Promise Competition

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Motivation

- Consider a buyer who can choose one of several sellers.
- Buyer wants to select the seller who...
  ... delivers better quality / acts more in her interest
  ... in a one-time interaction.
- Sellers *cannot commit* themselves to their offer
  - Typical model of imperfect competition: binding contracts
  - Here: *promises* about action when selected
  - Reneging costly for some but not for all sellers.

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  - Reneging costly for some but not for all sellers.
- **Examples:** renovating your house, procurement contract, car repair, medical (over) treatment, local politics

Why interesting?

- General dissonance in economics: Either we assume that talk is cheap - or that contracts are binding
- This study investigates situation in-between: when promises are binding to different degrees
- Relevant particularly if:
  - Experience or credence good
  - Repeated interaction is absent or uncertain
  - Reputation mechanisms are absent or flawed
- In standard models, competition induces sellers to make better offers i.e. to provide better quality
- Does competition still 'work' when contracts are not binding?

Research Question

- Does promise competition lead to a selection of better/worse sellers?
- Does promise competition lead to higher quality provision?

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This study

1. *Introduces a simple signaling model with two-dimensional private information*
2. *Derives predictions*
3. *Tests predictions in a laboratory experiment*

Results

1. Sellers pool promises
   - Promises provide no information
   - No selection of particular seller type (neither positive nor adverse)
2. The promise is *higher or equal* to the quality that 'good type' sellers would provide absent competition
   - Promises raise quality provision on average
   - Particularly by honest sellers with low 'natural' quality-provision

- Experiment supports these findings with some interesting qualifications

Related Studies

- Frankele & Kartik (2018): signals lose informativeness if mixed-type exists
- Callander and Wilkie (2007) study misrepresenting political platforms. Predict that honest candidates less often elected.
- Corazzini et al. (2014), Fehrler et al. (2018) analyze electoral competition in a one-dimensional signaling model.
- This study shows that (1) two dimensions of private information are im portant to understand promise competition (2) in equilibrium promises carry no information.

Cost of Promise-breaking

- The model's cost of promise-breaking does not need to be of psychological nature. Other sources: legal constraints, reputation costs, fabrication costs.
- In the experiment focus on one particular motivation for the cost of promise breaking - a psychological dis-utility.
- long literature demonstrates that some people have an aversion to lying or break their promise

  (lying: Gneezy, 2005. promise-breaking: Ellingsen & Johannesson, 2004; Charness & Dufwenberg, 2006.).
- Experimental literature finds varying degree of lying-aversion

Structure of the talk

1. Model of Promise Competition
2. Predictions
3. Experimental Design
4. Experimental Results

A model of promise competition

- Buyer seeks a one-time service.
- Two competing sellers make non-binding promise p_i about service-quality x_i.
- Buyer chooses one of two promises $a(p_1, p_2)$
  - utility $v(x)$ increasing in quality x and $v(0) \geq 0$.
- Seller-utility upon being selected with p and x:

$$U(p, x, \tau) = \pi - x + \alpha \cdot f(x) - \rho \cdot g(p, x),$$

where $g(x, p)$ cost of breaking a promise, $f(x)$ intrinsic motivation, and α, ρ type specific parameters *(private information)*.

Types

Sellers differ in two dimensions:

(1) **Motivation** α, (2) **Cost of breaking a promise** ρ.

Three types of sellers:

The good type: $\tau_g = (\overline{\alpha}, \overline{\rho})$.

The honest type: $\tau_h = (0, \overline{\rho})$.

The bad type: $\tau_b = (0, 0)$.

Figure

Cost of promise breaking

- Follows Abeler et al. 2018 and Gneezy et al 2018.
  - $\Rightarrow$ Fixed cost and variable cost.
- $g(x,p) = \begin{cases} G(|x-p|,p) + \nu & \text{if } p \neq x; \\ 0 & \text{otherwise,} \end{cases}$

  where $\nu \geq 0$.
- **Assumption 1** *(Cost of promise-breaking):*

  1. $G(0,p) = 0$ for all p, "No lie, no cost."
  2. $\frac{\partial G(|x-p|,p)}{\partial |x-p|} > 0$, for all x, p, "More lying, more cost."
  3. $\frac{\partial \partial G(|x-p|,p)}{\partial |x-p| \partial |x-p|} > 0$ for all x, p. "MC increasing."

Intrinsic motivation

- Some sellers are motivated to provide quality. Let $f(x)$ denote an agents motivation.
- **Assumption 2** *(Intrinsic Motivation):*
  - $f(x)$ is two times continuously differentiable
  - $f'_x(x)$ is decreasing
- Define $\overline{x}^n$ as optimal (natural) giving of τ_g.

Assumption 3 (Minimum likelihood good type)

"Likelihood of good type can't be too low, otherwise equilibrium does not exist."

- Assume,

$$\frac{\phi_{\tau_g}}{\phi_{\tau_g} + \phi_{\tau_b}} \overline{x}^n \geq x^*(\overline{x}^n, \tau_h).$$

where ϕ_τ denotes the likelihood of type τ,

and $x^*(p, \tau)$ the optimal action of type τ after promise p.

formal

Solution Concept

- Perfect Bayesian Equilibrium:

$\Rightarrow$ **Beliefs can support a large set of equilibria**
both pooling and separating equilibria

- Refinements that constrain beliefs: Criterion D1.

Results

- Pooling equilibria with single promise.
- Any promise $p \in [\overline{x}^n, x^{max}]$ can be the single promise in a pooling equilibrium.
- No other equilibria.
- **Predictions:**
  1. No selection of better sellers.
  2. Promise competition increases average quality provision.

Details

Experiment

- Second part of talk: Test predictions in Lab Experiment
- Abstract setting - Idea to show that general mechanisms work in general
- Experiment allows to measure selection
- Conducted at Incentive Labs at Rady School of Management, UCSD (155 participants)
- Preregistered

Design 1/3 - Promise Game

- Dictator game with two potential senders.
- Both senders make a promise to receiver about intentions.
- Receiver chooses who to play dictator game with.

$\Rightarrow$ chosen sender gets to split 100 points between herself and receiver.

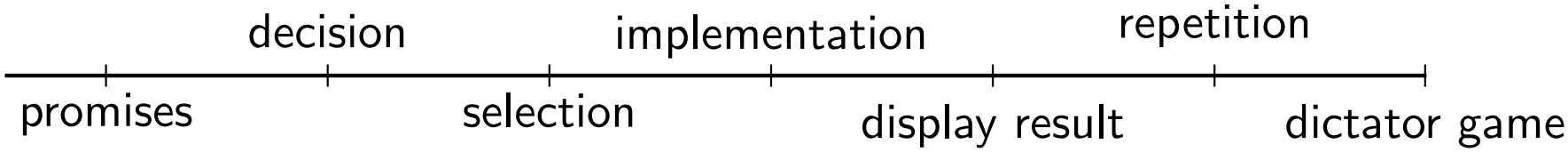
$\Rightarrow$ other sender receives nothing.

Design 2/3 - Issues

- Avoid salience of fair split
  - Every point sent to receiver is doubled
- Learning
  - 10 repetition with stranger matching.
  - Information about past decisions of own group.
- Want to compare givings to a non-promise situation
  - Participants also play regular dictator game
  - Random Order (beginning or end)

Design 3/3

Timeline of the experiment



- Decisions elicited with *strategy method*
- Random re-matching each round
- Ten rounds, get paid for a random round

Prediction from Model

- Pooling of promises

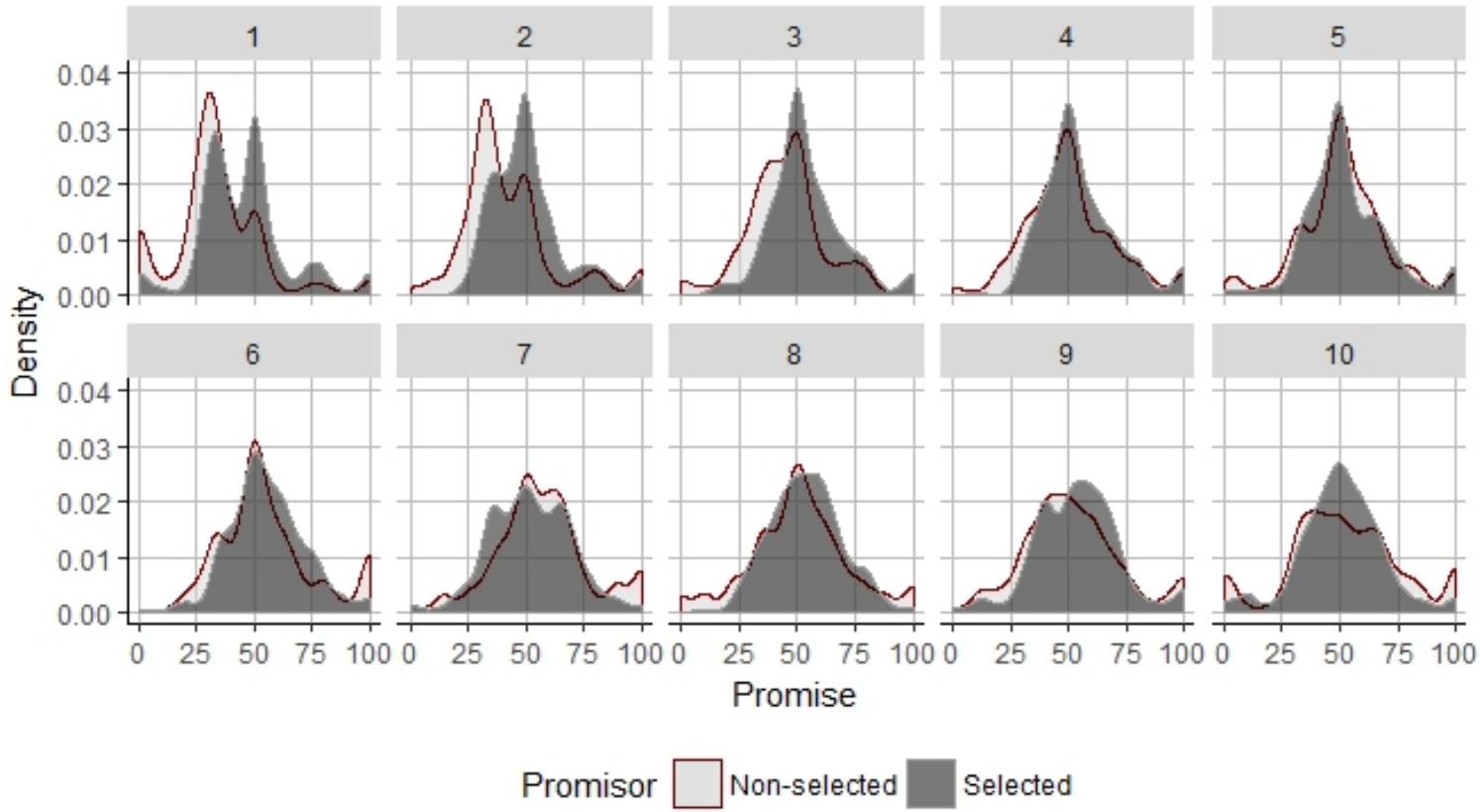
$\Rightarrow$ Selected senders give on average as many points as non-selected senders

- Agents promise at or above the 'motivated' senders (33 points)

$\Rightarrow$ Senders wit promise-breaking cost will act more in the interest of the receiver.

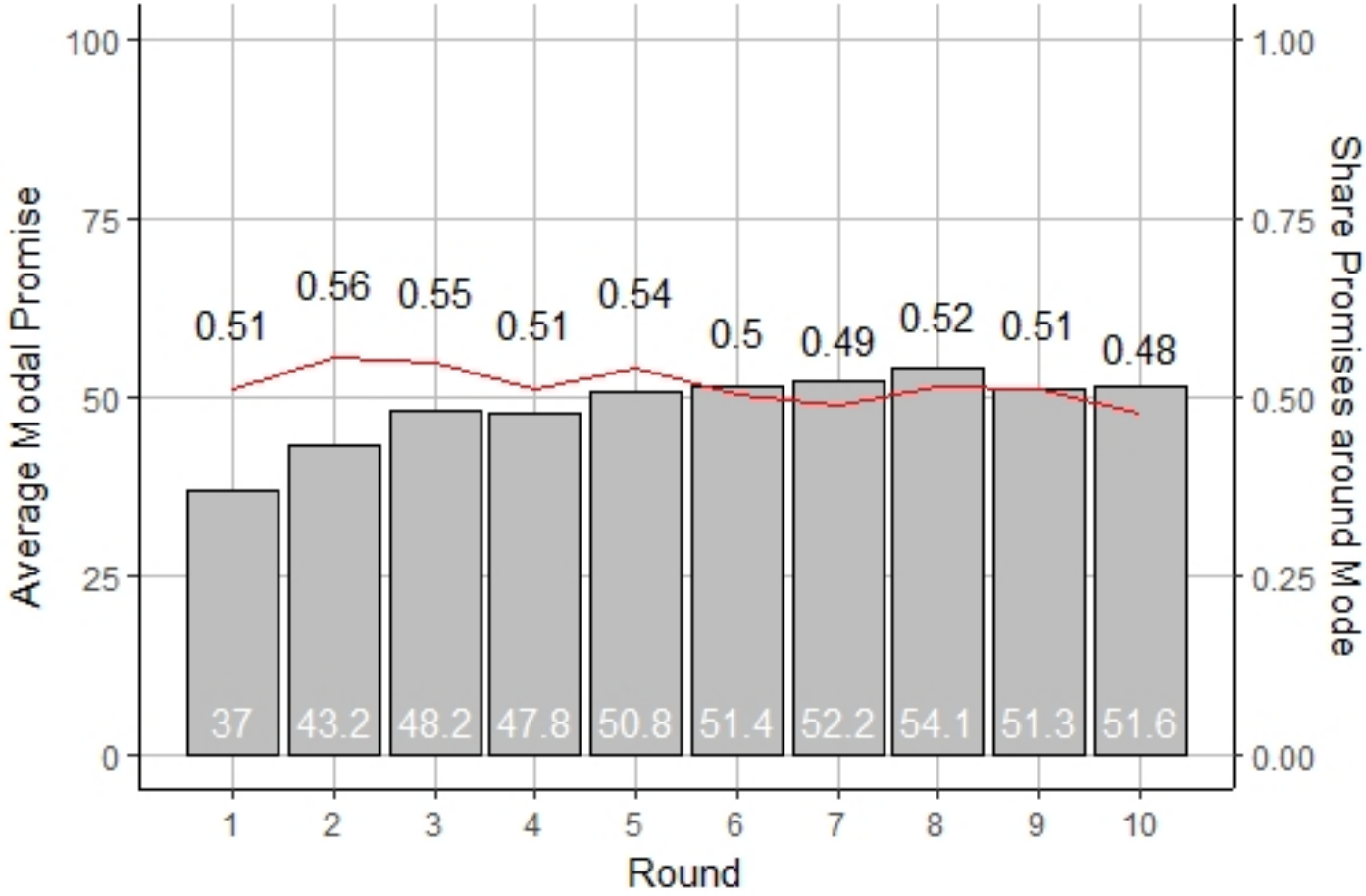
Results - Selected and none-selected promisors

Figure: Density of Promises of selected and not selected agents by round.



adj. promises

The Modal Promise



Define modal promise as the promise with the most other promises in a 5 point environment.

diff aggregations

Selection and giving

Table: Amount given by round

Round	**senders**			**difference**	
	all	selected	not-selected	t-statistic	p-value
1	35.883	38.353	33.007	2.116	0.035
2	32.349	36.490	29.163	3.054	0.002
3	28.970	30.654	27.222	1.443	0.150
4	28.361	31.667	26.549	2.019	0.044
5	27.762	29.536	26.052	1.284	0.200
6	27.135	25.588	28.660	-1.136	0.257
7	25.623	23.575	27.843	-1.659	0.098
8	23.968	22.131	25.869	-1.434	0.153
9	21.565	20.686	21.549	-0.358	0.720
10	18.663	21.046	17.170	1.664	0.097

Notes: The table displays the amount senders give in the promise game by round. The different columns represent all senders or only those who got selected or did not. The final two columns display the test statistic and p-value of a two sided t-test.

distribution

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distribution

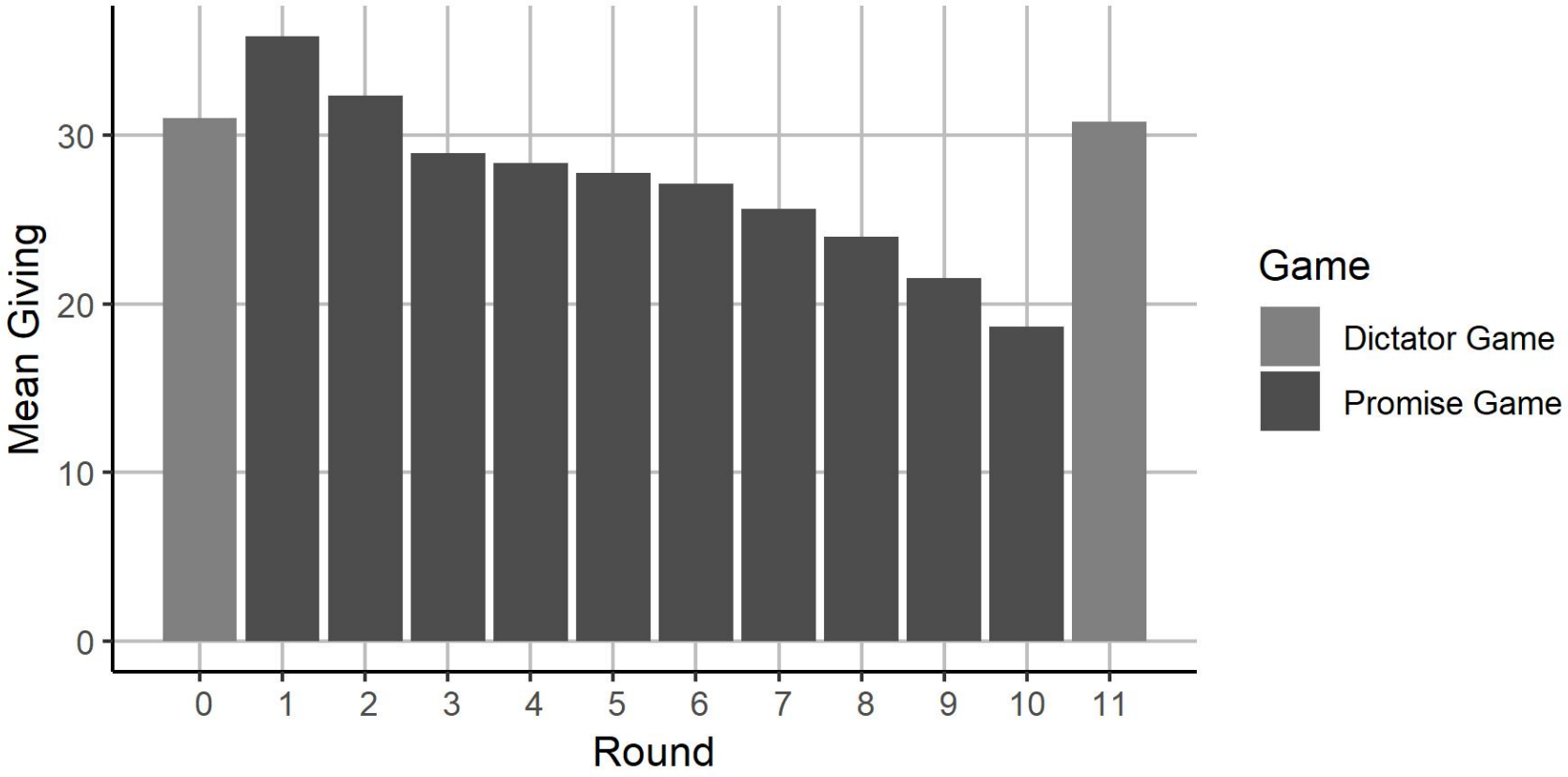
Finding 1

- Participants pool their promises after a few repetitions
- No selection of better/worse promisors

Caveats

- Initially no pooling and positive selection!
- Participants promise around but not at a single promise promise.

Giving by Round and Game



broken promises
comparison distributions

Test of Differences

Table: Comparison promise and dictator game giving

	Mean sending		**Difference**	
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all	27.141	30.967	-2.086	0.039
1	35.745	30.967	2.417	0.017

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Correlation of Promising and Giving

Table: Regression of change in giving on change in promising

	$\Delta_{t/t-1}$ Giving		
	(1)	(2)	(3)
$\Delta_{t/t-1}$ Promise	0.265^{***}	0.273^{***}	0.282^{***}
	(0.065)	(0.065)	(0.069)
($\Delta_{t/t-1}$ Promise) sqrt			-0.001
			(0.001)
Constant	-2.179^{***}		
	(0.207)		
Individual FE			X
Round FE		X	X
N	1,377	1,377	1,377
R^2	0.075	0.091	0.115

Notes: Clustered standard errors (individual) in parenthesis.
* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

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Scatter By type

Finding 2

- Participants give more in first round of promise game than dictator game
- Giving decreases over repetitions
- Perhaps surprising restart effect for dictator game in the end
- Change in promise correlated with change in giving

Summary

- Analyze competition with non-binding promises
- General issue in economics
- Results: Promises don't matter for beliefs & selection.
- Promises DO matter for the outcome (i.e. quality provided).
- Experiment provides an (abstract) example for such situation.

Who increases giving after promises?

	Δ Giving (Promise – Dictator Game)		
	Coefficient	*C-Interval*	*p*
(Intercept)	22.99	17.35 – 28.64	<.001
Dictator Giving	-0.59	-0.74 – -0.44	<.001
Observations		153	
R^2 / adj. R^2		.290 / .286	

OLS Regression of the difference in giving on the giving in the dictator game.

Why do participants decrease their giving?

	(1)	(2)
Giving $t-1$	0.678***	0.677***
	(0.031)	(0.031)
Giving $t-1$ Select Sender	0.111***	0.087**
	(0.019)	(0.033)
Previous Role: Receiver		−4.648*
		(1.912)
Previous Role: Selected Sender		1.294
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Giving Selected Sender * Receiver		0.111*
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Round FE	X	X
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N	1,377	1,377
R^2	0.493	0.499

Notes: *Regression of giving in round t on giving in previous round. Individual fixed effects. Clustered standard errors on individual level in parenthesis. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.*

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Distribution Promises and Giving

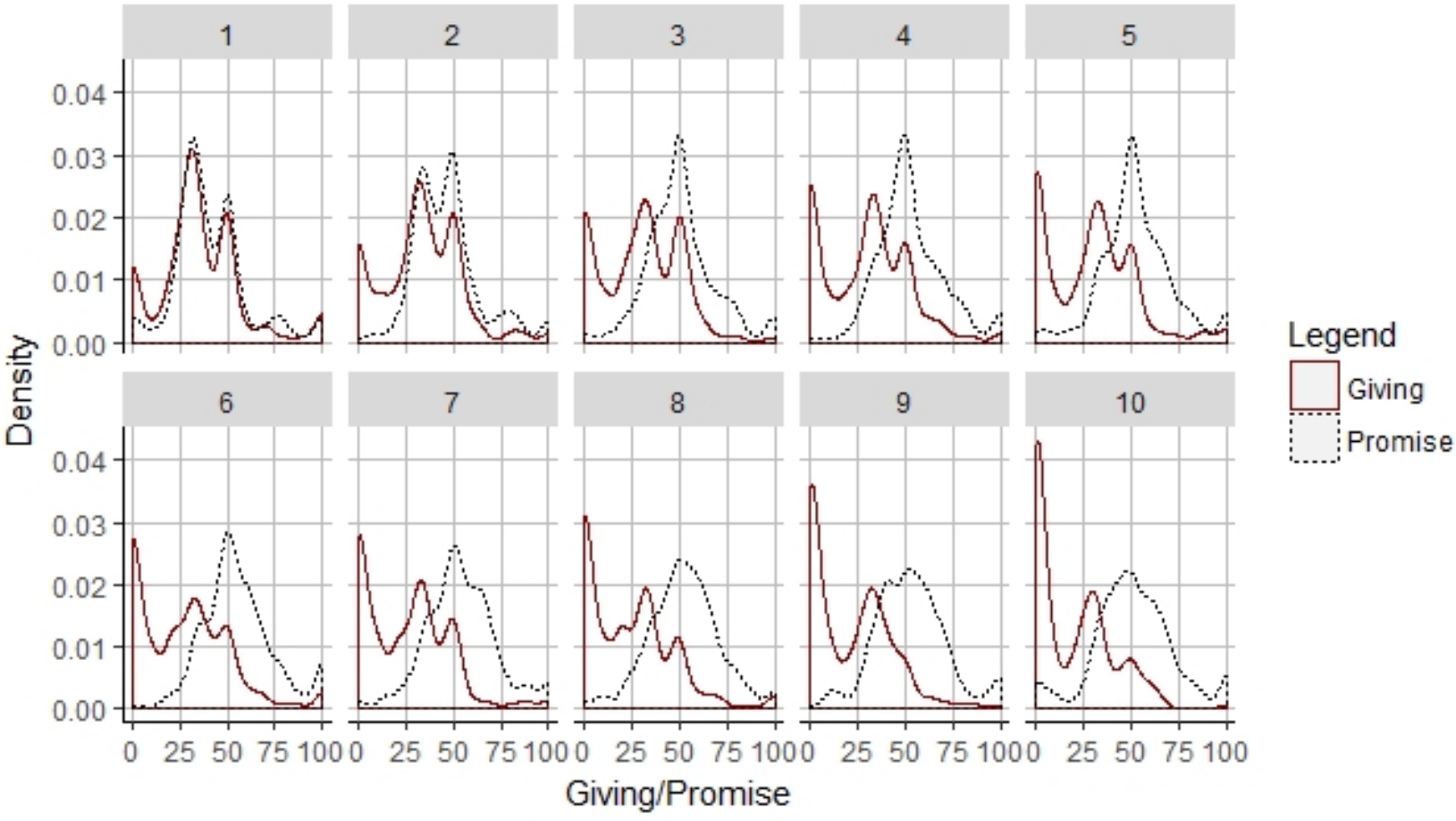

Figure: Density of promises and giving by round.

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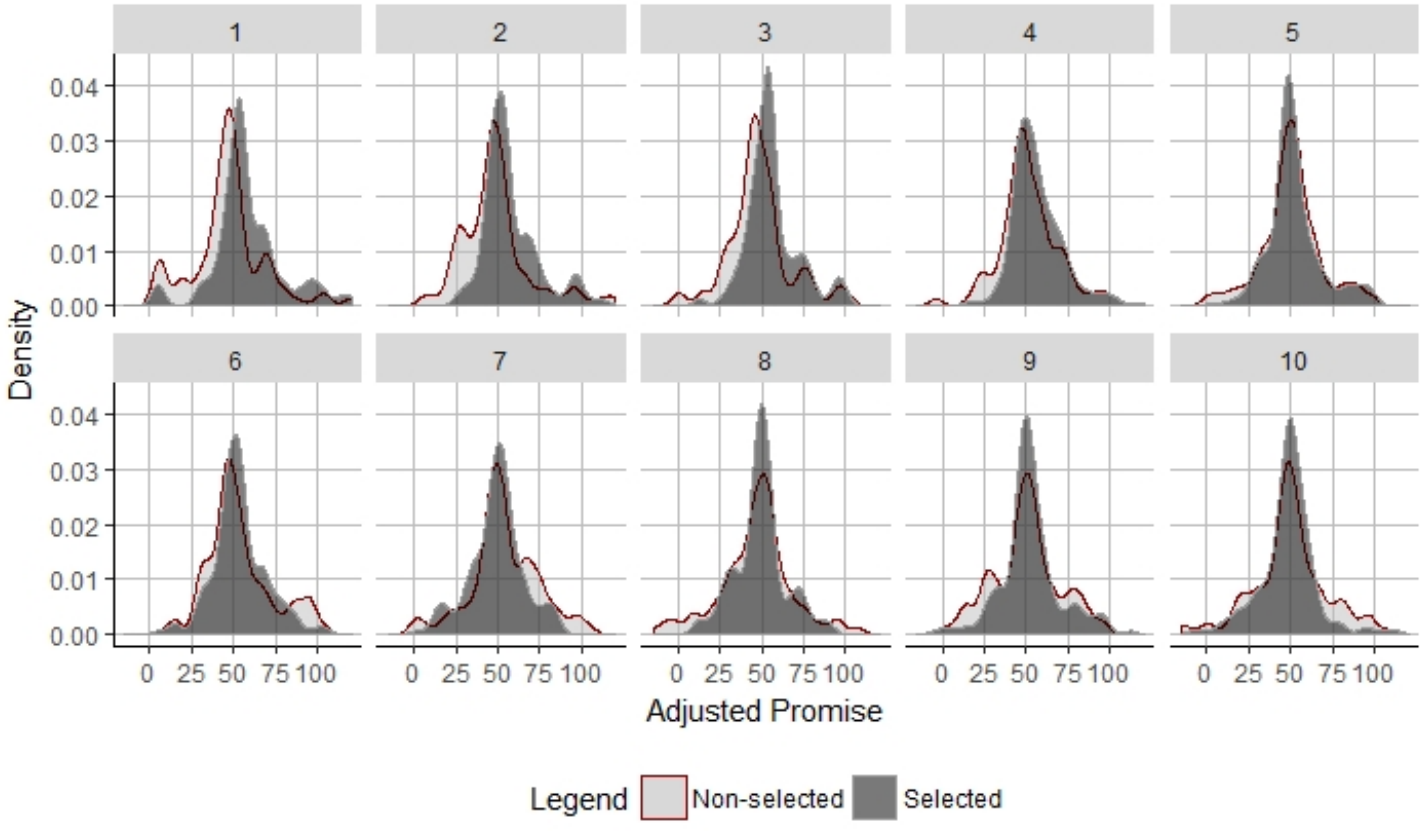
Density of promises adjusted to the mode



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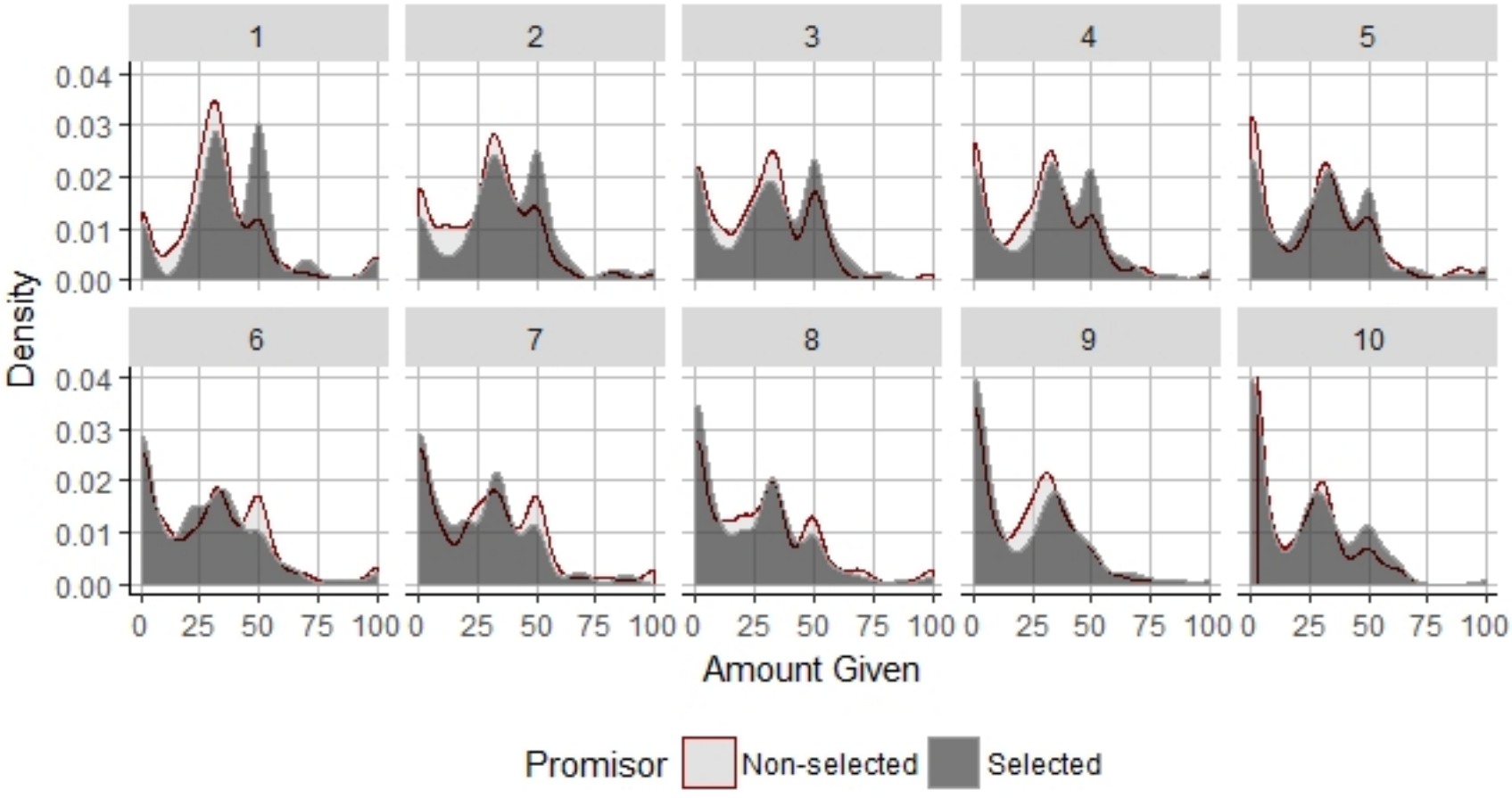
Distribution of giving by selection and round



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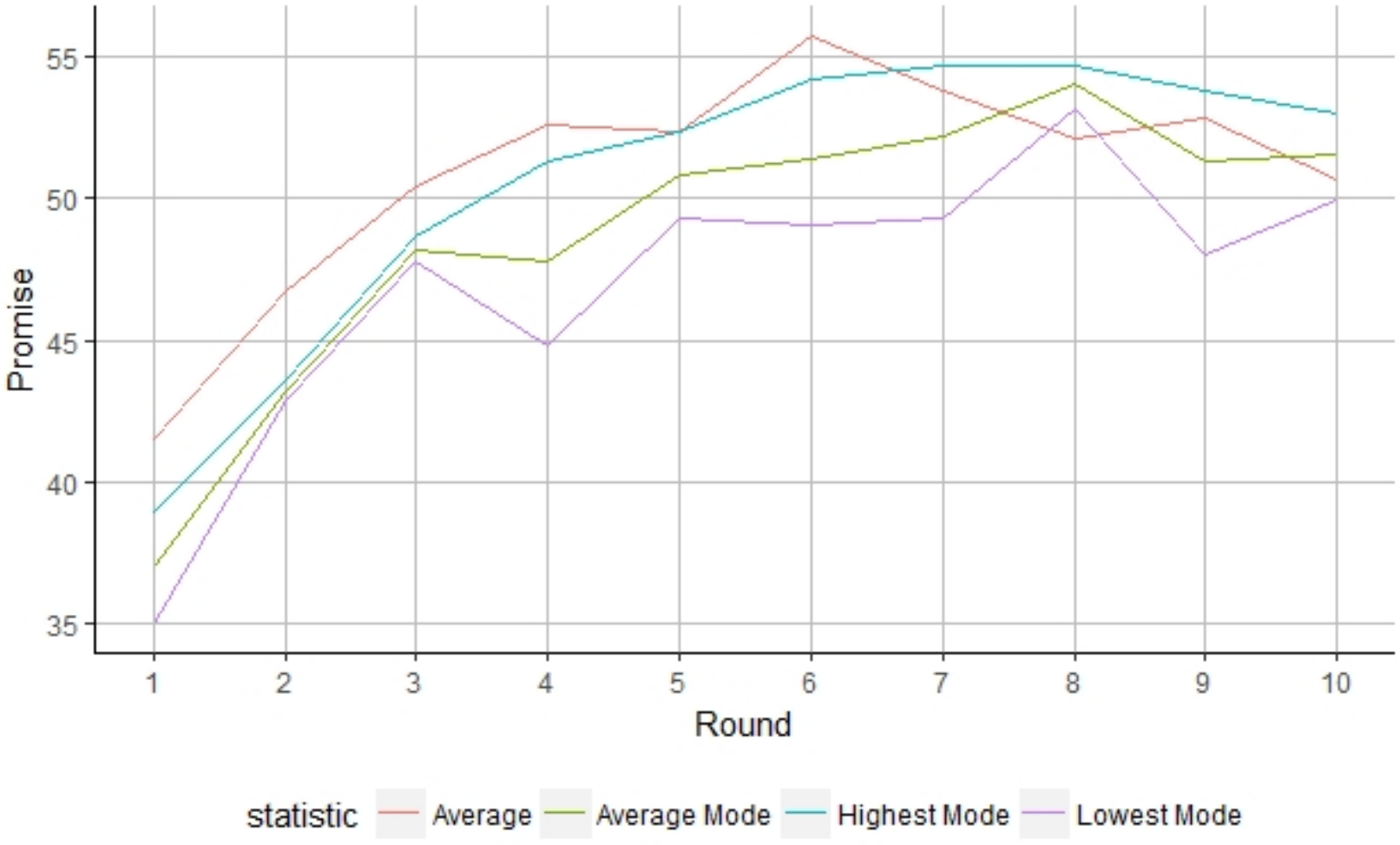
Different aggregations of the promises



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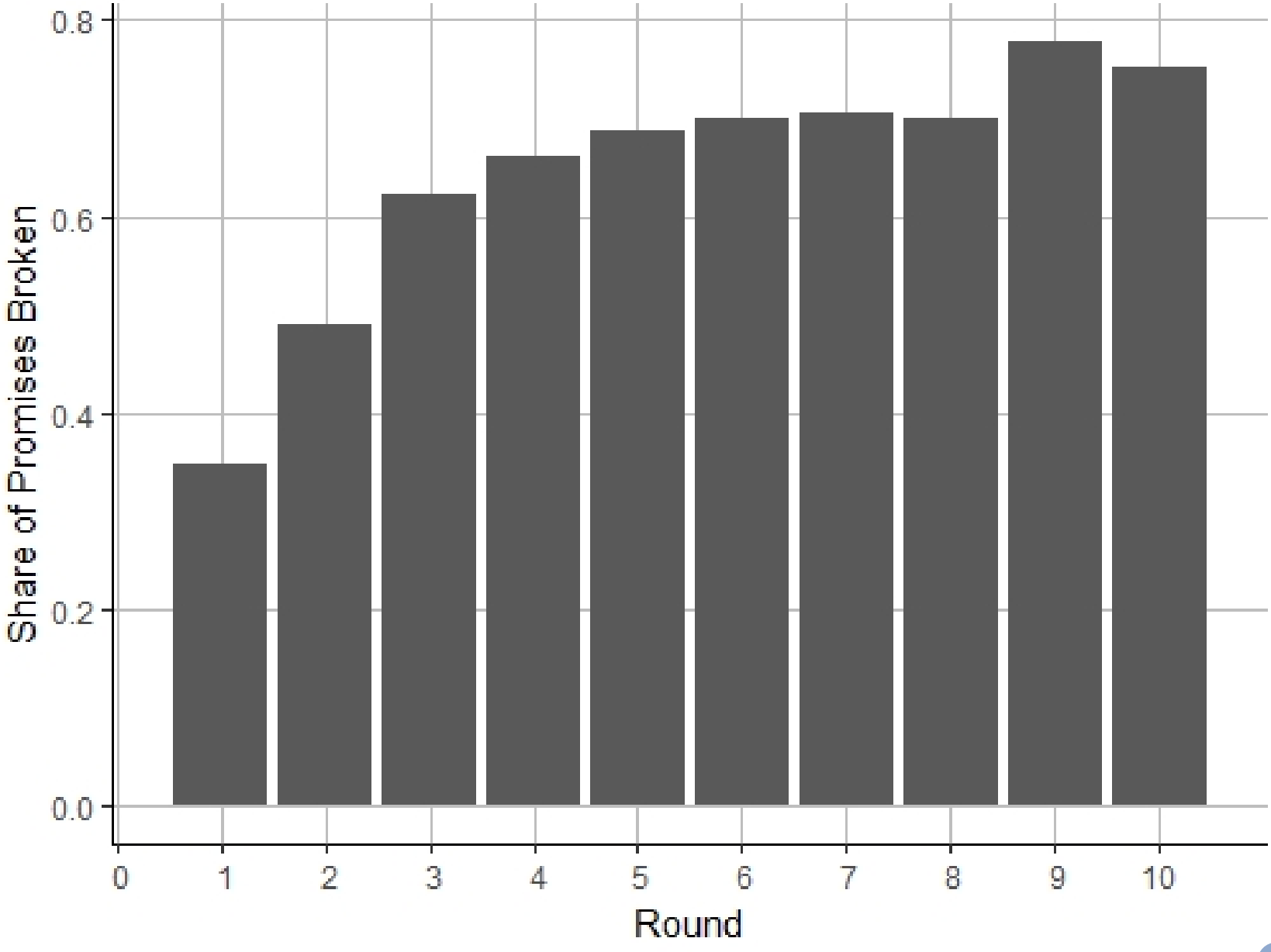
Broken Promises



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Broken Promises - Table

Round	**senders**			Chi-2 test
	all	selected	not-selected	p-value
1	0.346	0.359	0.294	0.273
2	0.490	0.523	0.477	0.493
3	0.621	0.667	0.588	0.193
4	0.660	0.654	0.654	1
5	0.686	0.693	0.686	1
6	0.699	0.739	0.660	0.170
7	0.706	0.719	0.706	0.899
8	0.699	0.778	0.641	0.012
9	0.778	0.797	0.784	0.888
10	0.752	0.725	0.771	0.429

Notes: *The table displays the share of senders who break their promise by round of the promise game. The last column displays the p-value of a test of proportions comparing the share of broken promises by selected and not-selected senders.*

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Example Parametrization

$$g(\rho, x) = \begin{cases} 5 + \frac{(p-x)^2}{p} & \text{if } \rho \neq x; \\ 0 & \text{otherwise,} \end{cases}$$

$\overline{\rho} = 1.$

$f(x) = \frac{-(49.5-x)^2}{33}.$

$\overline{\alpha} = 1.$

$\Rightarrow$ $\underline{x}^n = 0$; $\overline{x}^n = 33.$

$\overline{x}^{max} = 78.87.$

Pooling equilibria with p between 33 and 78.87
Type τ_h fulfills 1/2 of her promise

Back

Equilibria - Refinement D1

- Perfect Bayesian Equilibrium:
  - Worst belief is that ρ comes from type τ_b
  - Buyer expects 0 quality, hence would never select a seller with promise ρ

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- Perfect Bayesian Equilibrium:
  - Worst belief is that ρ comes from type τ_b
  - Buyer expects 0 quality, hence would never select a seller with promise ρ
- Refinements that constrain beliefs: Criterion D1.
- D1 restricts *beliefs about none-equilibrium promises*
- Requires that a buyer beliefs a none-equilibrium promise belongs to type who would deviate for the lowest *selection probability*.
- In other words: The buyer beliefs a promise comes from the agent-type who gains the most utility relative to the equilibrium level.

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Assumption 3

- The probability of type τ_b relative to τ_g is low enough such that if all types promise $\overline{x}^n$, the promise yields higher expected value than a lower promise by τ_h exclusively,

$$\frac{\phi_{\tau_g}}{\phi_{\tau_g} + \phi_{\tau_b}} \overline{x}^n > x^*(\overline{x}^n, \tau_h).$$

where ϕ_τ denotes the likelihood of type τ,

and $x^*(p, \tau)$ the optimal action of type τ after promise p.

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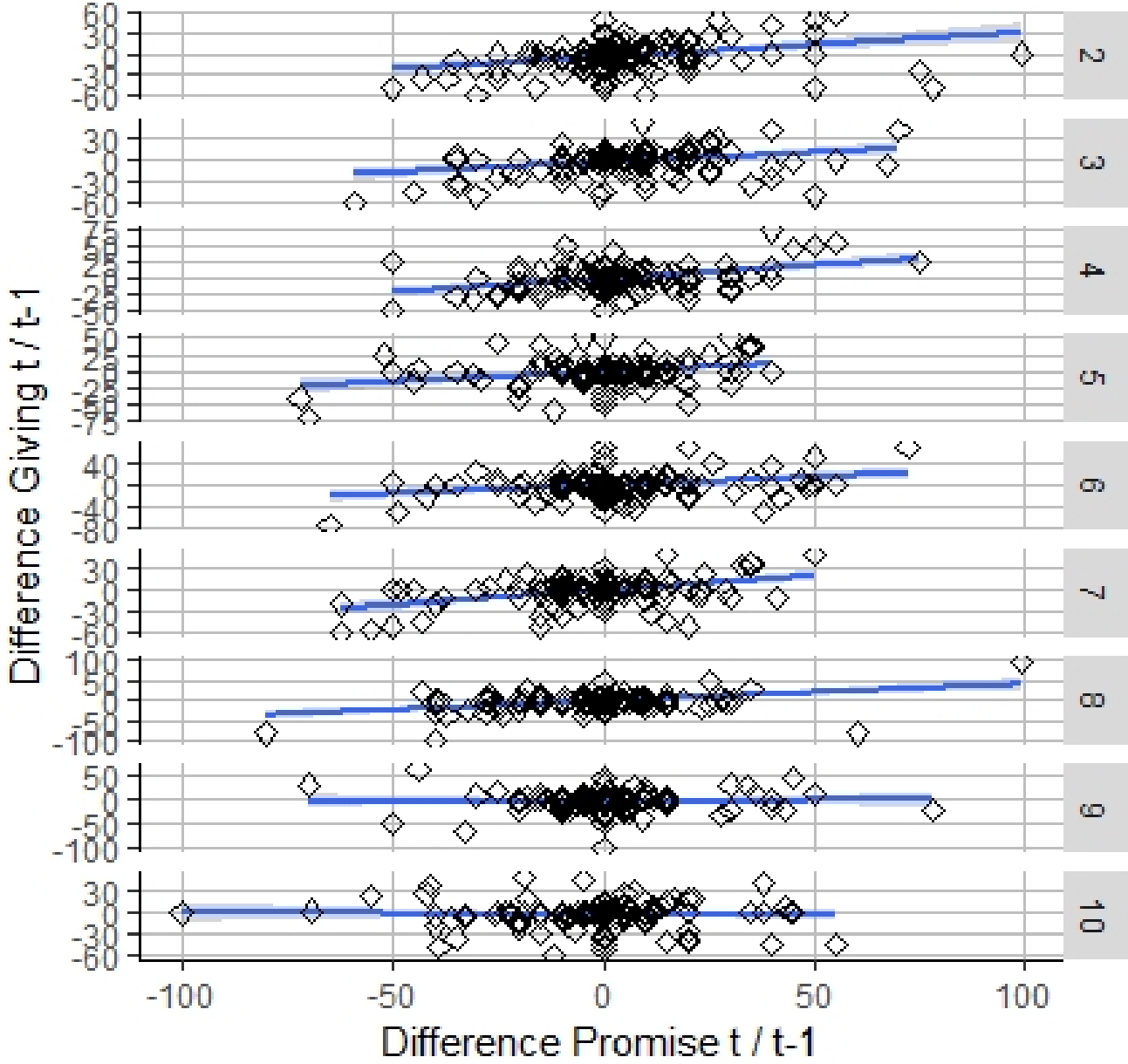
Scatter giving on promises



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Diff Correlation by Type

	$\Delta_{t/t-1}$ Giving	
	keepers	breakers
$\Delta_{t/t-1}$ Promise	0.345***	0.110
	(0.082)	(0.090)
($\Delta_{t/t-1}$ Promise) sqrt	−0.002	−0.002
	(0.001)	(0.002)
Individual FE	X	X
Round FE	X	X
N	900	477
R^2	0.157	0.050

Notes: Regression of difference of giving in round t to $t-1$ on difference of promise. Regression (1) uses participants that keep their promise in round 1. Regression (2) uses participants that break their promise in round 1. Round and individual fixed effects. Clustered standard errors (individual level) in parenthesis.
* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

◂ Back ◂ end

Types

- Promisors differ in two dimensions: (1) Motivation a, (2) Cost of breaking a promise c.
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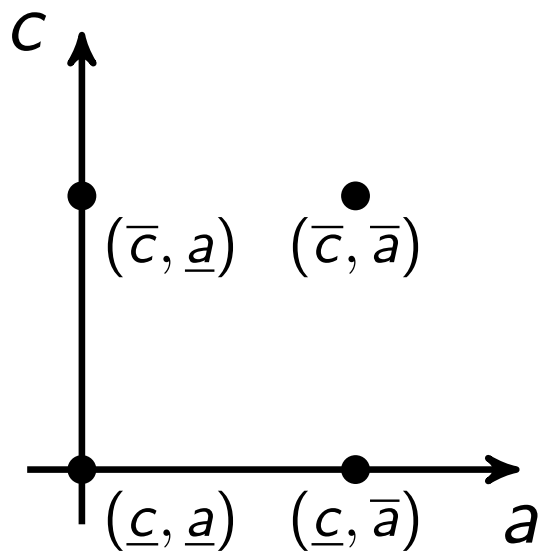

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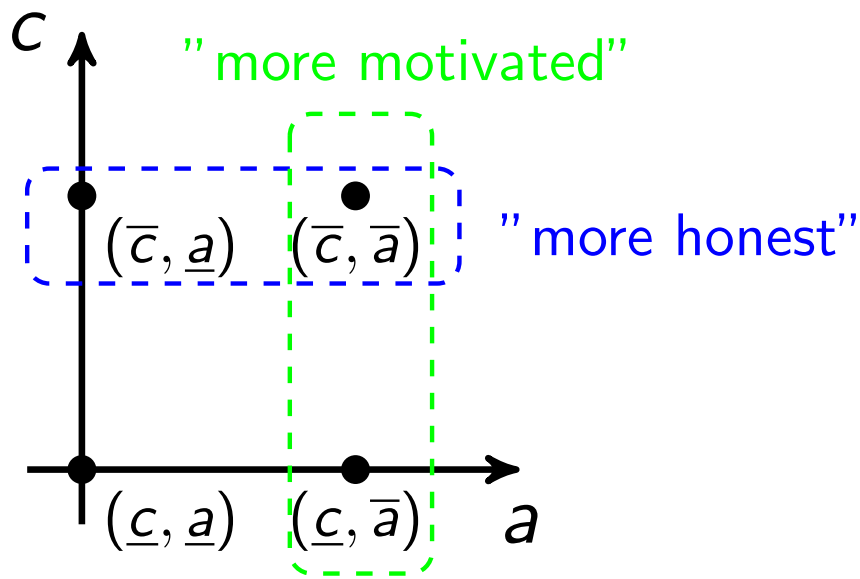

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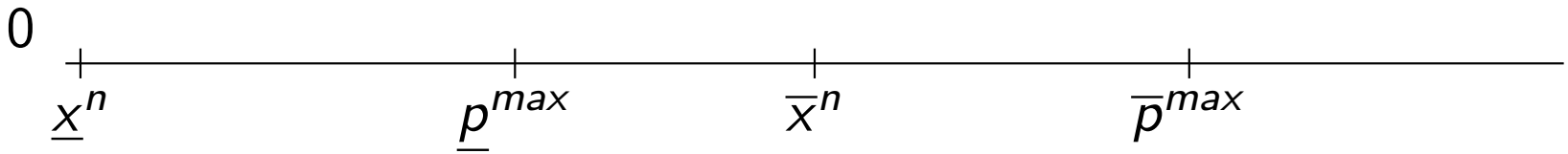
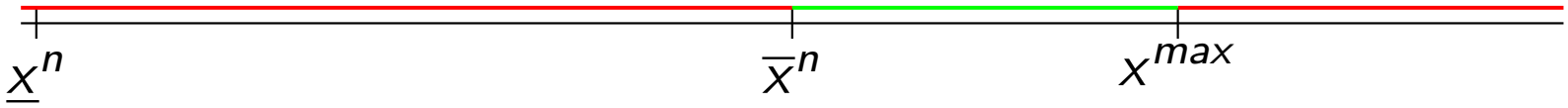
D1 Equilibria



- $\underline{x}^n$, $\overline{x}^n$ natural action of unmotivated/motivated sellers
- $\underline{p}^{max}, \overline{p}^{max}$ highest promise honest/good sellers keep (completely).

D1 Equilibria



- Below $\overline{x}^n$ type τ_g gains most from increasing promise •
- Above x^{max} the principal prefers a lower promise by τ_h •
- Between $\overline{x}^n$ and x^{max} beliefs are that lower promise comes from τ_h and higher promise from τ_b •

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