Behavioral Economics

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Lecture 7: Social preferences

Today's Topics

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1. Exam-like exercise.

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2. Small introduction.

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3. Measurement of Social preferences

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4. Behavioral Model: Social preferences

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3. Measurement of Social preferences
4. Behavioral Model: Social preferences
5. Application.

Exam-like exercise

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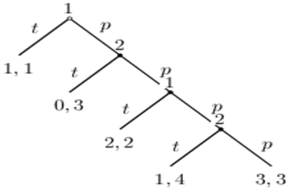

Figure: Game

- The game:
  - Two players 1,2 choose alternately
  - At each stage, a player can
    - choose t and end the game
    - or choose p and move on
  - The game has 4 stages

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- Subgame perfect equilibrium: both players choose t in every stage. The outcome is $(1, 1)$.

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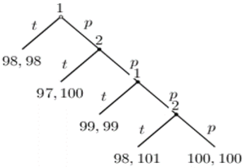

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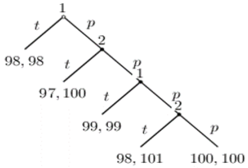

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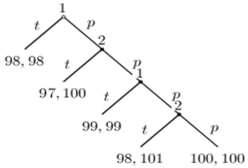

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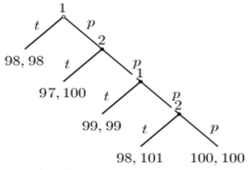

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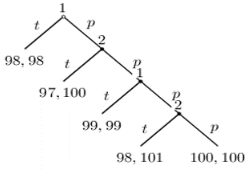

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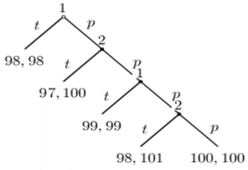

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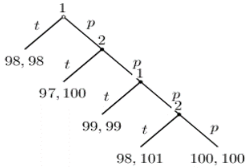

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- Example where situations of others may impact one's own utility.
- **World A Pareto-dominates World B but many people may prefer World B (to be richer than the others).**

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- **But what if utility depends on both x_1 and x_2?**

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- How can we model that?

3. Measurement of Social Preferences.

Dividing a pie

Figure: Pie

The dictator game

The dictator game

- 2 players.

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  - Player 1: proposer/dictator.
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- the dictator receives a monetary amount of S.
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- end of the game (receiver does not act)

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  - This is the solution unless Player 1's utility incorporates the welfare of the other player.

How much would you keep?

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- On average, you chose to keep 6.07 Euros of the initial endowment of $S = 10$ Euros.

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- On average, you chose to keep 6.07 Euros of the initial endowment of $S = 10$ Euros.
- 13% of you kept 10 Euro (so 87% of you passed something to the receiver).
- 40% of you kept exactly 5 Euro.

Findings of the dictator game

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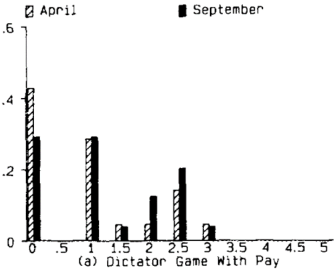

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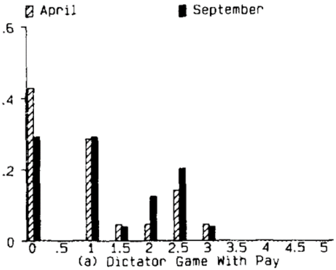

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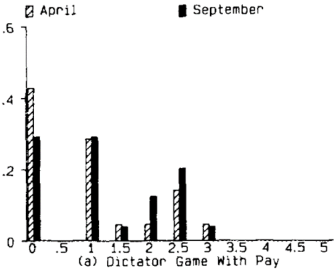

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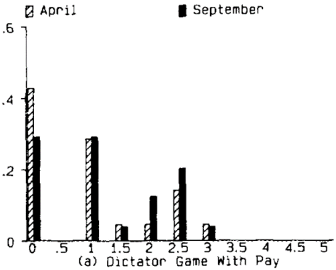

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  - Some are willing to give away up to half of the amount S.
  - Do these results generalize?

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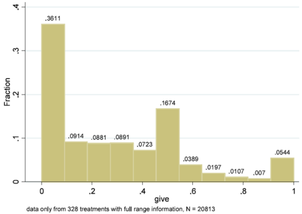

Figure: Distribution of individual give rates (Engel, 2011)

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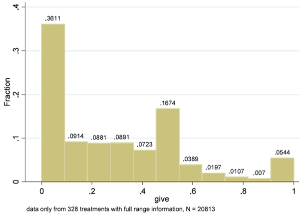

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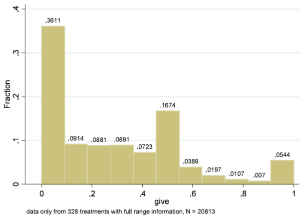

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  - Approx. 66% of subjects pass a positive transfer, giving on average 28.3% of the endowment, S.
  - 16.75% give away up to half of the amount S.

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  - It can be used to measure altruism

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- Stage 2: responder can accept or reject.
  - accept: payoffs $(x, S - x)$
  - reject: payoffs $(0, 0)$

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- Prediction: The SPE is therefore $\{x = S - \varepsilon, \textit{Accept}\}$.

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- When you were in the rol of *proposers*, you kept 5.184 Euro on average.
- When you were in the rol of *responders*:
  - 0% accepted when the proposer kept 10,9,8,7 or 6 Euro.
  - 18% of you accepted when the proposer kept 5 Euro.
  - 43% of you accepted when the proposer kept 4 Euro.
  - 56% of you accepted when the proposer kept 3 Euro.
  - 62% of you accepted when the proposer kept 2 Euro.
  - ...

Findings of the ultimatum game

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Game	c = amount to be distributed (DM)	Demand of player 1 (DM)	Decision of player 2
A	10	7.00	1
B	10	7.50	1
C	9	4.50	1
D	9	6.00	1
E	8	5.00	1
F	8	7.00	1
G	7	4.00	1
H	7	5.00	1
I	4	3.00	0
J	4	3.00	0
K	5	4.99	0
L	5	3.00	1
M	6	5.00	0
N	6	3.80	1
O	10	6.00	1
P	9	4.50	1
Q	8	6.50	1
R	7	4.00	0
S	6	3.00	1
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Figure: Results of Guth (1982)

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- Most proposers propose an amount equal or smaller than 50% to the receiver.
- Rejections appear when the receivers get a small size of the pie.

Results of the ultimatum game

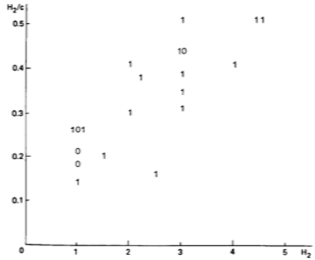

Fig. 2 Experienced acceptance behavior in easy games.

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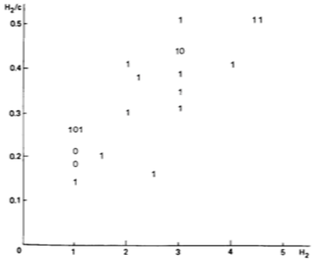

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- This figure shows that rejection is more frequent whenever the share of the pie sent to the receiver is small.
- Do these findings generalize?

Meta-analysis of the ultimatum game

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Variable	Obs.	Mean	Std. dev.	Min.	Max.
Year of publication	75	1998.0 *1998.4*	3.66 *3.60*	1982	2001
Year of experiment	28	1993.9 *1994.7*	3.37 *3.13*	1988	1998
Pie size in USD	57	37.12 *44.08*	86.05 *100.95*	.33	400
100 ∗ pie size in USD/GDP per capita	57	0.6527 *0.9258*	2.534 *3.296*	0.0034	17.62
Number of observations	74	31.57 *48.09*	22.99 *29.10*	3	112
Offered percentage of pie	75	40.41 *40.54*	5.85 *4.94*	26	58
Rejection rate	66	16.20 *15.75*	10.74 *10.18*	0	40
Dummy first/single round	75	0.75 *0.74*	0.44 *0.44*	0	1
Dummy strategy method	75	0.16 *0.21*	0.37 *0.41*	0	1
Dummy economics students	75	0.64 *0.65*	0.48 *0.48*	0	1

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- On average, the endowment is equal to 37 US dollars.
- The mean offer is equal to 40% of the endowment.
- Rejection rates are close to 16%.
- What determines offers and rejections? What do you think?

Meta-analysis of the ultimatum game

Table 2. Descriptive statistics by country.

Country	*N* (1)	Mean offer (2)	Mean reject (3)	IDV (4)	PDI (5)	AUTH (6)	TRUST (7)	COMP (8)	GDP pc (9)	GINI index (10)
Austria	1	39.21	16.10	55	11	−0.05	0.32	6.78	12955	23.1
Bolivia	1	37.00	0.00						1721	42.0
Chile	1	34.00	6.70	23	63	1.10	0.23	5.94	4890	56.5
Ecuador	2	34.50	7.50	8	78				2830	46.6
France	3	40.24	30.78	71	68	−0.15	0.23	5.97	13918	32.7
Germany	1	36.70	9.52	67	35	−1.30	0.38	6.75	11666	30.0
Honduras	1	45.70	23.05						1385	53.7
Indonesia	4	46.63	14.63	14	78				2102	36.5
Israel	5	41.71	17.73	54	13				9843	35.5
Japan	3	44.73	19.27	46	54	−1.58	0.42	5.52	15105	24.9
Yugoslavia	1	44.33	26.67	27	76	−0.65	0.30	7.07	4548	31.9
Kenya	1	44.00	4.00	27	64				914	57.5
Mongolia	2	35.50	5.00						1842	33.2
Netherlands	2	42.25	9.24	80	38	−0.55	0.56	5.60	13281	31.5
Papua New-Guinea	2	40.50	33.50						1606	50.9
Paraguay	1	51.00	0.00						2178	59.1
Peru	1	26.00	4.80	16	64	1.75	0.05	6.54	2092	46.2
Romania	2	36.95	23.50				0.16	7.32	2043	28.2
Slovakia	3	43.17	12.67			−0.55	0.23	6.97	4095	19.5
Spain	1	26.66	29.17	51	57	0.60	0.34	5.70	9802	38.5
Sweden	1	35.23	18.18	71	31	−1.35	0.66	6.78	13986	25.0
Tanzania	4	37.50	19.25	27	64				534	38.2
UK	2	34.33	23.38	89	35	0.10	0.44	6.19	12724	32.6
US East	22	40.54	17.15	91	40	1.11	0.50	6.70	17945	40.1
US West	6	42.64	9.41	91	40	1.11	0.50	6.70	17945	40.1
Zimbabwe	2	43.00	8.50						1162	56.8

- Substantial differences in subjects' behavior across countries

Results of the meta-analysis

Table 3. Determinants of offered shares.

	(1)	(2)	(3)	(4)	(5)	(6)
Year	−0.153	−0.146	−0.167	−0.114	−0.169	−0.252
	(0.158)	(0.162)	(0.154)	(0.168)	(0.159)	(0.175)
100 ∗ Pie/GDP per capita	−0.329**	−0.484**	−0.326**	−0.303**	−0.292**	−0.434**
	(0.161)	(0.216)	(0.164)	(0.142)	(0.144)	(0.195)
Strategy method	2.289*	3.144**	2.029	2.837**	2.325*	2.676*
	(1.232)	(1.518)	(1.312)	(1.191)	(1.307)	(1.367)
First/single round	2.872*	3.487**	2.930*	3.735**	2.688	2.505
	(1.478)	(1.493)	(1.535)	(1.411)	(2.042)	(1.631)
Economics students	−0.464	1.147	−0.213	−0.592	−0.576	1.447
	(1.346)	(1.699)	(1.583)	(1.259)	(1.368)	(1.373)
Europe East		3.435				
		(2.637)				
Europe West		−0.105				
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Israel		0.999				
		(2.833)				
Asia		2.898				
		(1.834)				
South America		1.950				
		(3.143)				
Africa		3.866				
		(2.433)				
US West		2.365				
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US East		reference				
IDV			0.006			
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PDI			0.034			
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AUTH				−1.562**		
				(0.743)		
TRUST					1.504	
					(8.151)	
COMP					0.474	
					(1.248)	
GDP per capita/100						−0.015
						(0.010)
Gini index						0.093
						(0.088)
Constant	40.958**	37.851**	39.055**	40.389**	39.148**	39.512**
	(3.164)	(3.596)	(4.380)	(3.170)	(5.522)	(3.931)
R-squared	0.1423	0.2089	0.1479	0.1827	0.1442	0.1815
# studies	75	75	75	75	75	75

- What determines offers?

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- What determines offers?
  - The size of the offer is negatively correlated to the size of the endowment.

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	(0.161)	(0.216)	(0.164)	(0.142)	(0.144)	(0.195)
Strategy method	2.289^{*}	3.144^{**}	2.029	2.837^{**}	2.325^{*}	2.676^{*}
	(1.232)	(1.518)	(1.312)	(1.191)	(1.307)	(1.367)
First/single round	2.872^{*}	3.487^{**}	2.930^{*}	3.735^{**}	2.688	2.505
	(1.478)	(1.493)	(1.535)	(1.411)	(2.042)	(1.631)
Economics students	−0.464	1.147	−0.213	−0.592	−0.576	1.447
	(1.346)	(1.699)	(1.583)	(1.259)	(1.368)	(1.373)
Europe East		3.435				
		(2.637)				
Europe West		−0.105				
		(1.875)				
Israel		0.999				
		(2.833)				
Asia		2.898				
		(1.834)				
South America		1.950				
		(3.143)				
Africa		3.866				
		(2.433)				
US West		2.365				
		(1.661)				
US East		reference				
IDV			0.006			
			(0.031)			
PDI			0.034			
			(0.040)			
AUTH				-1.562^{**}		
				(0.743)		
TRUST					1.504	
					(8.151)	
COMP					0.474	
					(1.248)	
GDP per capita/100						−0.015
						(0.010)
Gini index						0.093
						(0.088)
Constant	40.958^{**}	37.851^{**}	39.055^{**}	40.389^{**}	39.148^{**}	39.512^{**}
	(3.164)	(3.596)	(4.380)	(3.170)	(5.522)	(3.931)
R-squared	0.1423	0.2089	0.1479	0.1827	0.1442	0.1815
# studies	75	75	75	75	75	75

- What determines offers?
    - The size of the offer is negatively correlated to the size of the endowment.
    - The scale of respect to authority decreases the size of the shares.
        - in countries in which authority is respected more, proposers offer less

Results of the meta-analysis

Table 4. Determinants of rejection rates.

	(1)	(2)	(3)	(4)	(5)	(6)
Year	−0.507	−0.327	−0.377	−0.473	−0.551	−0.489
	(0.373)	(0.403)	(0.387)	(0.370)	(0.424)	(0.372)
100 * Pie/GDP per capita	−1.019**	−1.009**	−1.022**	−1.003**	−0.973**	−1.194**
	(0.239)	(0.208)	(0.238)	(0.233)	(0.216)	(0.276)
Strategy method	12.611**	13.724**	11.727**	12.800**	12.970**	12.512**
	3.422	(3.684)	(3.504)	(3.498)	(3.760)	(3.707)
First/single round	−2.562	−1.505	−2.220	−2.114	−3.004	−1.870
	(2.498)	(3.552)	(2.645)	(2.735)	(3.385)	(3.072)
Economics students	1.345	7.797	4.826	1.361	0.943	5.541
	(3.036)	(7.419)	(4.861)	(3.059)	(3.777)	(4.941)
Offered share	−0.491**	−0.541**	−0.484**	−0.512**	−0.495**	−0.547**
	(0.228)	(0.188)	(0.224)	(0.237)	(0.236)	(0.220)
Europe East		0.938				
		(4.671)				
Europe West		−0.462				
		(3.223)				
Israel		3.293				
		(6.892)				
Asia		12.981*				
		(7.487)				
South America		0.156				
		(8.465)				
Africa		5.939				
		(7.812)				
US West		−7.042**				
		(2.767)				
US East		Reference				
IDV			−0.058			
			(0.079)			
PDI			0.060			
			(0.087)			
AUTH				−0.827		
				(1.396)		
TRUST					3.696	
					(13.842)	
COMP					0.449	
					(1.945)	
GDP per capita/100						−0.033
						(0.025)
Gini index						0.026
						(0.151)
Constant	44.070**	35.731**	40.140**	44.286**	42.401**	44.945**
	(13.802)	(15.735)	(14.044)	(14.256)	(14.321)	(13.806)
R-squared	0.3411	0.4826	0.3644	0.3437	0.3421	0.3603
# studies	66	66	66	66	66	66

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# studies	66	66	66	66	66	66

- What determines rejections?
  - Size of the pie and share offered to the responder have a negative effect on rejection rate
  - The scale of respect to authority has no impact on rejection rate.

Summary of ultimatum game

- Experimental findings:
  - Proposers offer a positive amount (often an equal split)
  - Responders often reject offers below 20 %

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- Can be used to measure the other aspect of fairness
  - I may not like to get much more than someone else for no reason, so I would give part of it (altruism)
  - I may also dislike getting much less than someone else.

4. Behavioral Model: Social Preferences.

Beyond the classical assumptions

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Beyond the classical assumptions

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- Idea:
  - a person i's utility function $u_i(\cdot)$ has two or more arguments, i.e. $u_i(x_i, x_j)$, where x_i is i's payoff, x_j is the other person's payoff.

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- Example:

$$u_1(x_1, x_2) = x_1 + \lambda x_2 \text{ with } \lambda > 0$$

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$$u_i(x_1, ..., x_n) = x_i - \frac{\alpha_i}{n-1} \sum_{j=1}^{n} \max(x_j - x_i, 0) - \frac{\beta_i}{n-1} \sum_{j=1}^{n} \max(x_i - x_j, 0)$$

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  - α_i is i's aversion to disadvantageous inequality (activated if $x_j > x_i$).
  - β_i is i's aversion to advantageous inequality (activated if $x_i > x_j$).
  - Further, assume $\beta \leqslant \alpha$ and $0 \leqslant \beta < 1$.

Inequity aversion

- Example: 2 players

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- Increase payoff of player 2: $u_1(2, 3) = 2 - \alpha_1$.

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  - Increase payoff of player 2: $u_1(2,3) = 2 - \alpha_1$.
    - 1 is less happy even though his own payoff did not change and even though $(2,3)$ dominates $(2,2)$.

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  - Increase payoff of player 2: $u_1(2, 3) = 2 - \alpha_1$.
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  - Decrease payoff of player 2 : $u_1(2, 1) = 2 - \beta_1$.
    - 1 is less happy even though his own payoff did not change. Note that he prefers that 2 gets -1 than $+1$ because $\beta_1 \leqslant \alpha_1$.

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  - Decrease payoff of player 1: $u_1(1,2) = 1 - \alpha_1$.
    - Worst case for 1. He gets less and there is inequality.

Dictator Game under Inequity Aversion

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$$u_1(x_1, x_2) = x_1 - \alpha_1 \max(x_2 - x_1, 0) - \beta_1 \max(x_1 - x_2, 0)$$

- $S = 10$. Imagine that the dictator keeps $x = 5$. What do we learn?

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  - which means $5–0 \cdot \alpha_1–0 \cdot \beta_1 > 6 - 0 \cdot \alpha_1 - 2 \cdot \beta_1$.
  - Implies $\beta_1 > 1/2$.
  - We learned something about β_1!

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  - which means $5 – 0 \cdot \alpha_1 – 0 \cdot \beta_1 > 6 - 0 \cdot \alpha_1 - 2 \cdot \beta_1$.
  - Implies $\beta_1 > 1/2$.
  - We learned something about β_1!
- $u_1(5,5) > u_1(4,6)$.
  - which means $5 – 0 \cdot \alpha_1 – 0 \cdot \beta_1 > 4 - 2 \cdot \alpha_1 - 0 \cdot \beta_1$.

Dictator Game under Inequity Aversion

$$u_1(x_1, x_2) = x_1 - \alpha_1 \max(x_2 - x_1, 0) - \beta_1 \max(x_1 - x_2, 0)$$

- $S = 10$. Imagine that the dictator keeps $x = 5$. What do we learn?
- $u_1(5,5) > u_1(6,4)$
  - which means $5–0 \cdot \alpha_1–0 \cdot \beta_1 > 6 - 0 \cdot \alpha_1 - 2 \cdot \beta_1$.
  - Implies $\beta_1 > 1/2$.
  - We learned something about β_1!
- $u_1(5,5) > u_1(4,6)$.
  - which means $5–0 \cdot \alpha_1–0 \cdot \beta_1 > 4 - 2 \cdot \alpha_1 - 0 \cdot \beta_1$.
  - Implies $\alpha_1 > -1/2$ (always true given our assumptions).

Dictator game under Inequity aversion

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Dictator game under Inequity aversion

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- We need to see how someone would react if (s)he gets less than someone else...
- Like in the ultimatum game!

Ultimatum Game under Inequity aversion

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- Stage 2: receivers use

$$u_2(x_2, x_1) = x_2 - \alpha_2 \cdot \max(x_1 - x_2, 0) - \beta_2 \cdot \max(x_2 - x_1, 0)$$

to decide.

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- It gives $2 – \alpha_2 \cdot 6 – \beta_2 \cdot 0$ if receiver accepts.

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- It gives $2 – \alpha_2 \cdot 6 – \beta_2 \cdot 0$ if receiver accepts.
- It gives $0 – \alpha_2 \cdot 0 – \beta_2 \cdot 0$ if receiver rejects the offer.
- Receiver rejects if $2 – \alpha 2 \cdot 6 < 0$, that is, if $\alpha_2 > 1/3$

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  - $\beta_1 > 0$.
  - When they give 50-50, then $\beta_1 > 1/2$; when they give less, then $0 < \beta < 1/2$.
  - We don't learn much when they give more than 50/50.

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  - We don't learn much when they give more than 50/50.
- **Ultimatum game:** players in the role of receivers tend to reject small offers.
  - $\alpha_1 > 0$.
  - The higher the offer they reject, the larger α_1.

5. Application

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- Field evidence of inequity aversion from a fruit farm in the UK.
- Bandiera et al. (2005).

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  - Negative externality of relative pay: increasing own pay comes at cost of other's pay
  - Workers may reduce effort if they care about others.

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    - Incentive to keep the productivity low if care about others.
  - Next 8 weeks:
    - Compensation switched to flat piece rate per fruit.
    - Externalities shut down.
    - Switch announced on the day change took place (so it came as a surprise to workers).

Application

Application

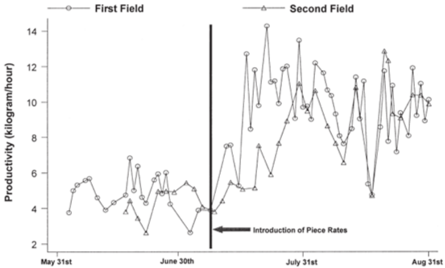

FIGURE I
Productivity (kilogram/hour) over the Season

- Figure shows average worker productivity for two fields of the farm.
- No trends before introduction of piece rates
- Introduction of piece-rate pay increases productivity by over 50 percent.

Application

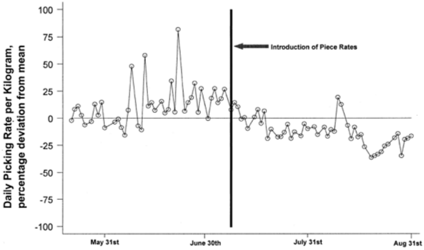

Figure IIIa
Unit Wage over the Season

- Increase in productivity not due to increased payment per unit of output.

Application

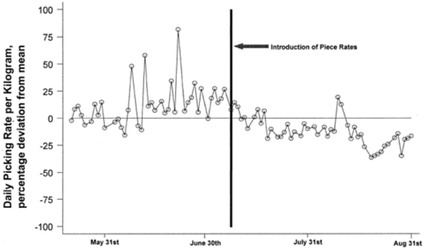

FIGURE IIIa
Unit Wage over the Season

- Increase in productivity not due to increased payment per unit of output.
- Wage per unit (kg) of output decreased with introduction of piece rates.

Application

	(1a) Relative incentives	(1b) Relative incentives	(2a) Piece rates	(2b) Piece rates
Share of workers in the field who are friends	−1.68*** (.647)	−5.52** (2.36)	.072 (.493)	1.17 (1.60)
Share of workers in the field who are friends × number of workers in same field		1.60** (.684)		−.285 (.501)
Number of workers in same field		.182 (.117)		.085 (.069)
Marginal effect of group size (at mean friends' share)		.236** (.110)		.076 (.065)
Worker fixed effects	Yes	Yes	Yes	Yes
Field fixed effects	Yes	Yes	Yes	Yes
Other controls	Yes	Yes	Yes	Yes
Adjusted R^2	.3470	.3620	.3065	.3081
Number of observations (worker-field-day)	2860	2860	4400	4400

- Stronger effects if working with friends

Application

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- No impact of piece rate for Fruit Type 2.

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  - No evidence of pure altruism.

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  - Fruit Type 2 (Raspberries): high and dense shrubs ⇒ others' productivity unobserved.
- No impact of piece rate for Fruit Type 2.
  - No evidence of pure altruism.
  - Effects could be driven by social preferences.

Application

	(1) Fruit type 2	(2) Fruit type 1	(3) Fruit types 1 and 2 combined
Piece rate dummy (P_t)	−.063	.483***	
	(.129)	(.094)	
Piece rate × fruit type 2			−.100
			(.095)
Piece rate × fruit type 1			.490***
			(.092)
Worker fixed effects	Yes	Yes	Yes
Field fixed effects	Yes	Yes	Yes
Other controls	Yes	Yes	Yes
Adjusted R^2	.3015	.3777	.6098
Number of observations (worker-field-day)	934	4224	5150

- Dependent variable: log worker productivity (kg picked per hour)
- No effect on Fruit Type 2 (raspberries) suggesting effects are driven by social preferences
- Results highlight importance of setting incentives carefully.

Exam-like exercise: Dictator Game with Punishment

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- The Game:

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  - Dictator Ann divides 10 between Ann and Bill. She keeps y.

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  - C's payoffs: $X_C = 5$

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- Charles Utility

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  - C's payoffs: $X_C = 5$
- Charles Utility

$$
\begin{aligned}
u_C(X_A, X_B, X_C) = & X_C - \\
& \alpha \cdot \big(\max(X_A - X_C, 0) + \max(X_B - X_C, 0) \big) - \\
& \beta \cdot \big(\max(X_C - X_A, 0) + \max(X_C - X_B, 0) \big)
\end{aligned}
$$

Exam-like exercise: Dictator Game with Punishment

- How much will Charles punish if Ann proposes to give 4 Euro to Bill i.e., $y = 6$?

Exam-like exercise: Dictator Game with Punishment

- How much will Charles punish if Ann proposes to give 4 Euro to Bill i.e., $y = 6$?
- How much will Charles punish if Ann proposes to give 2 Euro to Bill?

The End!