SMALL FIRM INVESTMENT UNDER UNCERTAINTY: THE ROLE OF EQUITY FINANCE

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Development Economics

MOTIVATION: THE MICROFINANCE PUZZLE

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1. **Macro-**level associations: financial access and growth (Beck et al., 2007).
2. **Micro-**level evidence: high returns to capital (McKenzie and Woodruff, 2008; De Mel et al., 2008, 2012; Fafchamps et al., 2014; Hussam et al., 2017).

HYPOTHESIS: CONTRACT STRUCTURE CONSTRAINS INVESTMENT

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Repayment **flexibility** can encourage higher-risk, higher-return investments (Field, Pande, Papp, & Rigol, 2013; Barboni & Agarwal, 2023; Battaglia et al., 2023).

EQUITY-LIKE CONTRACTUAL INNOVATIONS MAY BETTER STIMULATE INVESTMENT

I explore a different form of flexibility — equity-like contractual innovations through **performance-contingent** repayments — which were sub-optimal in many settings due to **costly state verification** (Townsend, 1979; Udry, 1990, 1994).

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Key challenges for the literature (Banerjee, Karlan, and Zinman, 2015):

1. **Contractual innovations** to improve take-up and effectiveness;
2. Evidence on **graduated borrowers**;
3. Understanding **non-credit microfinance**.

ARTEFACTUAL FIELD EXPERIMENTS

I conduct investment games with 765 growth-oriented small business owners, drawn from two broader field experiments. Summary statistics Investment games

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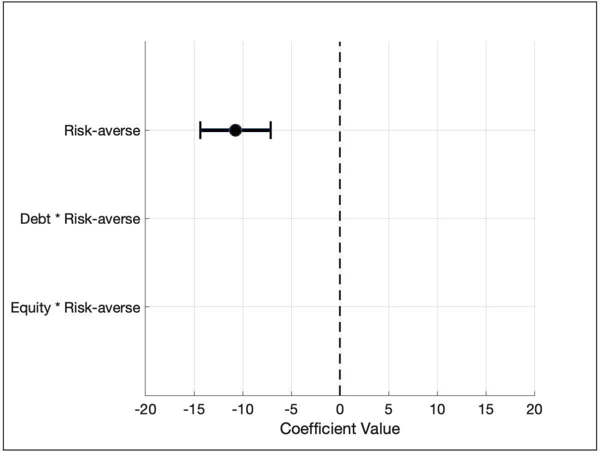
I first establish that equity-like contracts lead to **more profitable investment choices** than debt (Fischer, 2013). Overall effects

Using **risk preference** measures from approximately 30,000 incentivized choices, I demonstrate the important but **nuanced** role of 'risk aversion'. Preference elicitation

(1) EQUITY IS MORE IMPACTFUL FOR RISK-AVERSE FIRM OWNERS

$$Profit_i = \beta_0 + \beta_1 Debt_i + \beta_2 Equity_i + \beta_3 Risk\text{-}averse_i + \beta_4 Debt_i \cdot Risk\text{-}averse_i + \beta_5 Equity_i \cdot Risk\text{-}averse_i + \epsilon_i$$



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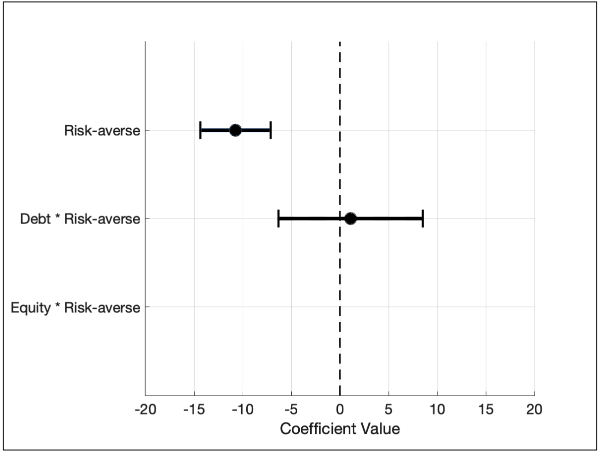

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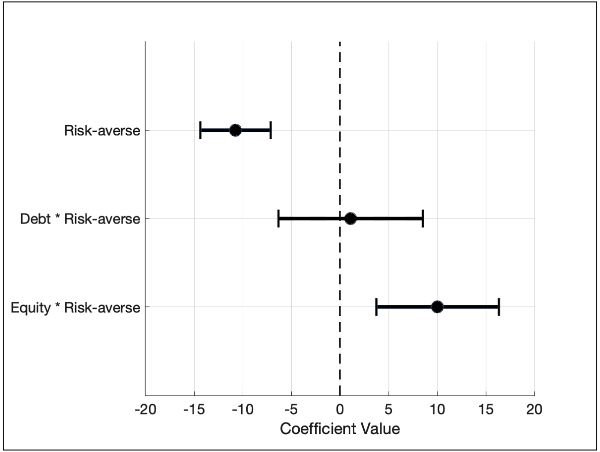

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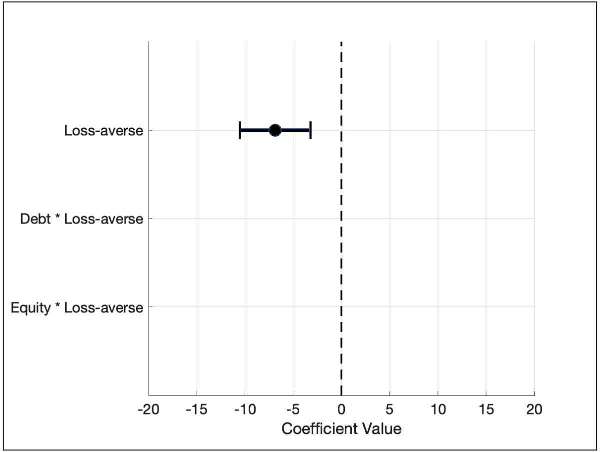

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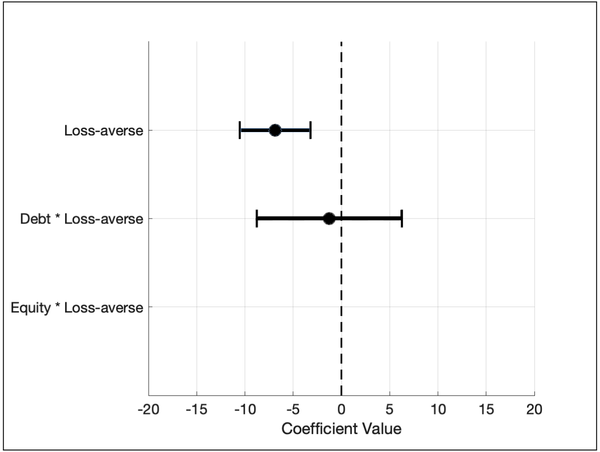

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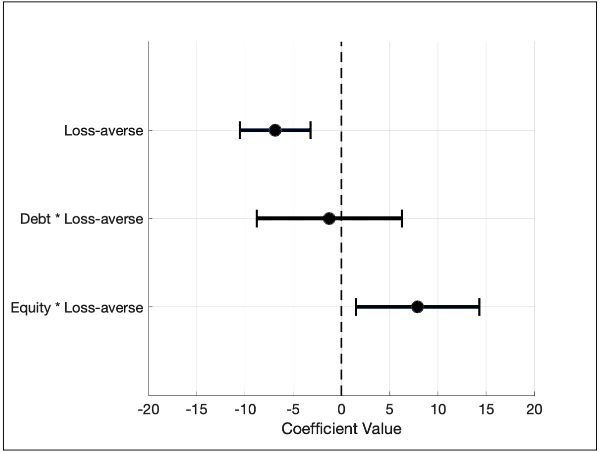

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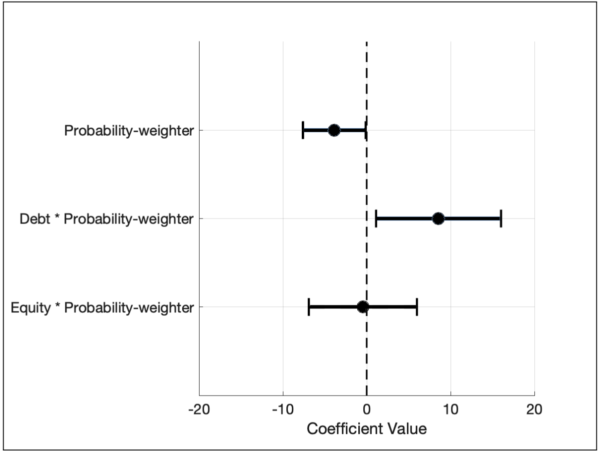

ROBUSTNESS CHECKS

- Multiple investment rounds. →
- Different equity sharing ratios. →
- Order effects. →
- Trichotomous measure for each of the three risk preference variables. →
- Three alternative methods for constructing the probability weighting index. →
- Heterogeneity is not driven by business owner education. →
- Results on probability weighting reflect actual distortions rather than potential over-optimism of business owners. →

MODELING DECISION-MAKING

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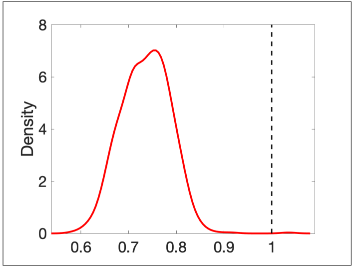
- I use the incentivized choices to structurally estimate risk preference parameters. Modeling decision-making
- Rather than presupposing the validity of prospect theory over expected utility, I initially estimate a mixture model. Further details: estimation

STRUCTURALLY ESTIMATED RISK PREFERENCE PARAMETERS

UTILITY CURVATURE (α)



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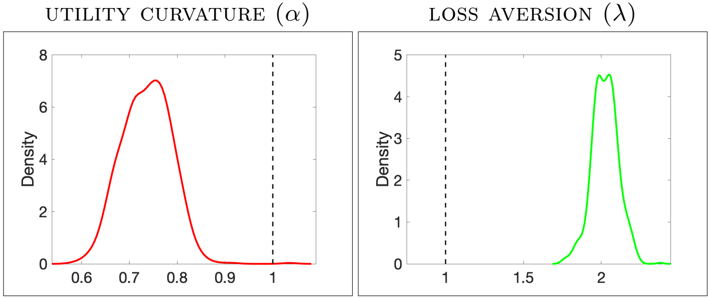

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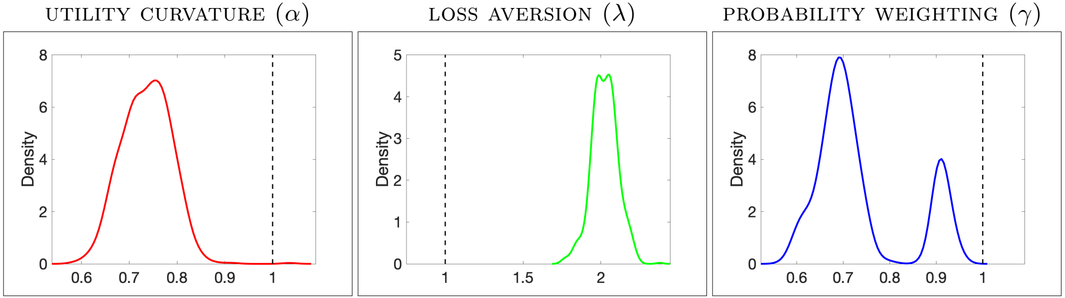

λ and γ consistent with literature (DellaVigna, 2018; Kremer et al., 2019; Dimmock et al., 2021).

Structural noise parameter Joint distribution Implications of γ

MODEL TAKE-UP UNDER ALTERNATIVE DECISION-MAKING ENVIRONMENTS

I explore **selection** using the estimated parameters and simulations from a distribution fitted on 'real-world' profits. Further details

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Firm owners characterised by an inverse-S-shaped probability weighting function:

1. **Over-weight** the small probability of very high profits;

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Firm owners characterised by an inverse-S-shaped probability weighting function:

1. **Over-weight** the small probability of very high profits;
2. **Under-weight** the probability of low profits.

DEMAND-SIDE FRICTION TO IMPLEMENTING EQUITY-LIKE CONTRACTS

I propose a **demand-side friction** to implementing equity, drawing upon **behavioral finance** literature that mostly focuses on loss aversion and on high-income countries (Exceptions: Kremer, Rao, Schilbach, 2019; Carney et al., 2022; Jack et al., 2023; McIntosh et al., 2019).

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Critically, results vanish with a normal distribution ($\sigma \to 0^+$) (Barberis & Huang 2008) →

COUNTERFACTUAL ANALYSIS: CONTRACTUAL TWEAKS BENEFIT FIRMS AND MFI

I demonstrate a simple **contractual innovation** that can address the demand-side constraint: a **'hybrid'** contract with equity-like performance-contingent payments and a debt-like capped upside. →

Counterfactual analysis: contractual tweaks benefit firms and MFI

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I quantify the benefits from introducing equity-like contracts in MFI portfolios, and discuss the constraints to implementation (Rigol & Roth, 2021; Choudhary & Limodio, 2022) →

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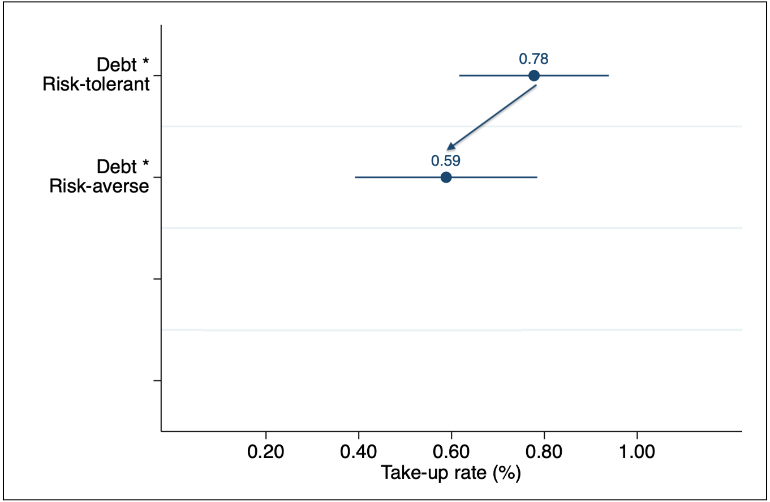

FIELD EXPERIMENT TAKE-UP HETEROGENEITY

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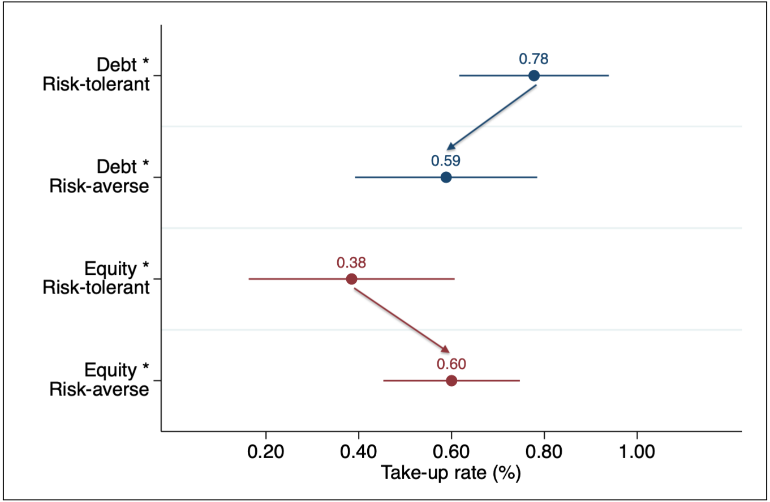

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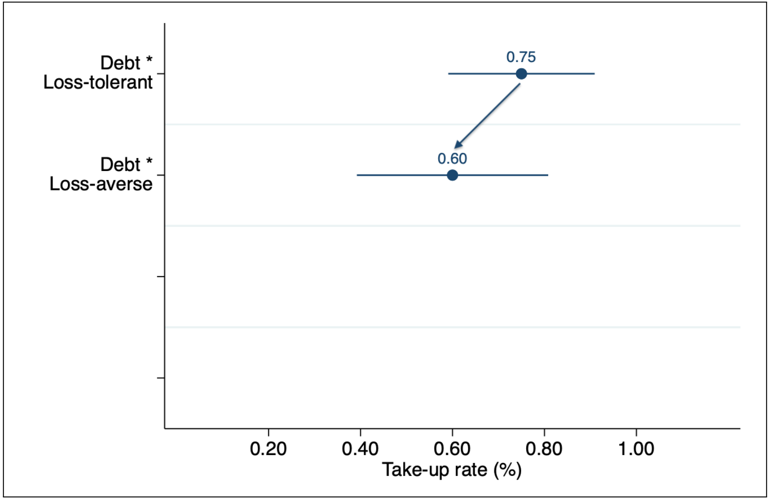

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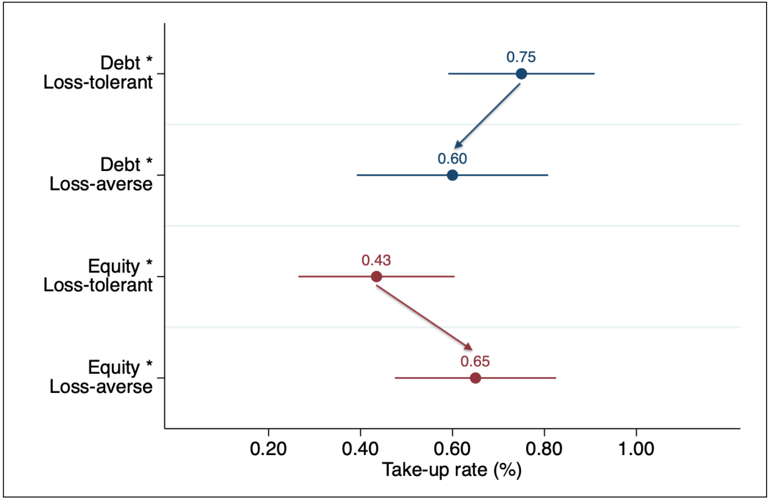
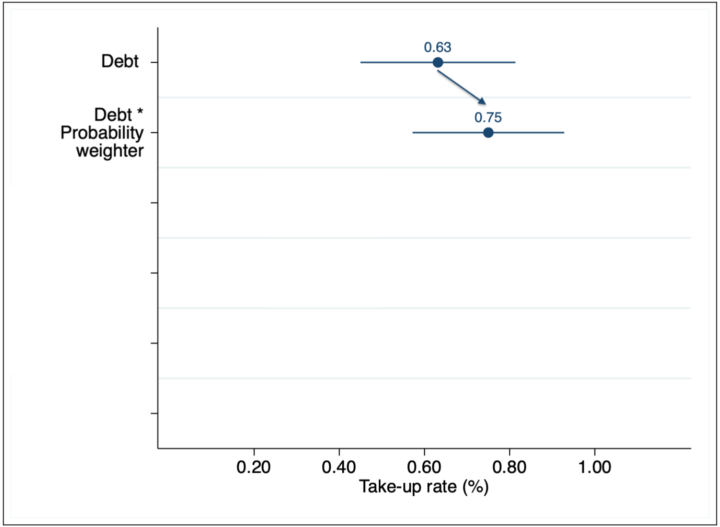


FIELD EXPERIMENT TAKE-UP HETEROGENEITY

Field experiment take-up: Pakistan

TESTING MODEL FIT OUTSIDE THE LAB: PROBABILITY WEIGHTING



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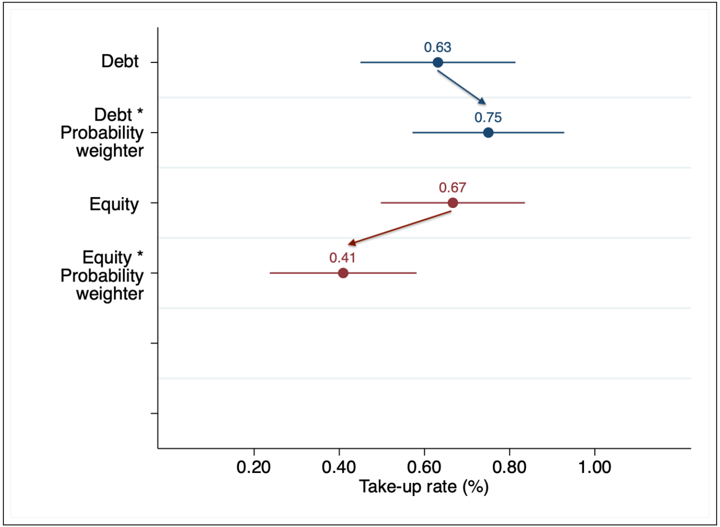

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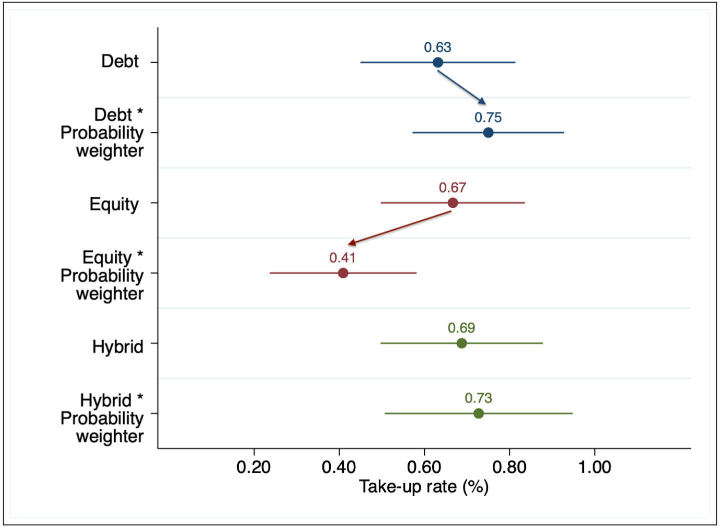

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CONCLUSION

I show that **equity-like** contracts lead to more profitable investment, and are particularly beneficial for the most risk- and **loss-averse** small firm owners.

However, individuals who **over-weight small probabilities** prefer debt contracts, especially in the presence of a **skewed** profits distribution.

Contractual innovations incorporating these behavioral insights can improve the feasibility of contracts that better encourage small firm investment and growth.

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SETTING: FIELD EXPERIMENTS IN KENYA AND PAKISTAN

An appropriate sample for equity-like innovations: **growth-oriented micro-enterprises** taking part in two broader field experiments.

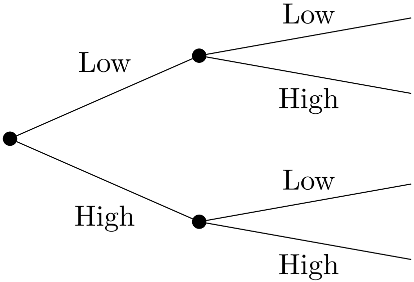
Pakistan: graduated borrowers offered $2,000 for asset financing (Bari et al., 2024).

Kenya: micro-distributors in a large multinational's route-to-market programme, offered financing for transportation asset (Cordaro et al., 2023).

	Mean	Standard deviation	P10	P25	Median	P75	P90
Age	36	10	25	29	35	42	50
Years of education	7	4	2	4	8	10	12
Business experience	9	8	1	3	6	12	20
Business profits	231	177	50	100	200	300	500
Household size	6	3	2	4	5	7	9
Household savings	499	1,063	0	5	100	500	1,500
Household expenditure	209	118	95	130	185	250	342

INVESTMENT GAME

Option	Cost	Low Payoff	High Payoff	Expected Profit
1	0	0	100	50
2	100	0	400	100
3	200	0	700	150
4	300	0	1000	200
5	400	0	1300	250



1. **Control** $\Omega = 200;$
2. **Debt** $\Omega = 200 + 500$ loan
3. **Equity** $\Omega = 200 + 500$ as equity (sharing ratio $\alpha \in \{0.25, 0.50\}$)

EQUITY LEADS TO MORE PROFITABLE INVESTMENT CHOICES

	(1) Expected return	(2) Expected return	(3) Expected return
Debt	63.79***	66.89***	52.69***
	(2.24)	(2.55)	(4.66)
Equity	74.58***	76.71***	66.92***
	(1.90)	(2.17)	(3.93)
Observations	3,060	2,392	668
Unique individuals	765	598	167
Country	Pooled	Pakistan	Kenya
Control mean	111.21	109.36	101.20
R-squared	0.267	0.283	0.183
Test: Debt = Equity	0.000	0.000	0.001
Effect size (%)	5.6	6.2	9.2
Effect size (standard deviations)	0.35	0.35	0.37

https://www.socialscienceregistry.org/trials/2224

Back

MEASURING RISK PREFERENCES

1. Four domain-specific questions on self-reported risk attitudes in: financial matters, occupation, faith in others, general (Dohmen et al., 2011).
2. 30 incentivised choices between binary lotteries with $p_g \in \{0.25, 0.50, 0.75\}$ and a gradually increasing certain payment (Vieider et al., 2015).
3. 10 incentivised choices between certain payment and binary lottery with one payoff in the loss domain, with the loss gradually increasing (Bartling et al., 2015).

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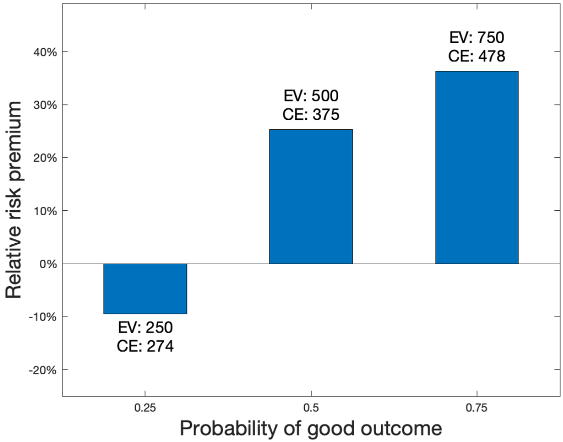

MEASURING RISK PREFERENCES: ELICITATION RESULTS

Self-reported measure of risk attitudes: I aggregate the scores across four questions, leading to an index of self-reported risk aversion that ranges from 0 to 40, with a mean of 21.2 and standard deviation of 8.3. I also find a strong and significant positive correlation of 0.30 between the risk aversion measures derived from the more general self-reported questions and those from incentivized games.

Incentivised activity: index of risk aversion that ranges from 0 to 30, with a mean of 20.3 and standard deviation of 9.4.

MEASURING RISK PREFERENCES: ELICITATION RESULTS

Non-parametric measure of probability weighting: For the $p_g = 0.25$ prospect, I find a mean risk premium of *negative* 23.6 (indicating a mean certainty equivalent of 273.6 that was actually higher than the 250 expected value of the risky prospect), and a standard deviation of 308.5. For the $p_g = 0.50$ prospect, I find a mean risk premium of 126.4 (reflecting a mean certainty equivalent of 374.6, compared to the expected value of 500), with a standard deviation of 336.2. For the $p_g = 0.75$ prospect, I find a mean risk premium of 272.0 (reflecting a mean certainty equivalent of 478.0 – much lower than the expected value of 750), with a standard deviation of 356.5.

Loss aversion: I construct a variable representing each individual's switching point, which is the mid-point between the x loss that they would tolerate (to accept the risky prospect) and the smallest x for which they would reject the prospect. The mean switching point is 601, with a standard deviation of 278. Back

ROBUSTNESS: DIFFERENT ROUNDS AND SHARING RATIOS

	(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)
Observations	2,392	668	3,060	3,060	3,060	3,060	3,060	3,060
Unique individuals	598	167	765	765	765	765	765	765
Control mean	109.36	101.20	111.21	78.79	178.12	107.58	77.97	176.47
R-squared	0.283	0.183	0.267	0.340	0.047	0.255	0.339	0.044
Country control			✓	✓	✓	✓	✓	✓
Test: Debt = Equity	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

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ROBUSTNESS: ORDER EFFECTS

Outcome:	(1) Order 1	(2) Order 2	(3) Combined
Equity	75.64***	73.47***	73.47***
	(2.65)	(2.74)	(2.73)
Debt	67.91***	59.55***	59.55***
	(3.18)	(3.16)	(3.16)
Control	106.96***	108.22***	108.22***
	(1.58)	(1.57)	(1.57)
Equity * Order 1			2.17
			(3.81)
Debt * Order 1			8.36*
			(4.48)
Order 1			-1.26
			(2.23)
Observations	1,552	1,508	3,060
R-squared	0.27	0.24	0.26
Treat Effect (%)	4.4	8.3	
Treat Effect (Stdev)	0.25	0.45	
Test: Equity = Debt	0.005	0.000	

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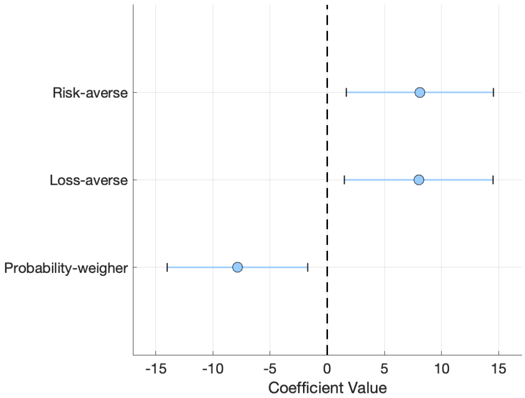
ROBUSTNESS: TRICHOTOMIZED RISK PREFERENCE MEASURES



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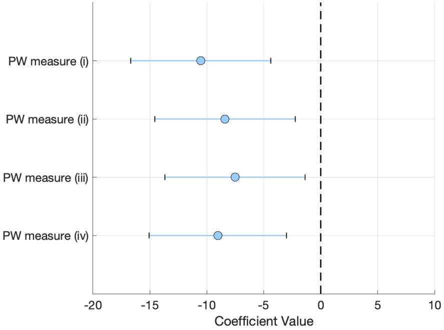
ROBUSTNESS: PROBABILITY WEIGHTING MEASURE



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ROBUSTNESS: EDUCATION LEVELS

	(1)	(2)	(3)
Risk-averse	-10.75***		
	(2.20)		
Loss-averse		-7.01***	
		(2.23)	
Probability-weigher			-2.74
			(2.25)
Education	-3.16	-3.39	-3.46
	(2.21)	(2.23)	(2.24)
Debt * Risk-averse	1.09		
	(4.51)		
Debt * Loss-averse		-1.36	
		(4.57)	
Debt * Probability-weigher			7.17
			(4.58)
Debt * Education	-2.58	-2.63	-1.69
	(4.51)	(4.51)	(4.59)
Equity * Risk-averse	10.04***		
	(3.83)		
Equity * Loss-averse		7.86**	
		(3.89)	
Equity * Probability-weigher			-3.94
			(3.91)
Equity * Education	-1.38	-1.12	-1.91
	(3.82)	(3.83)	(3.90)
Debt	64.41***	65.81***	61.33***
	(3.88)	(4.06)	(3.92)
Equity	69.72***	70.64***	77.27***
	(3.22)	(3.46)	(3.16)
Control	114.98***	113.16***	110.47***
	(1.90)	(1.92)	(1.80)
Number of observations	3,060	3,060	3,060
Test (Risk aversion): Debt = Equity	0.015		
Test (Loss aversion): Debt = Equity		0.012	
Test (Probability weighting): Debt = Equity			0.003

ROBUSTNESS: OPTIMISM

	(1) Alpha	(2) Lambda	(3) Gamma
Risk-averse	-10.36***		
	(-4.69)		
Loss-averse		-8.070***	
		(-3.60)	
Probability-weigher			-2.495
			(-1.10)
Optimistic	2.982	3.226	2.095
	(1.35)	(1.44)	(0.93)
Debt * Risk-averse	1.563		
	(0.34)		
Debt * Loss-averse		-1.319	
		(-0.28)	
Debt * Probability-weigher			7.224
			(1.59)
Debt * Optimistic	3.680	3.883	4.821
	(0.80)	(0.84)	(1.06)
Equity * Risk-averse	9.639*		
	(2.48)		
Equity * Loss-averse		8.337*	
		(2.10)	
Equity * Probability-weigher			-4.109
			(-1.06)
Equity * Optimistic	1.389	1.083	1.268
	(0.36)	(0.28)	(0.33)
Debt	61.79***	63.29***	58.70***
	(15.45)	(15.38)	(14.93)
Equity	69.09***	69.77***	76.33***
	(19.62)	(19.28)	(23.43)
Constant	111.8***	110.6***	107.8***
	(55.41)	(55.76)	(53.82)
Number of observations	2,988	2,988	2,988
Test (Risk aversion): Debt = Equity	0.032		
Test (Loss aversion): Debt = Equity		0.010	
Test (Probability weighting): Debt = Equity			0.002

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MODELING DECISION MAKING

$$PU_i = \sum_{k=1}^{n} \underbrace{W(p_k)}_{\text{Decision weight}} \cdot \underbrace{U(x_k)}_{\text{Utility function}}$$

EUT

$$W(p_k) = p_k$$

EUT

$$U(x) = x^r$$

PT

$$W_k = \omega(p_k + \cdots + p_n) - \omega(p_{k+1} + \cdots + p_n)$$

$$W_k = \omega(p_k)$$

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

PT

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

(1) ESTIMATING THE EUT MODEL

I assume a simple constant relative risk aversion (CRRA) utility function $U(x) = x^r$, where r is the risk aversion parameter to be estimated, and x is wealth after the realization of outcomes for the prospect under consideration.

The expected utility for a prospect i is simply the probability-weighted utility of each possible outcome k in the prospect, using the experimentally induced probabilities that all business owners were made aware of through detailed explanations and tests of probabilistic understanding: $EUT_i = \sum_k p_k \cdot U(x_k)$.

The expected utility for each pair of prospects is calculated for a candidate estimate of r, and the difference $\nabla EUT = EUT_1 - EUT_2$ forms an index that is then used to define the cumulative probability of the observed choice using the logistic function

(1) ESTIMATING THE EUT MODEL

The likelihood, conditional on the EUT model being true, depends on the estimates of r and the observed choices:

$$\ln L^{\text{EUT}}(r; y, X) = \sum_i \ln l_i^{\text{EUT}} = \sum_i [y_i \ln G(\nabla EUT) + (1 - y_i) \ln(1 - G(\nabla EUT))]$$

where y_i is a binary variable denoting whether the business owner chose the first or the second of the two prospects on offer in each of the 40 questions, and X is a vector of individual characteristics measured in the baseline survey: age, gender, country, monthly business profits, total household savings, and highest level of education.

Estimation is via maximum likelihood.

(2) ESTIMATING THE PT MODEL

Introduce the possibility of reference-dependent preferences and non-linear probability weighting in the decision making process.

The 40 risk preference elicitation questions induced variation in payoffs, including some in the loss domain, as well as probabilities.

Estimation proceeds in a similar manner to the EUT model, with each decision modelled as a binary choice between two prospects, and an index of latent preferences calculated as the difference in their prospective utility: $PU = PU_1 - PU_2$.

(2) ESTIMATING THE PT MODEL

The utility of prospect i is the probability-weighted utility of each of the prospect's outcomes:

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

$$W_k = \omega(p_k + \cdots + p_n) - \omega(p_{k+1} + \cdots + p_n)$$

for $k = 1, ..., n-1$, and

$$W_k = \omega(p_k)$$

for $k = n$, where x are the monetary outcomes, of which there are n possible outcomes for each prospect (with subscript k ranking outcomes from worst to best).

(2) ESTIMATING THE PT MODEL

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

$$W_k = \omega(p_k + \cdots + p_n) - \omega(p_{k+1} + \cdots + p_n)$$

$W(\cdot)$ is now the decision weight, and $w(\cdot)$ is a probability weighting function that is defined over the cumulative distribution and transforms the experimentally induced probabilities

Distinction between $w(\cdot)$ and $W(\cdot)$: $w(\cdot)$ models the distortion of probability, and $W(\cdot)$ multiplies the value of each outcome.

(2) ESTIMATING THE PT MODEL

I use a popular probability weighting function (Tversky and Kahneman, 1992):

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

Where γ controls the shape of the probability weighting function (and $\gamma = 1$ charaterises linear probability weighting, as in the EUT model).

One-parameter weighting functions have been found in several studies to provide an excellent fit to the data, almost as well as the two-parameter, linear-in-log-odds weighting functions (Wu & Gonzalez, 1996).

(2) ESTIMATING THE PT MODEL

I again use a simple CRRA power utility functional form, but now defined separately over gains and losses:

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

where α controls the curvature of the utility function and λ allows for the possibility of reference-dependent preferences, where the reference point being set at zero represents their initial starting point before undertaking the activities.

Identification of the loss aversion parameter λ comes from decisions comprising payoffs 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 risky prospects on offer.

(2) ESTIMATING THE PT MODEL

Estimation proceeds in the same manner as for the EUT model, using maximum likelihood. I calculate the utility of each prospect under consideration in the 40 decisions made by business owners, based on candidate values of the parameters α, λ, and γ.

I then link the latent index $\nabla PU = PU_1 - PU_2$ to the observed choices in the experiment using the logistic cumulative distribution function $G(\nabla PU)$. The conditional log-likelihood is:

$$\ln L^{PT}(\alpha, \lambda, \gamma; y, X) = \sum_i \ln l_i^{PT} = \sum_i \left[y_i \ln G(\nabla PU) + (1 - y_i) \ln(1 - G(\nabla PU))\right].$$

(3) ESTIMATING THE MIXTURE MODEL

To estimate the mixture model, let π^{EUT} denote the probability that the EU model is correct, and $\pi^{\text{PT}} = (1 - \pi^{\text{EUT}})$ as the probability that the PT model is correct. The grand likelihood can be written as the probability weighted average of the conditional likelihoods:

$$\ln L(r, \alpha, \lambda, \gamma, y'; y, X) = \sum_i \ln[(\pi^{\text{EUT}} \times l_i^{\text{EU}}) + (\pi^{\text{PT}} \times l_i^{\text{PT}})].$$

I then directly estimate the log-likelihood.

	Coefficient	Std. err.	$P > \|z\|$	95% confidence interval
π^{EUT}	0.127	0.015	0.000	[0.097 , 0.156]
π^{PT}	0.873	0.015	0.000	[0.844 , 0.903]

Result: **87%** of observations are better characterized by PT, and **13%** by EUT.

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STRUCTURAL ESTIMATION WITH STOCHASTIC ERRORS

	Coefficient	Std. err.	$P > \|z\|$	95% confidence interval
α	1.032	0.020	0.000	[0.993, 1.072]
λ	2.504552	0.044	0.000	[2.418, 2.592]
γ	.6109845	0.011	0.000	[0.590, 0.632]
μ	2.342888	0.117	0.000	[2.113, 2.573]

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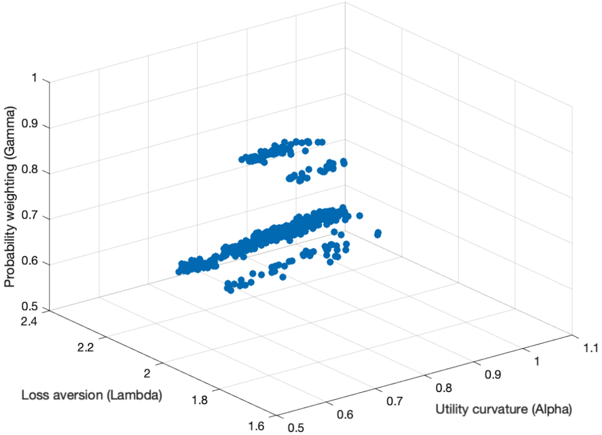
JOINT DISTRIBUTION



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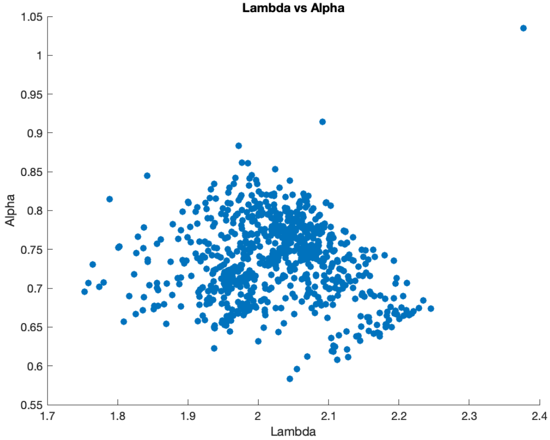

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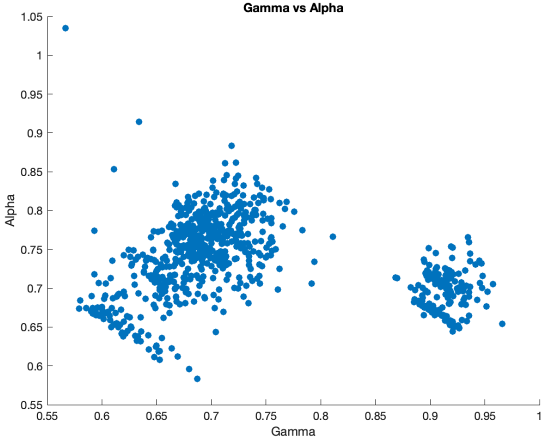

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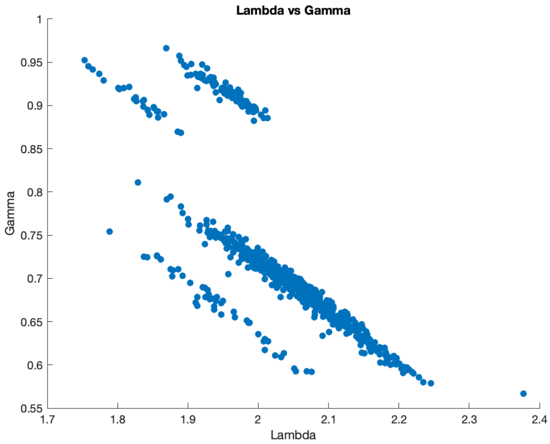

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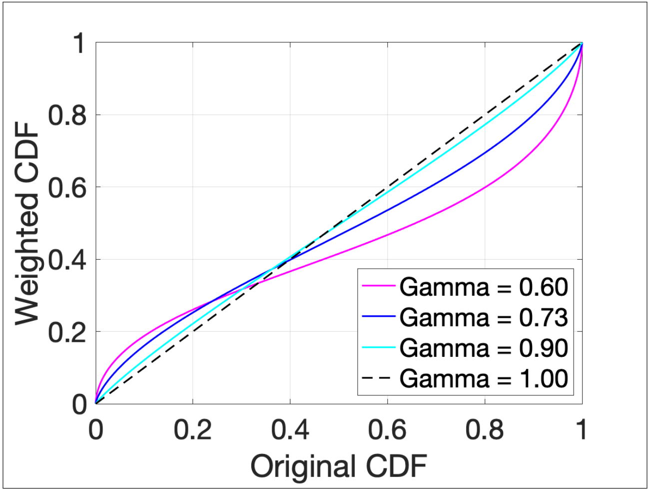
IMPLICATIONS OF γ



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CORRELATES OF ESTIMATED RISK PREFERENCE PARAMETERS

Table: CORRELATION BETWEEN RISK PARAMETERS AND OPTIMISM

	(1) α	(2) α	(3) λ	(4) λ	(5) γ	(6) γ
Optimism: return to capital	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00
	(0.00)	(0.00)	(0.01)	(0.00)	(0.01)	(0.00)
Constant	0.74***	0.71***	2.02***	2.33***	0.73***	0.55***
	(0.00)	(0.00)	(0.01)	(0.00)	(0.01)	(0.00)
Observations	747	747	747	747	747	747
Controls		✓		✓		✓

USING ESTIMATED PREFERENCES TO EXPLORE SELECTION

Assumptions: returns drawn from same distribution, fitted on 'real-world' profits. Therefore, focus on heterogeneity in risk preferences (Cohen & Einav, 2007). Distribution

The moderate amount of skew will have implications for the impacts of alternative contract structures for individuals with non-linear probability weighting.

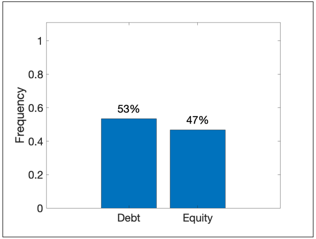
Static framework: focus on impact of different dimensions of risk preferences on contract choice. Initially, business owners offered $1,500 financing through either:

1. Loan (27% interest)
2. Equity (50% sharing)

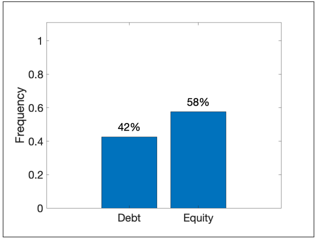
MODEL TAKE-UP UNDER DIFFERENT DECISION-MAKING ENVIRONMENTS

Allow each business owner to choose their utility-maximising contract – individual risk preference parameters – under three environments:

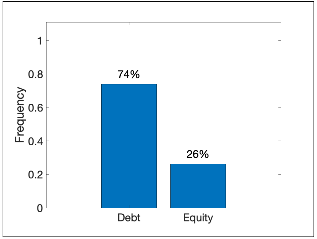
EXPECTED UTILITY



INCORPORATING LOSS AVERSION



INCORPORATING PROBABILITY WEIGHTING



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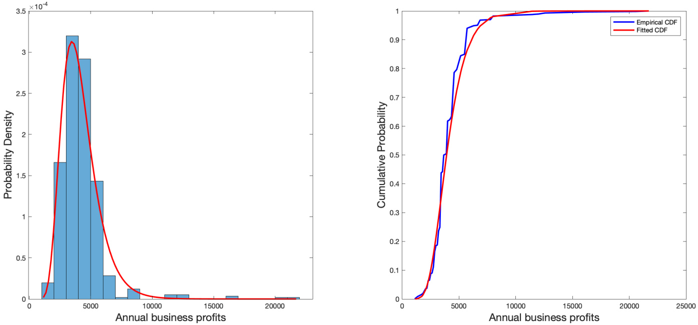
SELECTING DISTRIBUTION OF BUSINESS RETURNS FOR COUNTERFACTUAL ANALYSIS

Table: Distributional fit

Distribution	Sum of Squares Error (SSE)
Lognormal	0.078
Birnbaum-Saunders	0.093
Gamma	0.131
Normal	0.385
Weibull	0.412
Rayleigh	0.523
Poisson	1.658
Generalized Pareto	1.840
Exponential	2.146

SELECTING DISTRIBUTION OF BUSINESS RETURNS FOR COUNTERFACTUAL ANALYSIS

Figure: VISUAL ASSESSMENT OF DISTRIBUTIONAL FIT



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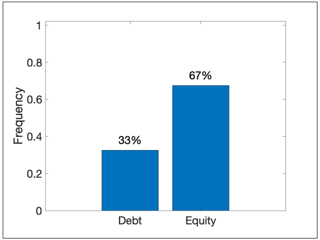
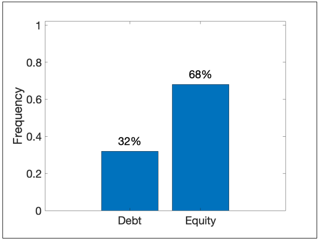
REMOVING SKEW FROM THE RETURNS DISTRIBUTION

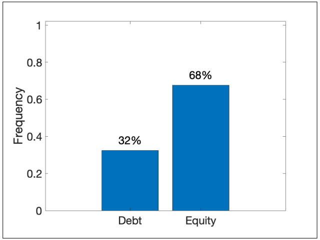
PANEL A: EXPECTED UTILITY



PANEL B: LOSS AVERSION



PANEL C: PROBABILITY WEIGHTING



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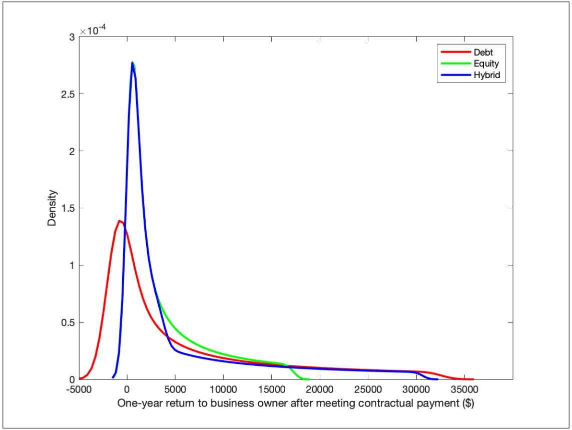
CONTRACTUAL INNOVATIONS: HYBRID

A simple **contractual tweak** can help individuals who benefit from equity contracts but select out of them due to overweighting of small probabilities.

A **‘hybrid’** contract provides the same performance-contingent payment structure and risk-sharing benefits as equity, but with a (debt-like) capped upside.

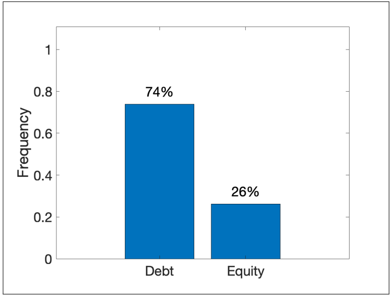
While novel in this context, they are increasingly being used in high-income settings e.g. **payment companies**.

Figure: MODEL-BASED DISTRIBUTION OF RETURNS UNDER EACH FINANCING CONTRACT

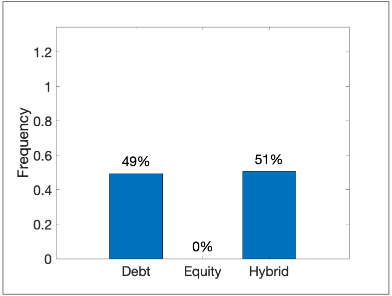


MODEL-BASED SELECTION INTO HYBRID CONTRACTS

WITHOUT HYBRID



WITH HYBRID



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QUANTIFYING THE GAINS TO FIRMS FROM INTRODUCING EQUITY-LIKE CONTRACTS

Compensating-variation welfare measure using numerical optimisation:

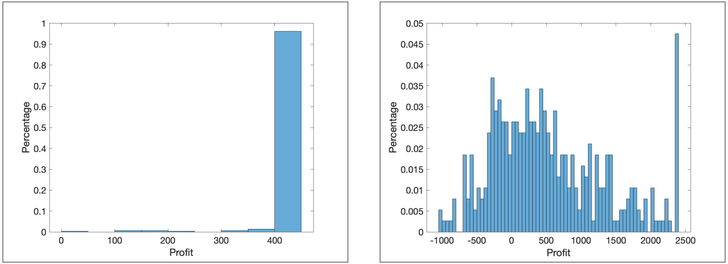
$$PU_i^{Equity} = \sum_{k=1}^{n} W(p_k) \cdot U\left[(1-\tau) \cdot x_k\right] \quad = \sum_{k=1}^{n} W(p_k) \cdot U(x_k - Debt + T) = PU_i^{Debt}$$

Solve for individual-specific valuations of equity (T), using estimated α, λ, and γ.

Averaging across sample and including increase in MFI profits, total surplus is 6% to 11% of disbursed capital.

MFI PROFITS FROM INTRODUCING EQUITY-LIKE CONTRACTS

PANEL A: DEBT　　　PANEL B: HYBRID



Traditional lenders may struggle to provide riskier products (Choudhary & Limodio, 2022)

The incentive structures within MFIs may be a constraint, and may inhibit graduation to more sophisticated products (Rigol & Roth, 2021).

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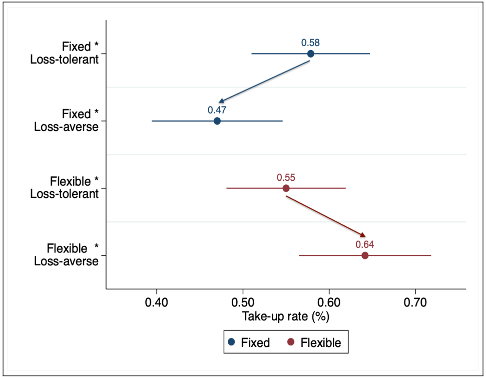
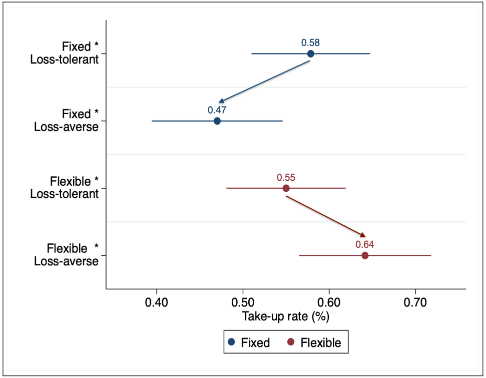
FURTHER TAKE-UP RESULTS OUTSIDE OF THE LAB: PAKISTAN

PANEL A: RISK AVERSION



PANEL B: LOSS AVERSION



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