit state of the world, which is subjectively overweighted by clients with non-linear probability weighting, but not so by a more sophisticated financial institution.

Notwithstanding the traditional challenges, there have been significant recent developments in financial technology and mobile money (Suri, 2017; Higgins, 2019). This has greatly facilitated digital transactions and improved observability of income streams in an increasing number of contexts (for example, online marketplaces, or businesses that accept digital payments through point of sales systems, which have greatly increased in prevalence since Covid-19). Such developments can improve both the screening of higher-potential clients (mitigating adverse selection) and the monitoring of client transactions and performance (mitigating moral hazard concerns). This opens up many possibilities for designing equity-like microfinance contracts that involve shared ownership of an income stream, rather than shared ownership of the actual business, thereby mitigating legal enforcement issues, and utilising digital payment methods for capital disbursal and repayment.

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Tables and figures

Table 1: EFFECT OF CONTRACTS ON INVESTMENT CHOICE

	(1) Round 1: Pakistan	(2) Round 1: Kenya	(3) Round 1: Pooled	(4) Round 2: Pooled	(5) Round 3: Pooled	(6) Round 1: Pooled	(7) Round 2: Pooled	(8) Round 3: Pooled
Debt	66.89	52.69	63.79	64.18	22.22	63.79	64.18	22.22
	(2.55)	(4.66)	(2.24)	(2.03)	(2.20)	(2.24)	(2.03)	(2.20)
Equity	76.71	66.92	74.58	76.96	30.82			
	(2.17)	(3.93)	(1.90)	(1.77)	(1.91)			
Equity (25% sharing)						74.18	76.60	31.90
						(2.10)	(2.01)	(2.09)
Equity (50% sharing)						74.97	77.32	29.74
						(2.06)	(1.86)	(2.06)
Control	109.36	101.20	111.21	78.79	178.12	107.58	77.97	176.47
	(1.15)	(2.98)	(1.24)	(1.15)	(2.18)	(1.12)	(0.94)	(2.03)
Observations	2,392	668	3,060	3,060	3,060	3,060	3,060	3,060
R-squared	0.28	0.18	0.27	0.34	0.05	0.25	0.34	0.04
Country control			✓	✓	✓	✓	✓	✓
Test: Equity = Debt	0.000	0.001	0.000	0.000	0.000			
Effect size (%)	5.6	9.2	6.2	8.9	4.3			
Effect size (standard deviations)	0.35	0.37	0.35	0.49	0.15			
Test: Equity (25%) = Equity (50%)						0.640	0.650	0.178

Note: In each column, the dependent variable is the expected profit of the chosen investment option in that particular round. The 3,060 observations reflect the within-design setup of the experiment, whereby each of the 765 unique microenterprise owners were assigned — in a randomly perturbed order — to each of the four treatment groups: *Control*, *Debt*, *Equity (25% sharing)* and *Equity (50% sharing)*. *Debt* and *Equity* are dummy variables for the debt and equity contracts respectively, with the reported coefficient representing the average expected profit of the investment option chosen under that particular contract relative to the average expected profit of the investment option chosen by the control group, represented by the dummy *Control* (which is the constant in the regression). In columns 3 to 8, the Pakistan and Kenya samples are pooled, and a Kenya country dummy is included. In columns 1 to 5, *Equity* pools both the 25% sharing ratio contract and the 50% sharing ratio contract, whereas columns 6 to 8 estimate impacts of each equity contract separately. Standard errors are clustered at the individual level and are reported in parentheses below each coefficient estimate. In the panel below the table, the fourth row presents p-values for the null hypothesis that the effect of being assigned to the equity contract is equal to the effect of being assigned to the debt contract. The fifth and sixth rows quantify the estimated treatment effect (of equity compared to debt) as a percentage of the control group mean and in standard deviations of the control group mean, respectively. The seventh row presents p-values from test of the null hypothesis that the effect of being assigned to the equity contract with 25% sharing ratio is equal to the effect of being assigned to the equity contract with 50% sharing ratio.

Table 2: HETEROGENEITY BY RISK PREFERENCES: INVESTMENT CHOICE

	(1)	(2)	(3)	(4)
Risk averse	-10.74***		-9.52***	
	(2.20)		(2.30)	
Loss averse		-6.87***	-3.69	
		(2.23)	(2.31)	
Probability weighting				-2.31
				(2.25)
Debt * Risk averse	1.10		1.70	
	(4.51)		(4.72)	
Debt * Loss averse		-1.25	-1.82	
		(4.57)	(4.78)	
Debt * Probability weighting				7.38
				(4.50)
Equity * Risk averse	10.05***		8.36**	
	(3.83)		(4.00)	
Equity * Loss averse		7.90**	5.11	
		(3.89)	(4.05)	
Equity * Probability weighting				-3.70
				(3.85)
Debt	63.19***	64.50***	63.89***	60.43***
	(3.33)	(3.52)	(3.92)	(3.04)
Equity	69.06***	70.09***	67.09***	76.26***
	(2.90)	(3.06)	(3.41)	(2.48)
Control	113.48***	111.48***	114.90***	108.63***
	(1.62)	(1.66)	(1.86)	(1.47)
Number of observations	3,060	3,060	3,060	3,060
Test (Risk aversion): Debt = Equity	0.015		0.091	
Test (Loss aversion): Debt = Equity		0.013	0.079	
Test (Probability weighting): Debt = Equity				0.003

Note: In all columns, the dependent variable is the expected profit of the investment option chosen by the microenterprise owner. The 3,060 observations are generated from the within-design experimental setup with 765 unique microenterprise owners. *Risk averse* and *Loss averse* are dummy variables for whether a microenterprise owner was measured to have above-median risk aversion or loss aversion respectively in the baseline preference elicitation exercises, and *Probability weighting* is a dummy for whether the individual has an above-median value of the non-parametric measure of non-linear probability weighting. *Equity * Risk averse* represents the expected profit of the investment option chosen by the most risk averse microenterprise owners over and above the expected profit of the investment option chosen by the most risk tolerant microenterprise owners (which is represented by the coefficient on *Equity*), with an analogous interpretation for the other interaction terms. In the panel below the table, the second, third and fourth rows present *p*-values from a test of the null hypothesis that *Equity * Risk averse = Debt * Risk averse*, *Equity * Loss averse = Debt * Loss averse*, and *Equity * Probability weighting = Debt * Probability weighting* respectively. *** p<0.001, ** p<0.05, * p<0.10.

Table 3: HETEROGENEITY BY RISK PREFERENCES: CONTRACT CHOICE

	(1)	(2)	(3)	(4)
Risk averse	0.095**			0.078**
	(0.037)			(0.038)
Loss averse		0.108***		0.095**
		(0.037)		(0.038)
Probability weighting			-0.183***	-0.194***
			(0.036)	(0.036)
Constant	0.404***	0.393***	0.544***	0.451***
	(0.027)	(0.028)	(0.026)	(0.035)
Observations	726	726	726	726

Note: In all columns, the dependent variable is a dummy for whether the microenterprise owner chose to take an equity contract over debt for the final contract choice that was implemented for real money (726 observations reflect one final unique choice from each microenterprise owner, pooling Pakistani and Kenyan data). *Risk averse* and *Loss averse* are dummy variables for whether a microenterprise owner was measured to have above-median risk aversion or loss aversion respectively in the baseline preference elicitation exercises, and *Probability weighting* is a dummy for whether the individual has an above-median value of the structurally estimated non-linear probability weighting parameter. *** p<0.001, ** p<0.05, * p<0.10.

Figure 2: STRUCTURALLY ESTIMATED RISK PREFERENCE PARAMETERS

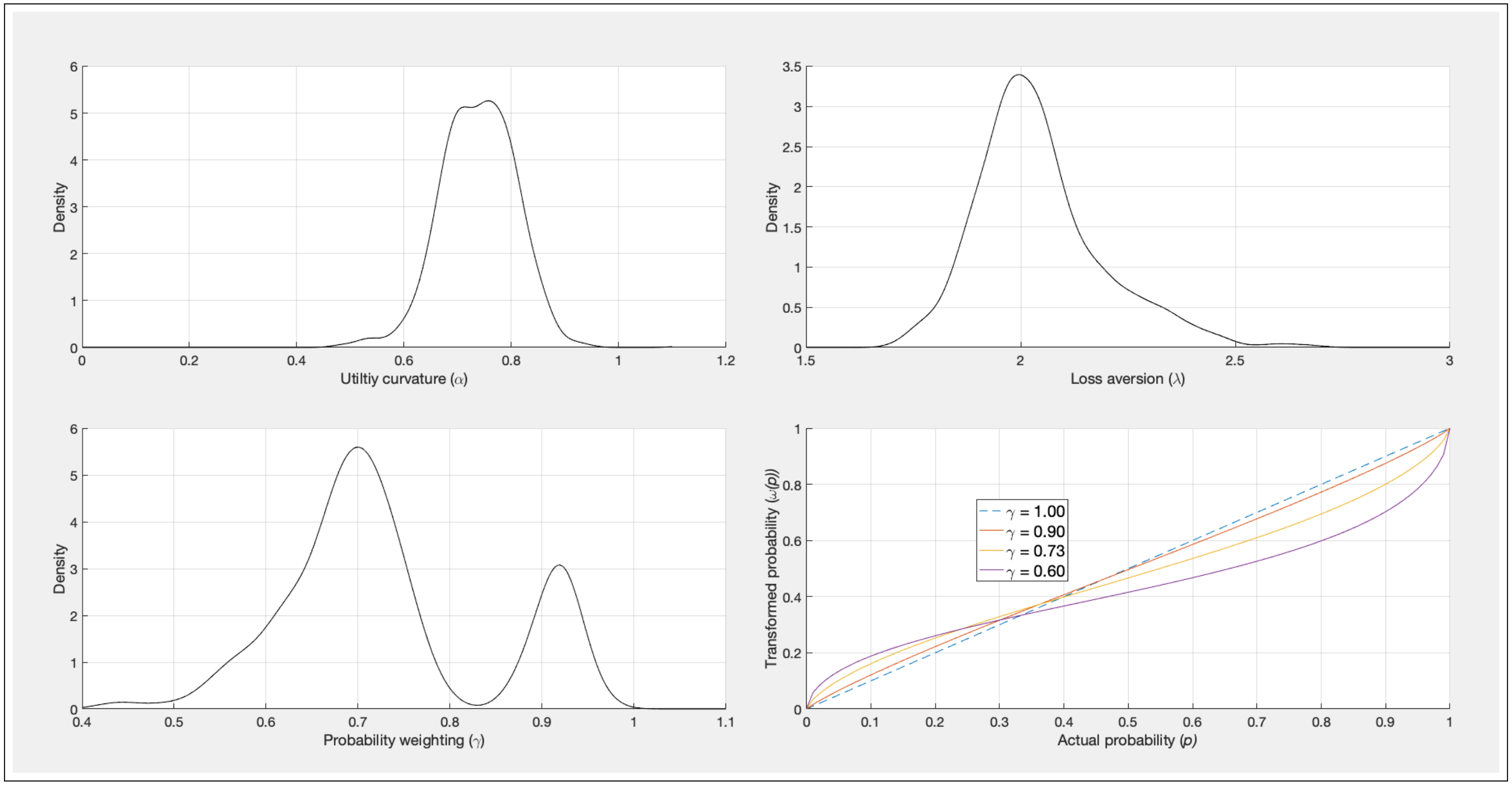

Figure 3: COUNTERFACTUAL CONTRACT SIMULATIONS AND WELFARE

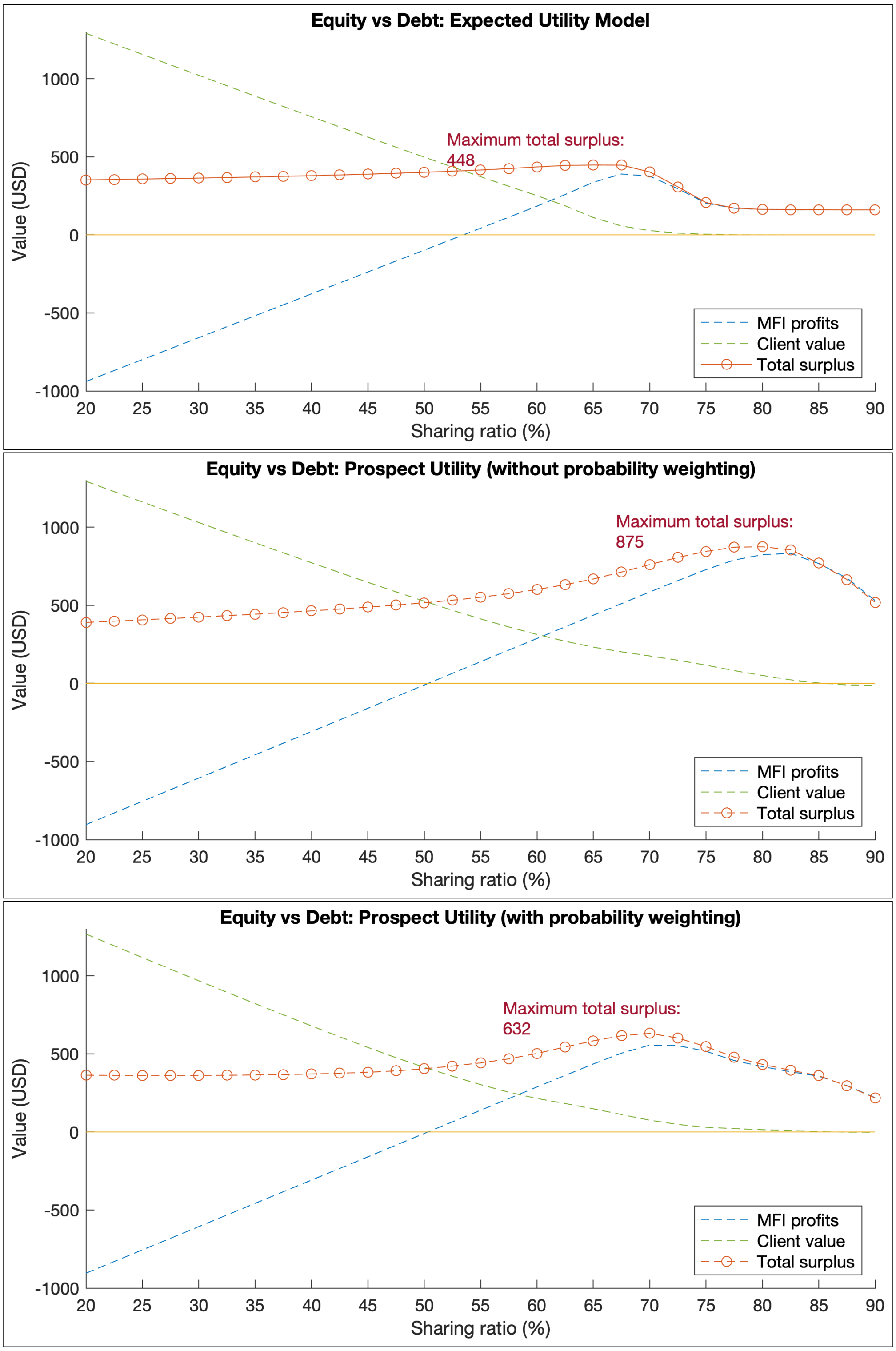

Figure 4: HYBRID CONTRACT: PERFORMANCE-CONTINGENT PAYMENTS WITH CAPPED UPSIDE