Econ 219B
Psychology and Economics: Applications (Lecture 7)

Stefano DellaVigna

March 4, 2020

Outline

1. Shaping Social Preferences
2. Social Preferences Wave II: Warm Glow and Charitable Giving
3. Social Preferences Wave III: Inequity Aversion and Reciprocity
4. Workplace Effort: Inequity Aversion
5. Methodology: Field Experiments
6. Social Preference Wave III: Reciprocity and Gift Exchange
7. Gift Exchange: Workplace

Section 1

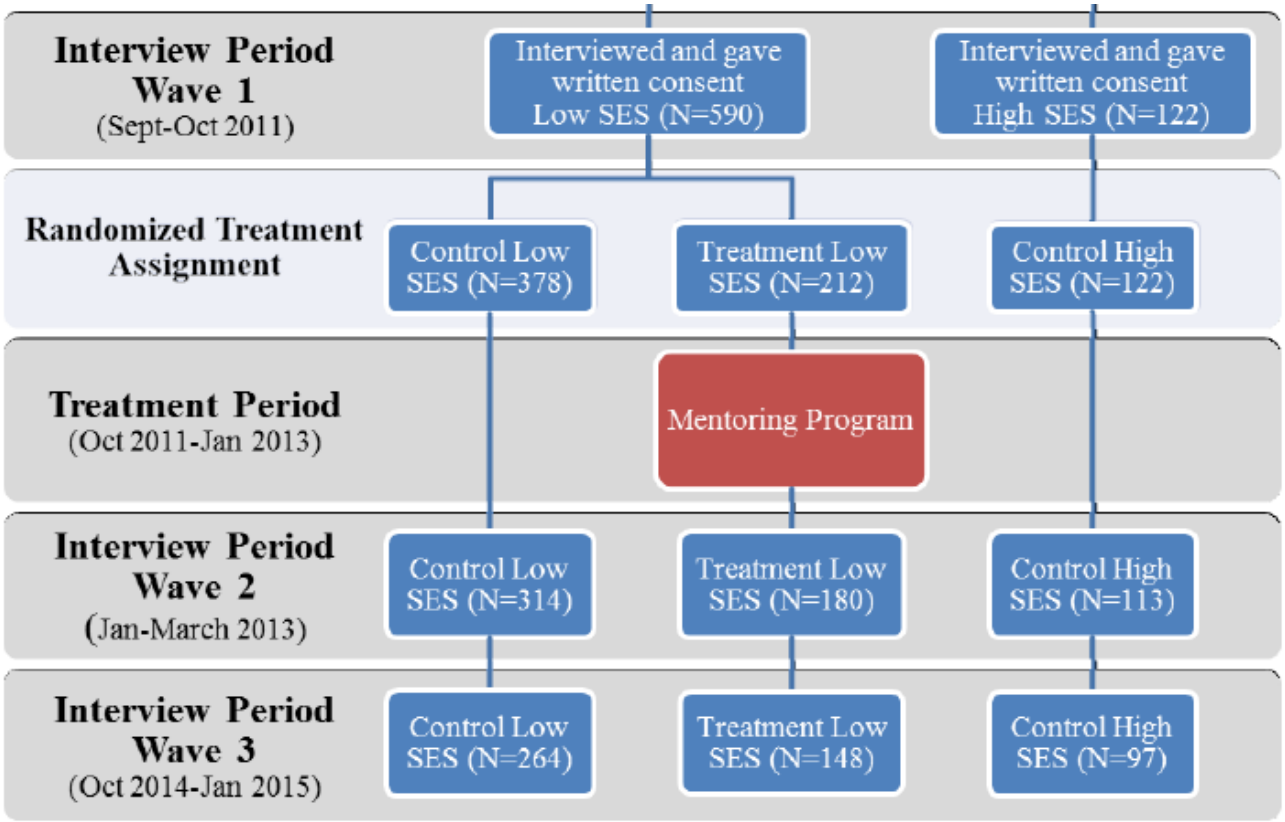
Shaping Social Preferences

Introduction

- In given economic setting, take preferences as given (Becker, '*De Gustibus non est disputandum*')
- But over medium-term, preferences can shift
- Focus on evolution of social preferences
- Example 1: **Hjort (2014 QJE)** – conflict affects social preferences between workers of different ethnicity

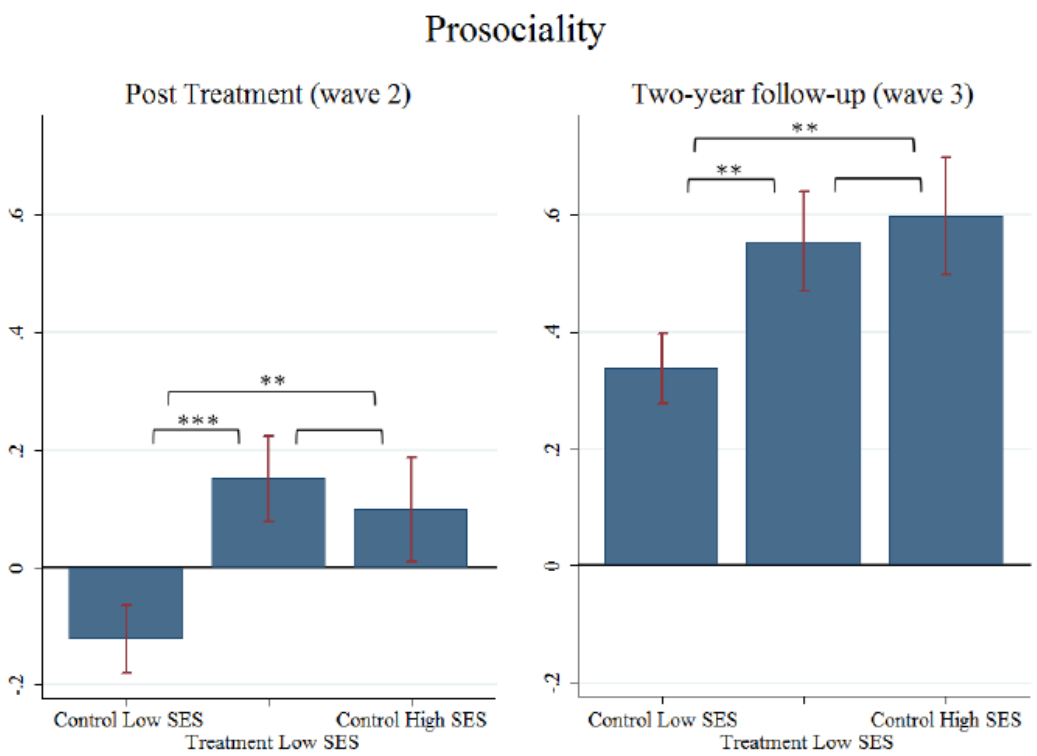
Example 2: Deckers, Falk, Kosse, Schildberg-Hörisch (JPE, forthcoming)

- Program in Germany for low income children ages 7-9, assign
  - 1.5 year mentoring program
  - OR control



Measures

- Measure 1: Children 6 stars (traded with toys) between themselves and another (anonymous) child, local or in Africa
- Measure 2: Ask 'How much do you trust others'



Example 3: Cappelen et al. (JPE, forthcomig)

- Example 3: **Cappelen, List, Samek, and Tungodden (JPE, forthcoming)**
  - They set up a pre-school (!) in Chicago Heights, IL, high-poverty area
  - Randomized access to preschool
  - Examine, among other things, the impact on social preferences
- Slides courtesy of Anya

CHECC

Chicago Heights Early Childhood Center

- In 2010-2012, households with children ages 3-4 years were recruited and randomized into one of three groups:

Preschool

Free, 9-month full-day preschool for the child (no direct intervention for the parent)

Parent Academy

Free, 9-month incentivized parenting program for parents to learn how to teach to child at home. Parents incentivized (could earn up to $7,000)

Control ("Family Program")

Neither child or parent received interventions. Families invited to activities to reduce attrition.

CHECC Academic Outcomes

- Parent Academy has large impact on “non-cognitive” or executive functioning skills - working memory, attention, inhibitory control – which fade over time (Fryer, Levitt, List, 2015).

- Preschool has large impact on “cognitive” skills – reading, writing, math – which also fade by 2nd grade (Fryer, Levitt, List, Samek, work in progress).

- Both programs also show some differential impacts by sub-group, e.g., for PK the effects are concentrated among lowest performing kids.

Our Experiment

- Take advantage of the CHECC RCT to study the causal impact of Preschool/Parent Academy programs (relative to control group) on social preferences.
- Return to children from original CHECC program 2 years later (when they are 7-8 years old) and conduct social preference experiments.

- Prior agreement with School District 170 (9 schools) to follow up with children in-class. We reached <u>all</u> children attending SD170 at the time of the social preference experiment.
- Our children feed into several districts (no agreements with other districts), so we capture 38% of Preschool (N=84), 38% of Parent Academy (N=89) and 35% of Control (N=130).

Overview of Experiments

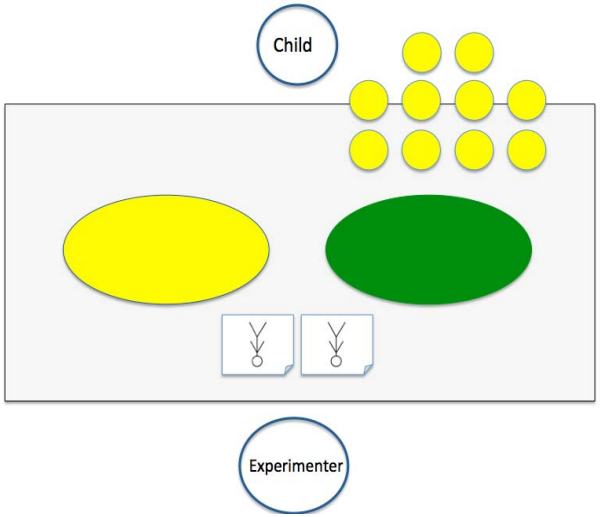
Experiment	Type	Description
Dictator	Stakeholder	Allocate coins between self and another child.
Efficiency	Spectator	Choose between an unfair and efficient allocation or a fair and inefficient allocation.
Luck	Spectator	Allocate stickers between a lucky child and an unlucky child.
Merit	Spectator	Allocate stickers between a child who did well and a child who did not do well.

Luck Game

[…] these kids are not the same as the two you decided for before […]

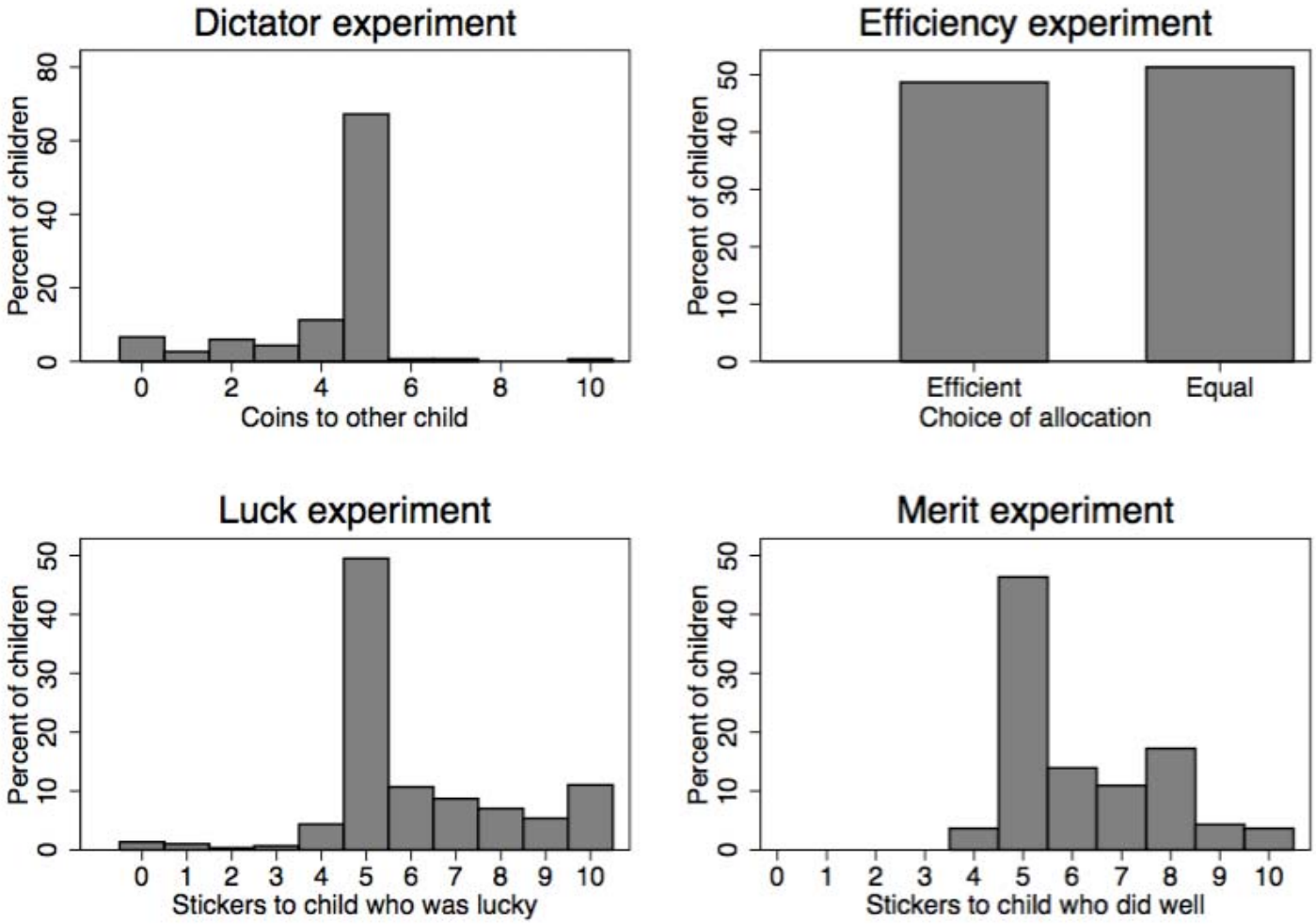
We are going to decide what each of the kids get by flipping a token. If [it] up GREEN, […] the kid with the GREEN plate gets all the stickers and the kid with the YELLOW plate is given no stickers [repeat for Yellow].

Even though this is what the kids got, ***now YOU can decide whether you want to change the number of stickers given to each of them. You can choose to split up the stickers any way you want.***



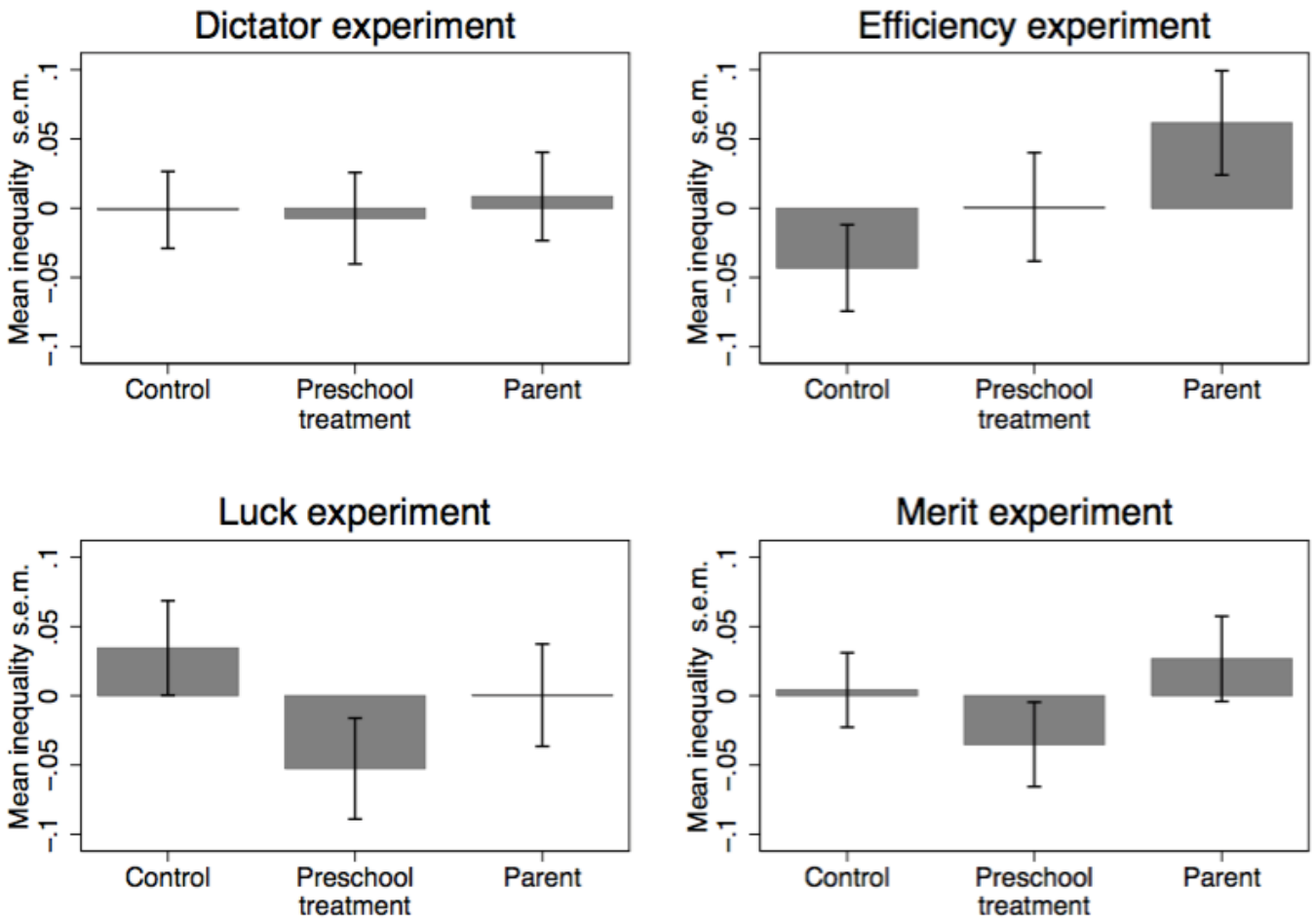
Summary of Results

- Percent of children implementing each decision



$$\text{Inequality} = \frac{|\text{Income Person } A - \text{Income Person } B|}{\text{Total Income}}$$

- Mean inequality implemented, relative to average, by treatment.



Example 4: Rao (2019)

- Example 3: **Rao (AER, 2019):** Consider the impact of exposure to students of different social class on preferences
- Remarkable impacts over just 1-2 years of exposure
- Policy now rolled out nationally in India
- Slides courtesy of Gautam

Elite Private Schools in Delhi

Elite private schools are:

- Expensive: Tuition \$500-\$2500/year (25-110% of median annual household income)
  - Public schools are free
- Selective: In my sample, accept $\approx 7\%$ of applicants
  - Strictly regulated admissions criteria
    - Neighborhood
    - Older siblings in same school
    - Parents alumni, parent interview

Policy Innovation

Policy change in Delhi in 2007:

- 20% admissions quota in private schools for poor students
  - Household income cutoff: $2000/year
- Schools which received subsidized land from *state* govt.
  - Over 90% of elite private schools
- No fees for poor children
- No tracking

Variation across classrooms

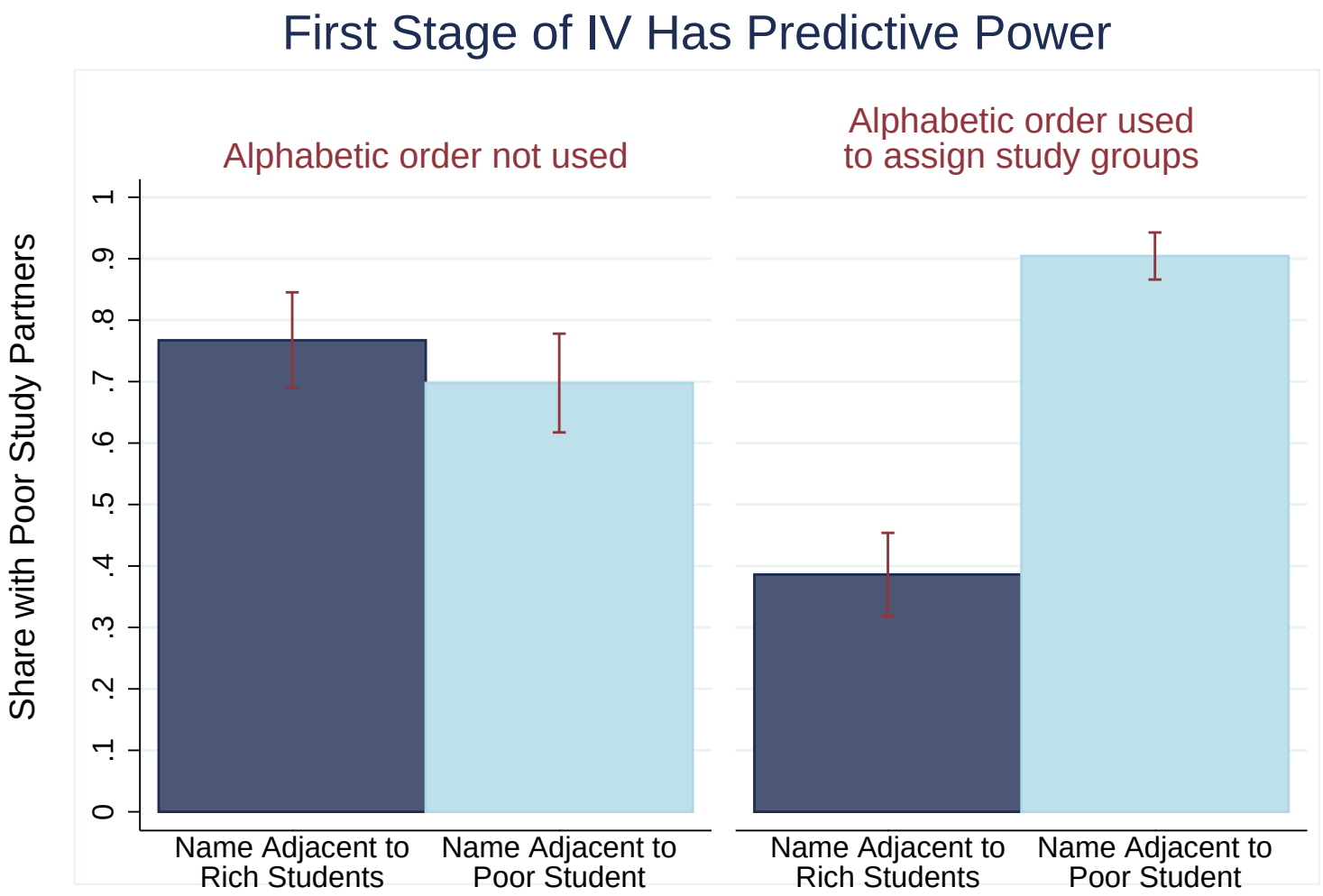
Sample for this paper:

- $k = 14$ schools
  - 9 Treatment Schools
  - 2 Delayed Treatment Schools
  - 3 Control Schools
- $n = 2017$ randomly selected students in 14 schools
  - in Grades 2-5
- Over-sample control, delayed treatment schools
  - Treatment schools in same neighborhoods

Variation within classroom (IV strategy)

- 1 hr a day working in small groups of 2-4 students
- Some schools ($k = 7$) use alphabetic order of *first* name to assign study groups.
  - Exogeneous variation in personal interactions
- Other schools ($k = 4$) frequently shuffle groups
  - Only "direct" effect of name

Alphabetic Order Predicts Study Partners

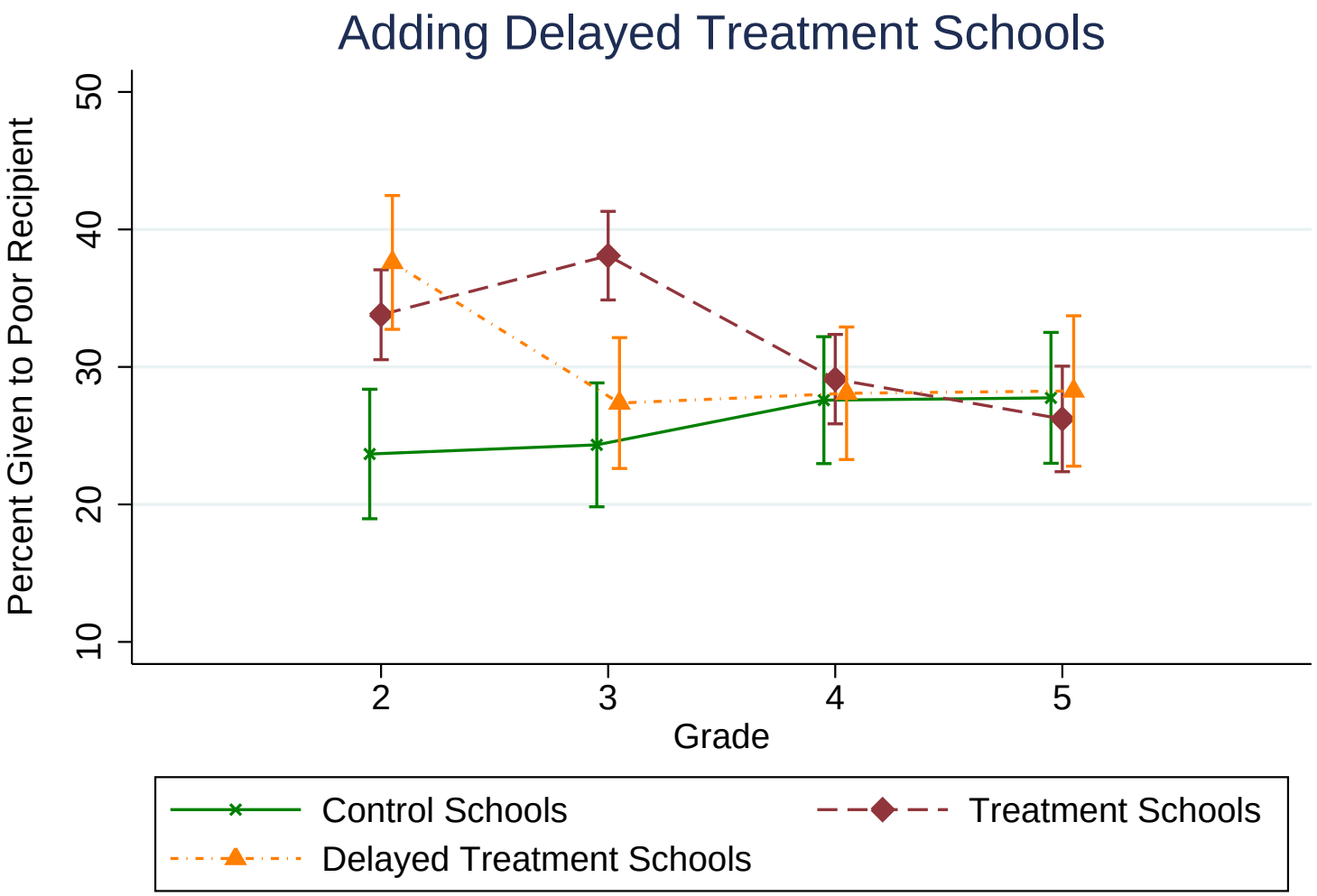


Note: 95% confidence intervals around mean amount given.

Dictator Games

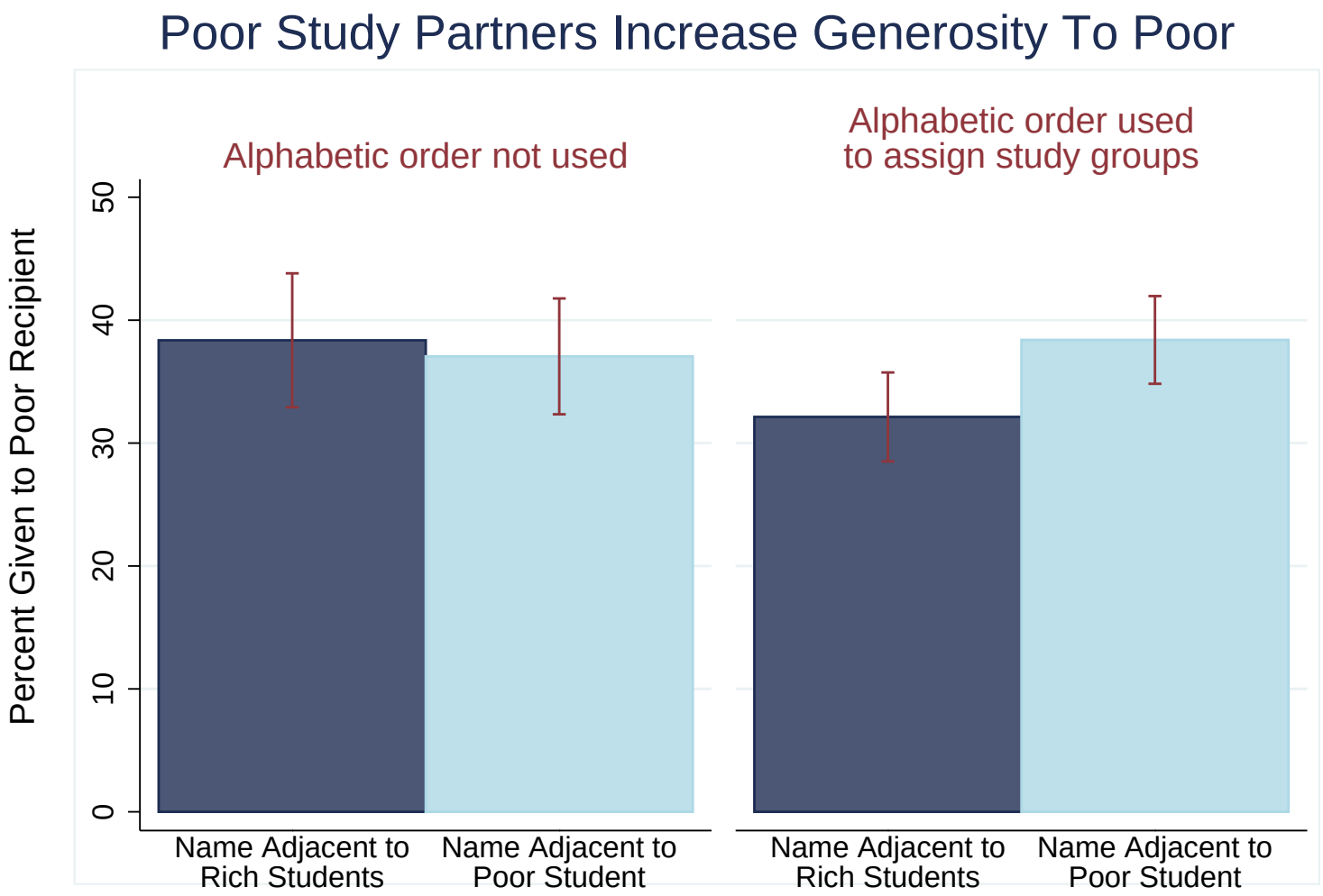
- Students endowed with 10 Rupees, choose to share $x \in [0, 10]$
  - Can exchange money for candy later (Rs. 1 per piece)
- Vary the identity of the recipient
  - Game 1: **Poor** student in a school for poor children
  - Game 2: **Rich** student in a private (control) school
  - Order randomized
- Name and photographs of school shown to subjects.
  - Debriefing: Subjects understood recipient poor / rich

Dictator Game with Poor Recipient



Note: 95% confidence intervals around mean amount given.

Dictator Game with Poor Recipient

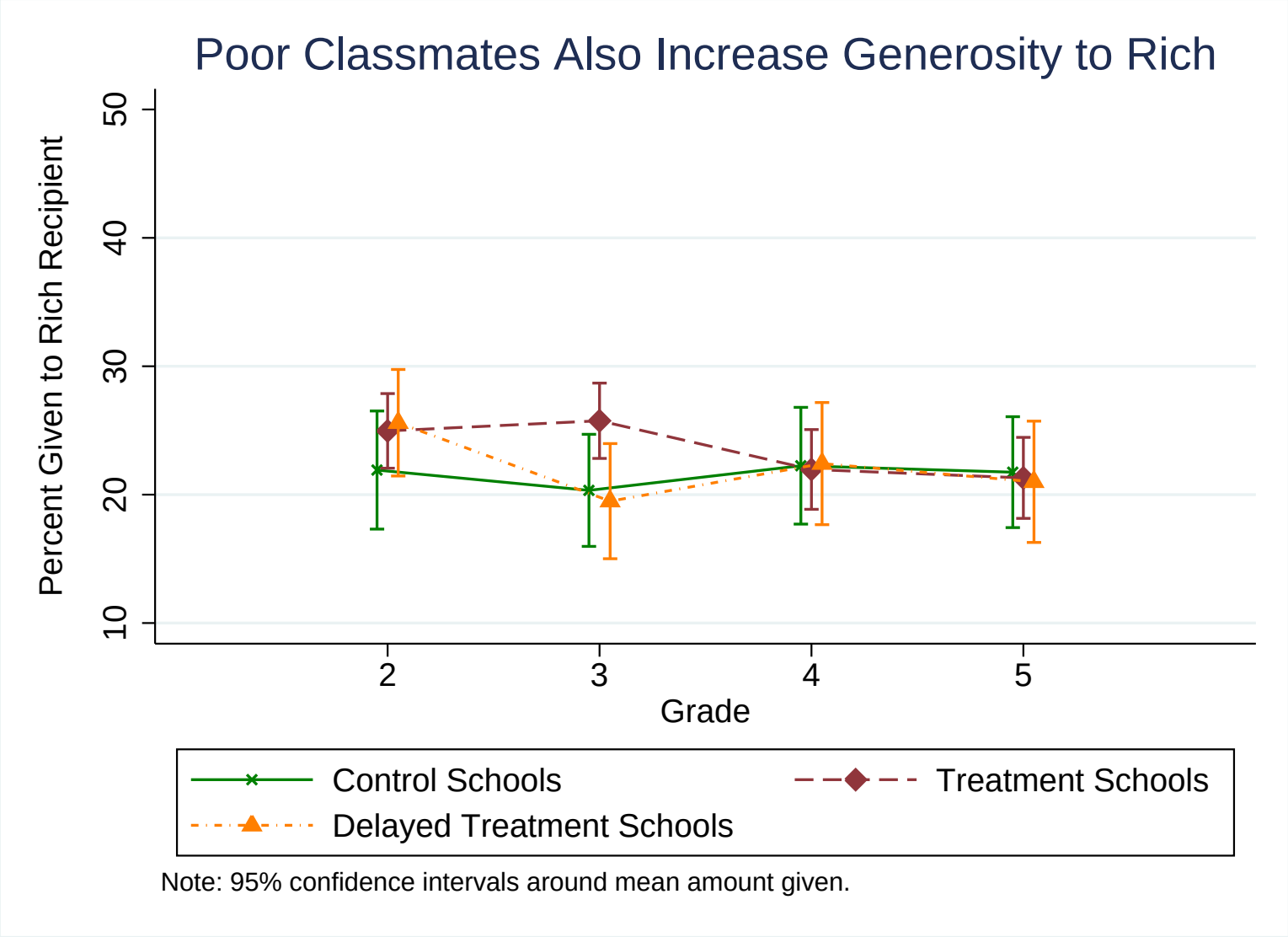


Note: 95% confidence intervals around mean amount given.

Dictator Game with Poor Recipient - Regressions

	Dependent Variable: Share Given to Poor Recipient in Dictator Game (%)			
	(1)	(2)	(3)	(4)
Specification:	DiD	DiD	IV	DiD+IV
Sample:	Full Sample	Younger Sibs	Treated Class	Full Sample
Treated Classroom	12.22***	12.95***		8.747**
	(1.901)	(2.274)		(3.510)
Has Poor Study Partner			7.53**	12.08***
			(3.147)	(4.313)
Controls	Yes	Yes	Yes	Yes
Fixed Effects	School, Grade	School, Grade	Classroom	School, Grade
p-value (CGM)	< 0.01	< 0.01	.	.
Control Mean	27.12	26.75	33.77	27.12
Control SD	27.22	26.53	28.13	27.22
N	2015	1141	677	2015

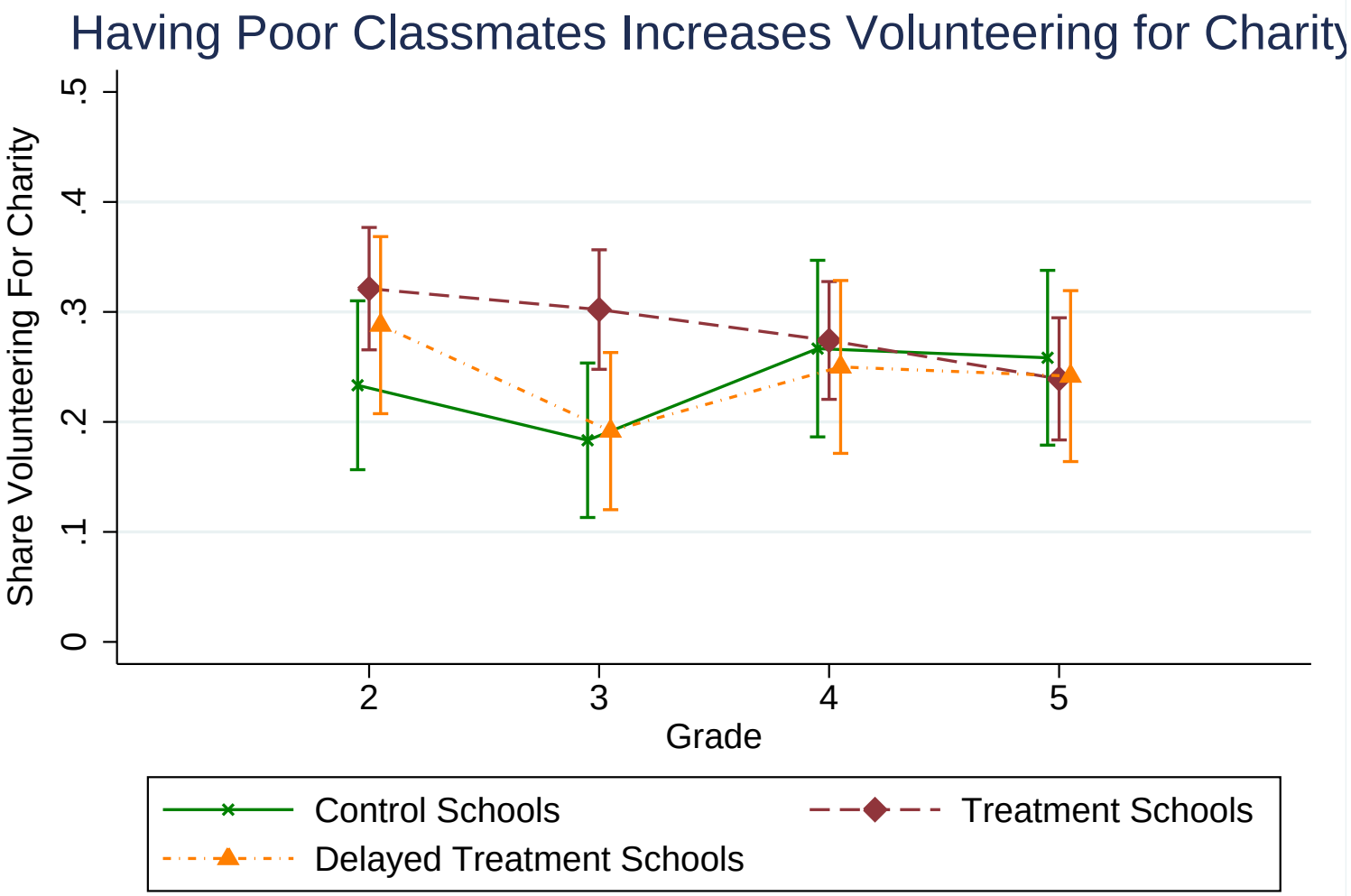
Dictator Game with Rich Recipient



Volunteering for charity

- Schools offer volunteer opportunity for charities
  - Spend two weekend afternoons in school to help fundraise for a children's NGO
- Participation is strictly voluntary
  - Only 28% of students participate
- Administrative data on attendance

Volunteering for charity



Note: 95% confidence intervals around mean amount given.

Field experiment on team selection

- Subjects are students from two elite private schools
  - One treatment school, one control school
  - We invite *athletic* poor students from a public school
- Students must choose teammates to run relay race
  - Tradeoff ability vs. social similarity
- $n = 342$

Team Selection Experiment Design

Stage 1: Randomization

- Randomized to sessions with varying stakes
  - Rs. 50, Rs. 200 or Rs. 500 per student for winning team
    - Rs. 500 ($10) approx. one month's pocket money
  - Variation in "price" of discrimination
- Brief mixing to judge socioeconomic status

Team Selection Experiment Design

Stage 2: Ability revelation and team selection

- Observe a 2-person race
  - Usually one poor and one rich student
    - Neither is from your school
  - Uniforms make school identifiable
- Pick which of the two runners you want as your partner
- Discrimination Picking the slower runner

Team Selection Experiment Design

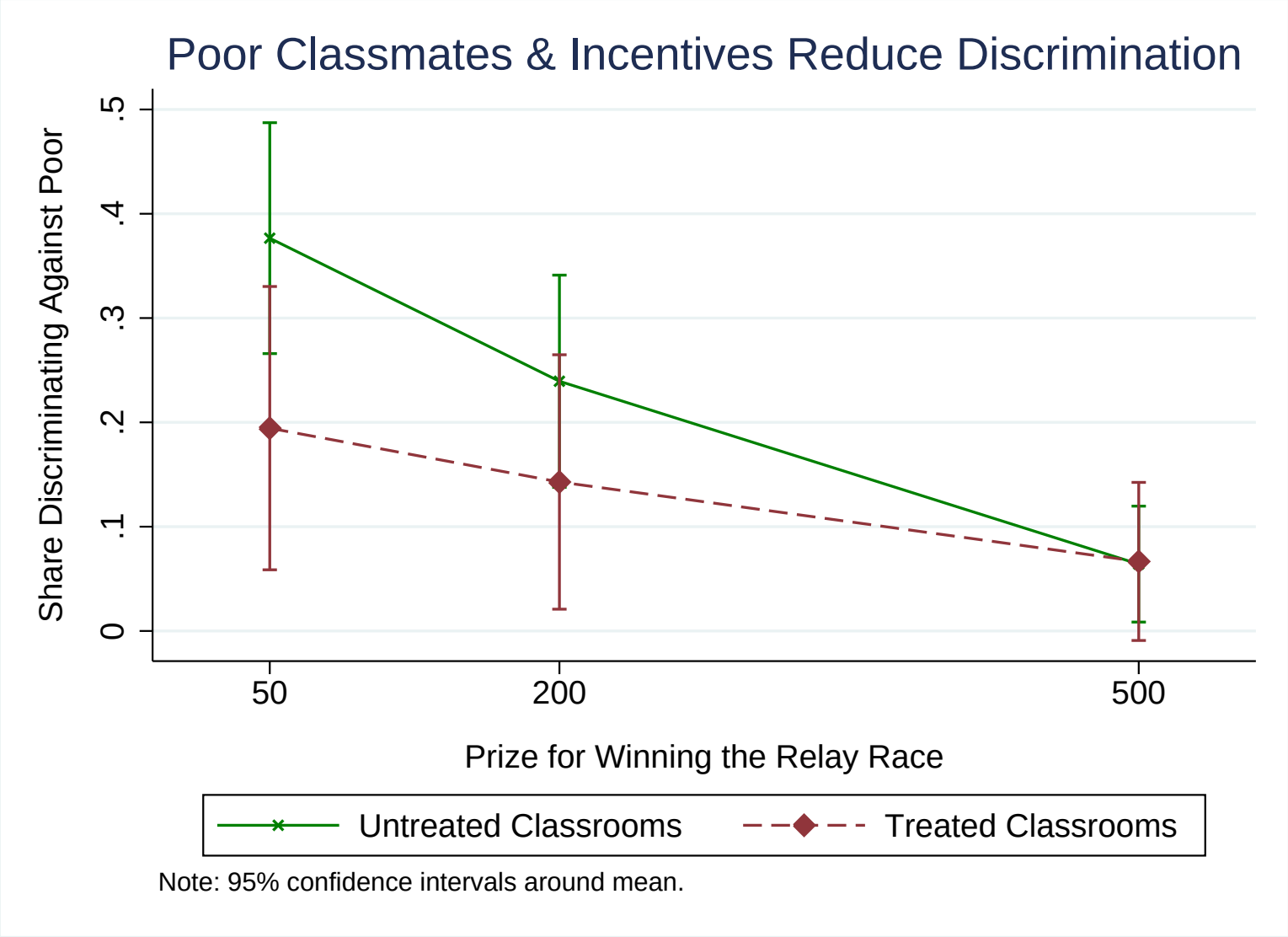
Stage 3: Choice implementation and relay race

- Students randomly picked to have their choices implemented
  - Plausible deniability provided
- Relay races held and prizes distributed as promised

Stage 4: Social interaction

- Must spend 2 hours playing with teammates
  - board games, sports, playground
- Was pre-announced

A quasi-demand curve for discrimination



What part of the treatment is crucial?

- Personal interactions explain a lot of the overall effect
  - 70% of the change in "willingness to play"
  - 38% of the increase in giving to the poor
- Likely an underestimate of importance of interaction

Section 2

Social Preferences Wave II: Warm Glow and Charitable Giving

Charitable Giving

- **Andreoni (2004, 2015).** Excellent survey of the theory and evidence
- Stylized facts:
  - US Giving large: 1.5 to 2.1 percent GDP
  - Most giving by individuals (Table 1)

Table 1 Sources of private philanthropy, 2011

Source of gifts	*Billions of dollars*	*Percent of total*
Individuals	217.8	73
Foundations	41.7	14
Bequests	24.4	8
Corporations	14.6	5
Total for all sources	298.5	100

Source: Giving USA, annual report 2012.

Giving over time

- Giving fairly constant over time (Figure 1)

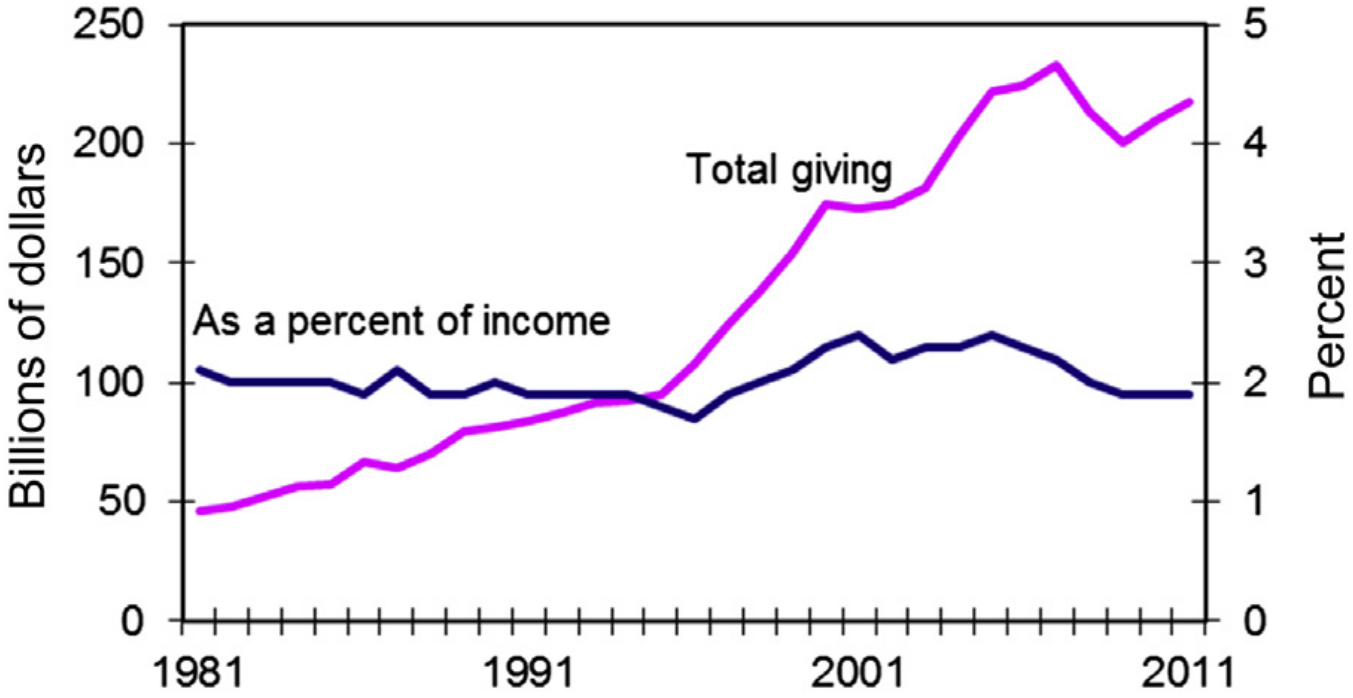


Figure 1 Giving by individuals, 1981–2011. Dollars are inflation-adjusted to 2011 values. Source: Giving USA, annual report 2012.

Pure Altruism

- Charitable giving important phenomenon – How do we understand it?
- **Model 1.** Pure altruism: Model utility of Self giving g_s

$$u\left(w_s - g_s\right) + \alpha f\left(G_{-s} + g_s\right)$$

where G_{-s} is giving by others, $f\left(\right)$ is production function of charity

- F.o.c.

$$-u'\left(w - g_s^*\right) + \alpha f'\left(G_{-s} + g_s^*\right) = 0$$

- More giving if more altruistic

$$\frac{\partial g_s^*}{\partial \alpha} = -\frac{f'\left(G_{-s} + g_s^*\right)}{u''\left(w - g_s\right) + \alpha f''\left(G_{-s} + g_s^*\right)} > 0$$

Pure Altruism

- How would giving change if giving by others (or by government) increases?

$$\frac{\partial g_s^*}{\partial G_{-s}} = -\frac{\alpha f''\left(G_{-s} + g_s^*\right)}{u''\left(w - g_s\right) + \alpha f''\left(G_{-s} + g_s^*\right)} \approx -1$$

- Prediction of strong crowd out of giving
  - If government spends on income of needy group, corresponding almost one-on-one decrease in giving
  - Evidence of crowding out: Limited crowd-out
- Problem (ii): Model predicts giving to one highest-value charity—Instead we observe dispersion across charities
- Problem (iii): In-person or phone requests for giving raise much more than impersonal requests (mail)

Warm Glow

- **Andreoni (1994)**: Warm-Glow or Impure altruism.
  - Utility
$$u\left(w_s - g_s\right) + av\left(g_s\right)$$
  - Agent gets warm glow utility $v\left(g_s\right)$ directly from giving
  - Utility $v\left(g_s\right)$ sharply concave
  - F.o.c.
$$-u'\left(w - g_s^*\right) + av'\left(g_s^*\right) = 0$$

- Predicts:
  - No crowd-out
$$\frac{\partial g_s^*}{\partial G_{-s}} = -\frac{0}{u''\left(w - g_s\right) + av''\left(g_s^*\right)} = 0$$
  - Small giving to several charities if $v\left(g\right)$ is charity specific
  - Glow can be higher for in-person requests (raises a)

Warm Glow

- Warm-Glow models a la Andreoni (1994) used to understand charitable giving and social preferences
- BUT: harder to extrapolate across contexts and quantity
  - How to understand warm glow function v?
  - How do we extrapolate warm glow parameter a?
- Progress (see later) using social signalling models

Section 3

Social Preferences Wave III: Inequity Aversion and Reciprocity

Charness-Rabin (QJE, 2002)

- Simplified model of preferences of s (self) when interacting with o (other):

$$\begin{aligned}(1-\rho)x_s + \rho x_o \text{ if } x_s &> x_o \\ (1-\sigma)x_s + \sigma x_o \text{ if } x_s &< x_o.\end{aligned}$$

- Captures:
  - selfishness ($\rho = \sigma = 0$)
  - baseline altruism (if $\rho = \sigma > 0$)
  - full altruism ($\rho = \sigma = 1/2$)
  - differentially so if ahead or behind ($\rho > \sigma$)
  - inequity aversion (**Fehr-Schmidt QJE, 1999,** $\rho > 0 > \sigma$)

Dictator Game: Forsythe et al. (1994)

- Dictator Game. Have \$10 and have to decide how to share
- **Forsythe et al. (GEB, 1994)**: sixty percent of subjects transfers a positive amount.
- Transfer \$5 if

$$\begin{aligned} \rho 5 + (1-\rho)5 &= 5 \geq \rho 0 + (1-\rho)10 -> \rho \geq 1/2 \text{ and} \\ \sigma 5 + (1-\sigma)5 &\geq \sigma 10 + (1-\sigma)0 -> \sigma \leq 1/2 \end{aligned}$$

- Transfer \$5 if

$$\begin{aligned} \rho &\geq .5 -> \text{Prefer giving \$5 to giving \$0} \\ .5 &\geq \sigma -> \text{Prefer giving \$5 to giving \$10} \end{aligned}$$

- Dictator game behavior consistent with inequity aversion
- Number of other experiments also consistent (including gift exchange)

Challenges

- Taking this to field data? Hard
- Issue 1:
  - Person s with disposable income M_s meets needy person o with income $M_o < M_s$
  - Person s decides on donation D
  - Assume parameters $\rho \geq .5 \geq \sigma$
  - This implies $\pi_s^* = \pi_s^* \rightarrow M_o - D^* = M_s + D^* \rightarrow D^* = (M_s - M_o)/2$
  - Wealthy person transfers half of wealth difference!
  - Clearly counterfactual

Challenges

- Issue 2:
  - Lab: n subjects, with n small
  - Field: Millions of needy people. Public good problem
- Issue 3:
  - Lab: Forced interaction.
  - Field: Sorting – can get around, or look for, occasions to give

Challenges

- In addition to payoff-based social preferences, intentions likely to matter
  - ρ and σ higher when s treated nicely by o
  - Model intentions of o
  - Positive reciprocity: Respond to being treated nicely
  - Negative reciprocity: Respond to being treated unfairly
  - More evidence of the latter in lab experiments

Section 4

Workplace Effort: Inequity Aversion

Social Comparisons in the Workplace

- Workers compare to co-workers
  - Get some utility from being paid more than others
  - Get high disutility from being paid less then others (inequity aversion)
  - $\rightarrow$ Wage compression
- Is there evidence of this?

Card-Mas-Moretti-Saez (AER 2012)

- Study of job satisfaction for UC employees
  - Examine the impact of salary comparisons
- UC is ideal setting:
  - Salaries are public
  - But not as easy to access
  - Sacramento Bee posted them online

Design

- Email survey to staff at various University of California Campuses
- Field experiment on content of survey
- Mention to some, but not others, the website of the Sacramento Bee: "*Are you aware of the web site created by the Sacramento Bee newspaper that lists salaries for all State of California employees? (The website is located at www.sacbee.com/statepay, or can be found by entering the following keywords in a search engine: Sacramento Bee salary database).*"
- Counting on human curiosity for first stage...
- Follow-up survey to measure job satisfaction and interest in moving to other job
- Impact on stated job satisfaction and reported intention to look for new job

Results

Table 4: Effect of Information Treatment on Measures of Job Satisfaction

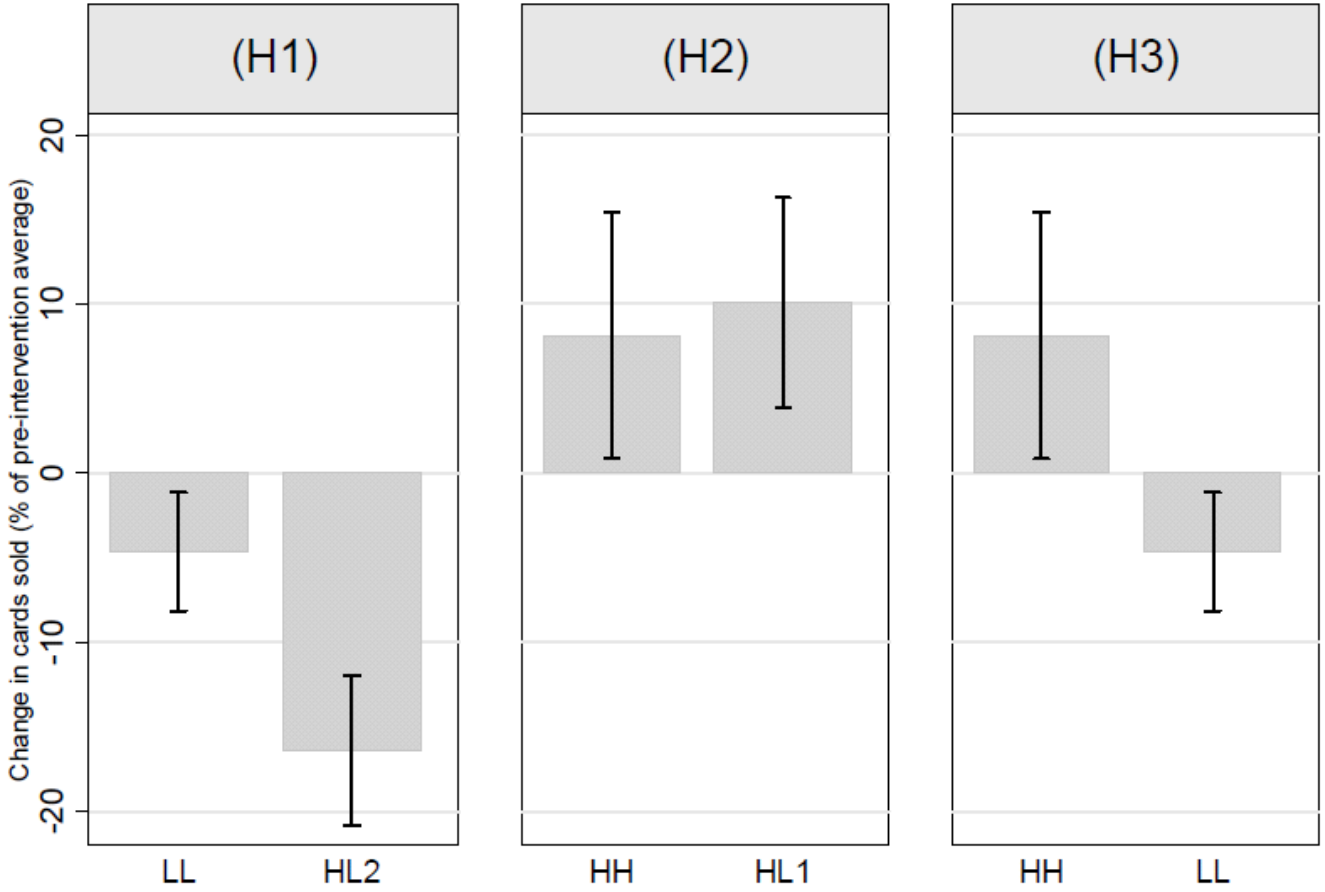
	Satisfaction Index (10 point scale)			Reports Very likely to Look for New Job (Yes = 1)			Dissatisfied and Likely Looking for a New Job (Yes = 1)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Treated individual	-2.0	–	–	1.0	–	–	2.0	–	–
	(2.2)			(1.2)			(1.1)		
I. Treated individual with earnings ≤ median pay in unit	–	-6.3	–	–	4.3	–	–	5.2	–
		(2.9)			(1.8)			(1.8)	
II. Treated individual with earnings > median pay in unit	–	2.0	2.2	–	-2.0	-2.0	–	-0.9	-0.9
		(2.6)	(2.6)		(1.6)	(1.6)		(1.3)	(1.3)
II-I	–	8.3	–	–	-6.3	–	–	-6.1	–
		(3.5)			(2.4)			(2.1)	
Treated × earnings in first quartile in pay unit	–	–	-15.0	–	–	8.0	–	–	8.1
			(4.0)			(2.6)			(2.4)
Treated × earnings in second quartile in pay unit	–	–	1.9	–	–	0.8	–	–	2.5
			(3.9)			(2.5)			(2.3)
P-value for exclusion of treatment effects	0.36	0.05	0.00	0.85	0.03	0.01	0.08	0.01	0.00
Mean of the dependent variable in the control group [standard deviation]		274.2			21.9			12.9	
		[66.1]			[41.4]			[33.5]	

Notes: All models are estimated by OLS. All coefficients and means are multiplied by one hundred. Standard errors, clustered by campus/department, are in parentheses (818 clusters for all models). "Earnings" refers to total UC payments in 2007. Pay unit refers to the respondent's department or administrative unit. Median pay is computed seperately for faculty and staff. The satisfaction index is the average of responses for the questions: "How satisfied are you with your wage/salary on this job?", "How satisfied are you with your job?", and "Do you agree or disagree that your wage is set fairly in relation to others in your department/unit?". Responses to each of these questions are on a 1-4 scale and are ordered so that higher values indicate greater satisfaction. The variable "Dissatisfied and Likely Looking for a New Job" is 1 if the respondent is below the median value of the satisfaction index and reports being "very likely" to make an effort to find a new job. See text and Appendix Table A3 for further details on the construction of the dependent variables. In addition to the explanatory variables presented in the table, all models include controls for campus × (staff/faculty), a cubic in earnings, and main effects. The sample size is 6,411.

Cohn, Fehr, Herrmann, Schneider (JEEA 2014)

- Workers hired in pairs to sell cards
- On second work day, pay randomly made different
- 25% pay cut for both workers, or only one worker
- Effect on effort?

Effect on Effort



(error bars represent standard error of the mean; spare workers excluded)

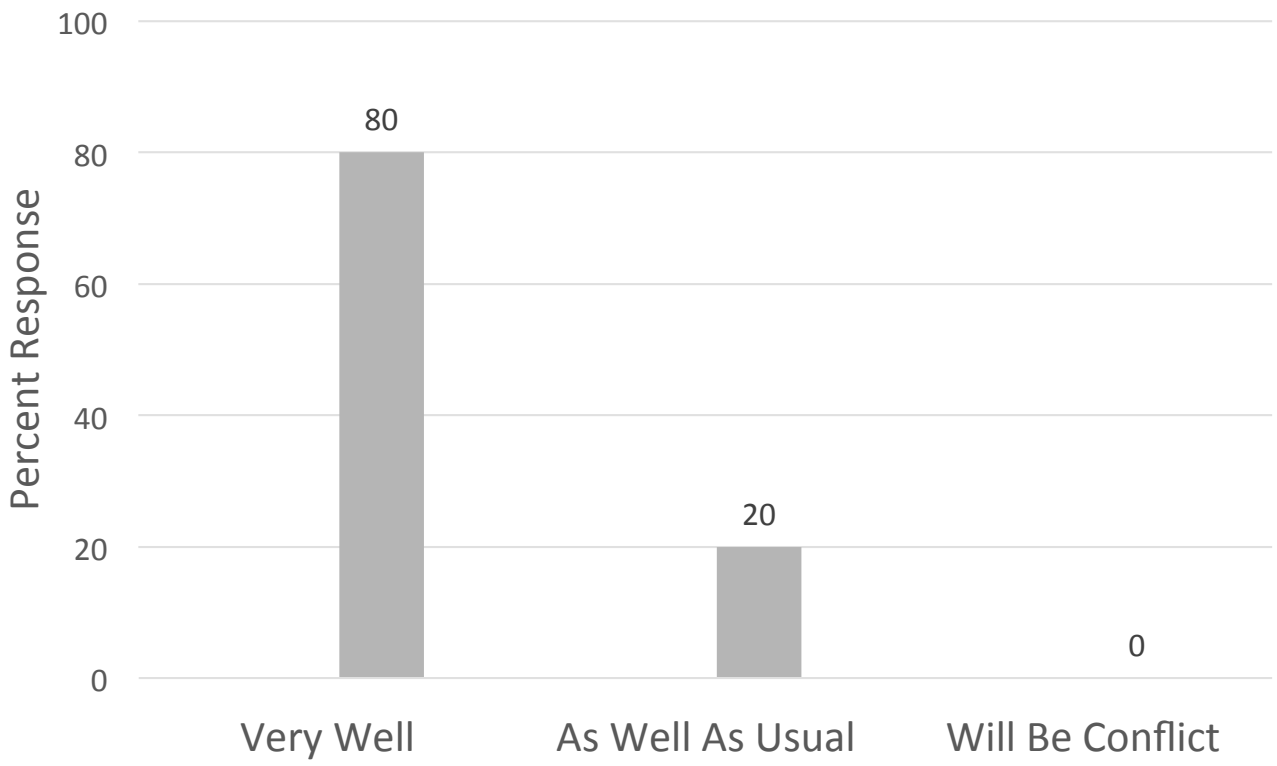
- Notice: Return to gift exchange next lecture

Breza, Kaur, Shamdasani (2018)

- **Breza, Kaur, Shamdasani (QJE, 2018)**
- Experiment randomizing pay comparisons, as well as reasons
- Slides courtesy of Supreet

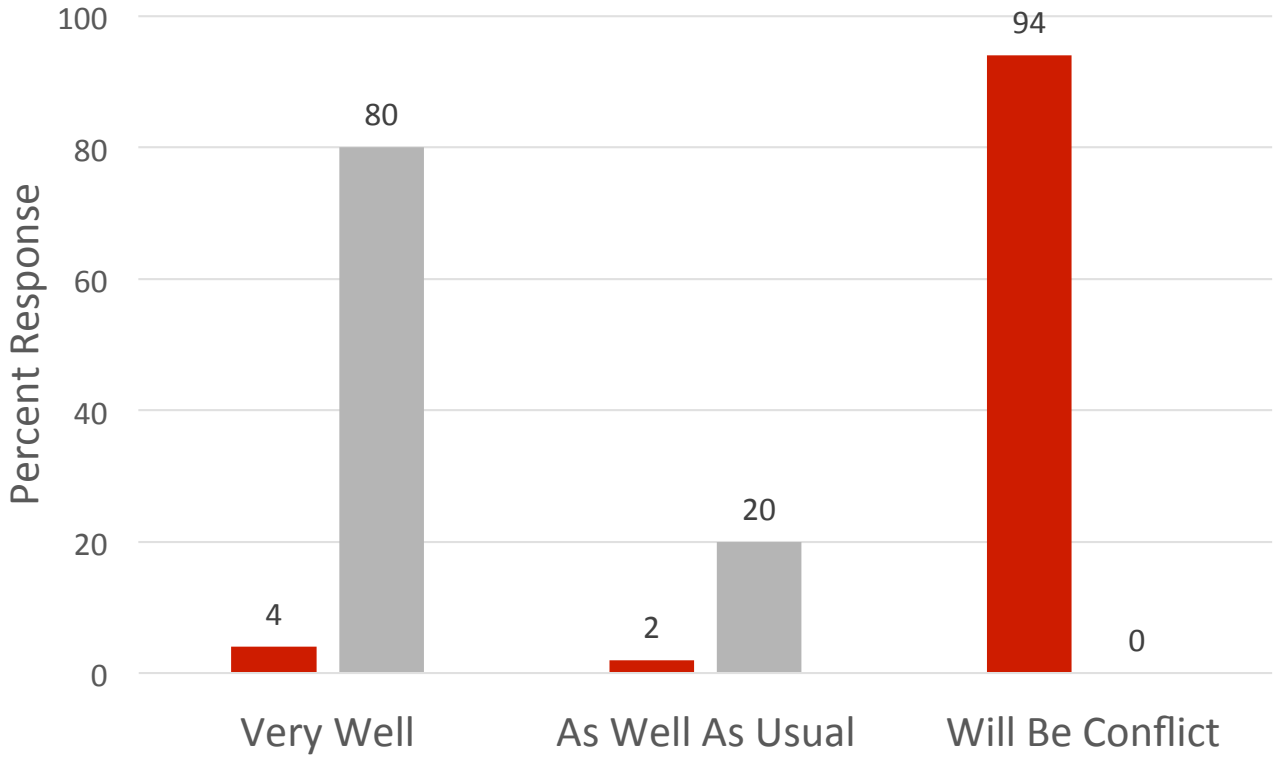
Motivation: Relative Pay Concerns

3 people from a village get hired to work on a construction site together. The prevailing wage is Rs. 250. <u>The contractor pays them Rs. 250/day.</u> How well will they work together?



Motivation: Relative Pay Concerns

3 people from a village get hired to work on a construction site together. The prevailing wage is Rs. 250. The contractor pays them different wages, based on their strength: Rs. 250/day, Rs. 270/day, and Rs. 290/day. How well will they work together?



Framework (adapted from DellaVigna et al 2015)

Worker i receives wage offer w_i from firm, and chooses:
(i) whether to work
(ii) level of effort (incomplete contracting).

Outside option (from not working): $R_{it} \equiv R_i + \varepsilon_{it}$

Payoff from working:

$$V\left(w_i, \mathbf{w_{-i}}\right) = w_i - c\left(e_i\right) + M\left(w_i, \mathbf{w_{-i}}\right) e_i$$

where:

e_i = effort level chosen, where $e_i \geq 0$
$c(\cdot)$ = convex effort cost
$\mathbf{w_{-i}}$ = wages of co-workers (peers)
$M\left(w_i, \mathbf{w_{-i}}\right)$ = morale effect

Framework

Conceptualize relative pay concerns as reference dependence

$$V\left(w_i, \mathbf{w_{-i}}\right) = w_i - c\left(e_i\right) + M\left(w_i, \mathbf{w_{-i}}\right) e_i$$

$$M\left(w_i, \mathbf{w_{-i}}\right) = -\alpha f\left(w_i - w_R \mid w_i < w_R\right) + \beta f\left(w_i - w_R \mid w_i > w_R\right) + g\left(w_i\right)$$

where:

w_R determined by peer wages & productivity (i.e., $w_R \equiv r\left(\mathbf{w_{-i}}, \theta\right)$)
α reflects utility effect of being paid less than w_R
β reflects utility effect of being paid more than w_R

Note: α and β are reduced form – reflect own preferences & social dynamics

Predictions

- Changes in $1_{w_i < w_R}$ and $1_{w_i > w_R}$ will affect both labor supply & effort
- Direction of effects reveal signs of α and β
  - Under most formulations/theories: $\alpha < 0$
  - Sign of β ambiguous (loss aversion, inequity aversion, social undermining)

Context

- Low-skill manufacturing
  - Rope, brooms, incense sticks, candle wicks, plates, floor mats, paper bags…
  - Factory sites in Orissa, India
  - Partner with local contractors (set training and quality standards)
  - Output sold in local wholesale market

- Workers employed full-time over one month
  - Seasonal contract jobs (common during agri lean seasons)
  - Primary source of earnings

- Flat daily wage for attendance
  - Typical pay structure in area

- Sample
  - 378 workers
  - Adult males, ages 18-65
  - All have experience with flat daily wages; 45% have worked under piece rates

Experiment Design

Construct design to accomplish 3 goals:

1. **Clear reference group for each worker**

2. Variation in co-worker pay, holding fixed own pay

3. Variation in perceived justification for pay differences

1. Reference Group = Product Team

- Teams of 3 workers each
- All team members produce *same* product
- Each team within factory produces *different* product
  - E.g. Team 1 makes brooms, Team 2 makes incense sticks, …
- Factory structure
  - 10 teams in each factory
  - 10 products: brooms, incense sticks, rope, wicks, plates, etc.
- Note: Individual production
  - Hire staff to measure worker output after each day

Wage Treatments

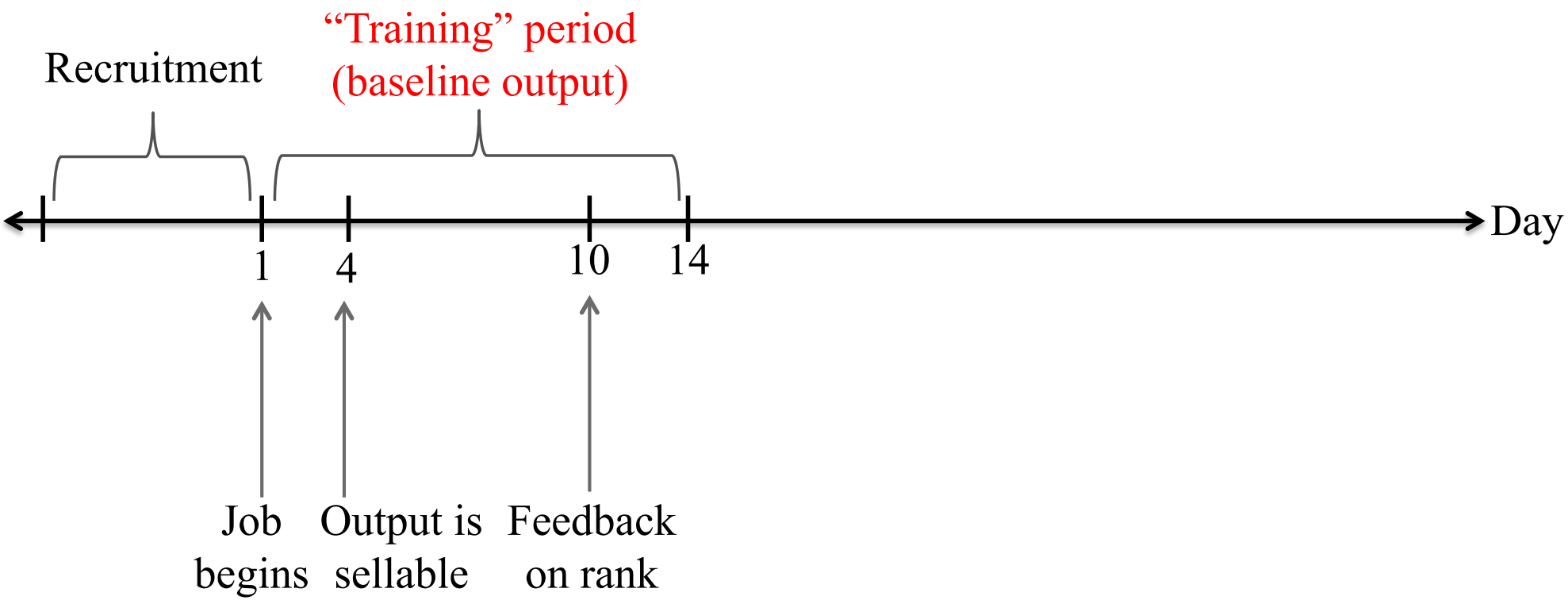
Design: Wage Treatments

Worker Rank	Heterogeneous	Compressed_L	Compressed_M	Compressed_H
Low productivity	w_{Low}	w_{Low}	w_{Medium}	w_{High}
Medium productivity	w_{Medium}	w_{Low}	w_{Medium}	w_{High}
High productivity	w_{High}	w_{Low}	w_{Medium}	w_{High}

- Expect $w_i < w_R$

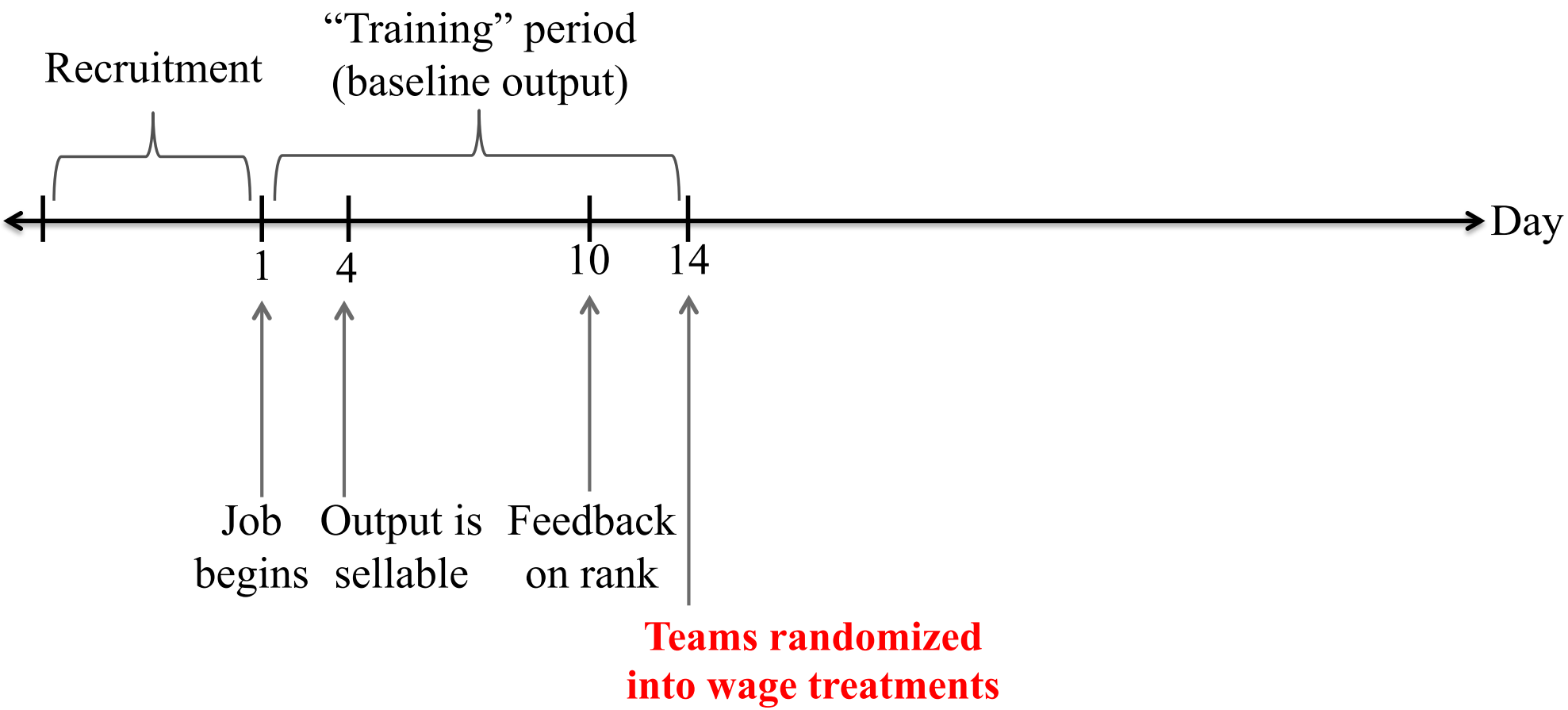
- Predictions
  - H_0: $\alpha = 0$: same output
  - H_1: $\alpha < 0$: output lower under Heterogeneous pay

Timeline for Each Round



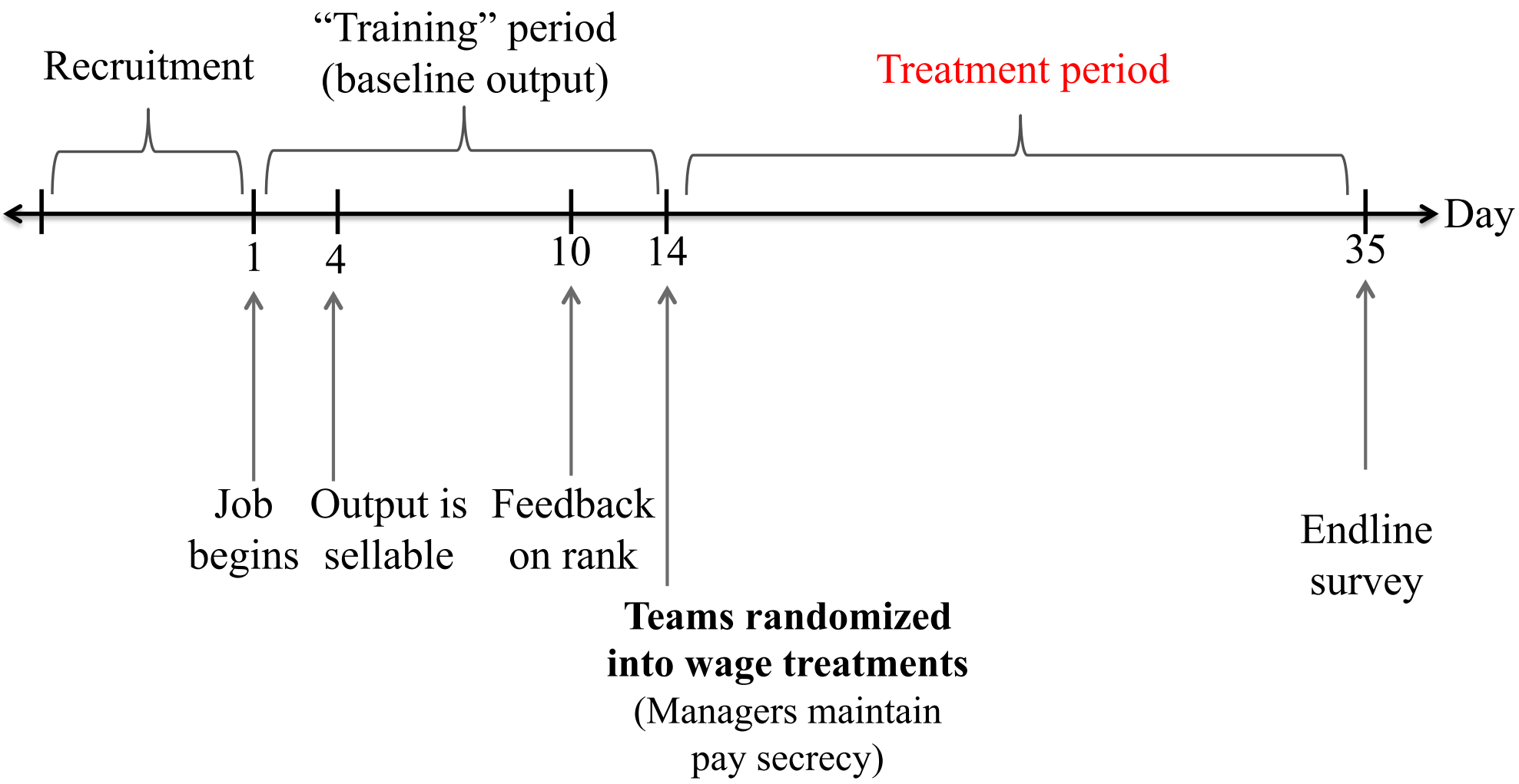
- Training: all workers receive same training wage
  - Set to prevailing wage in area (outside option)
- Day 1: workers are told post-training wage may depend on baseline productivity

Timeline for Each Round



- All workers get a pay <u>increase</u> of 5-15% (wages above outside option)
- Each worker privately told his individual wage
  - Managers maintain pay secrecy

Timeline for Each Round



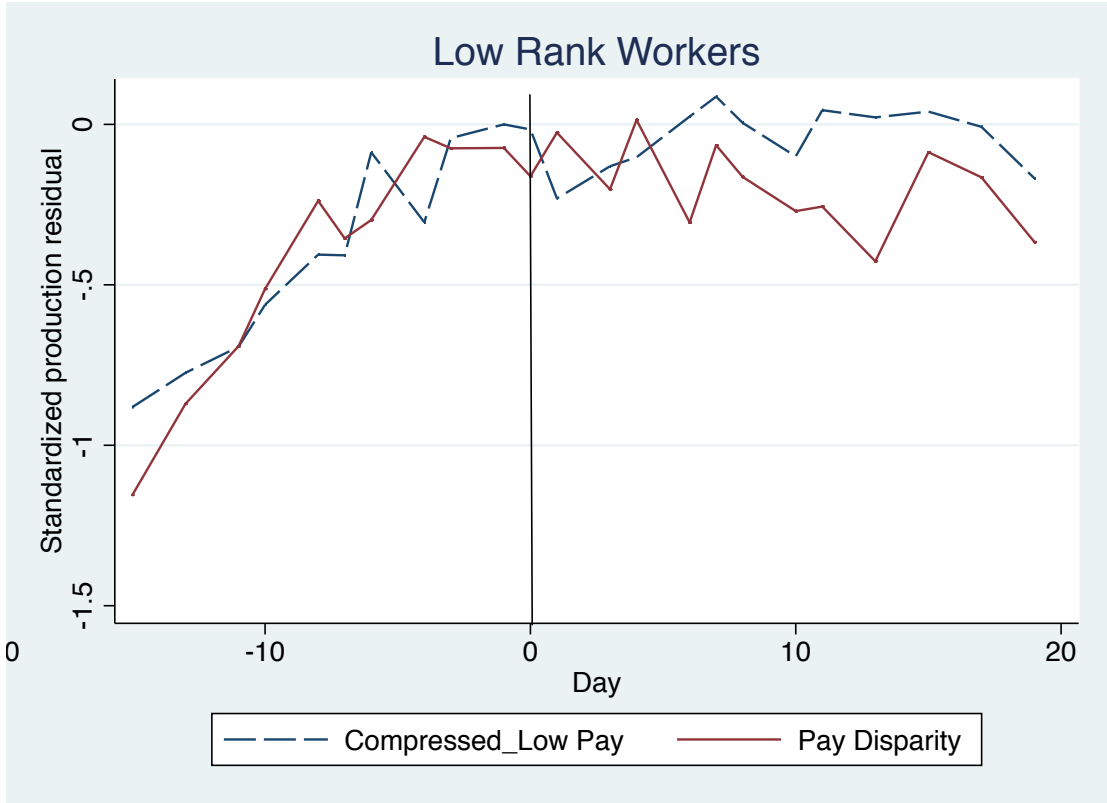
Measurement

- Production = 0 when workers are absent

- Pooling across tasks
  - 10 production tasks
  - Standardize output within each task (using mean and standard deviation in baseline period)
  - Enables pooling across tasks using a consistent unit (standard deviations)

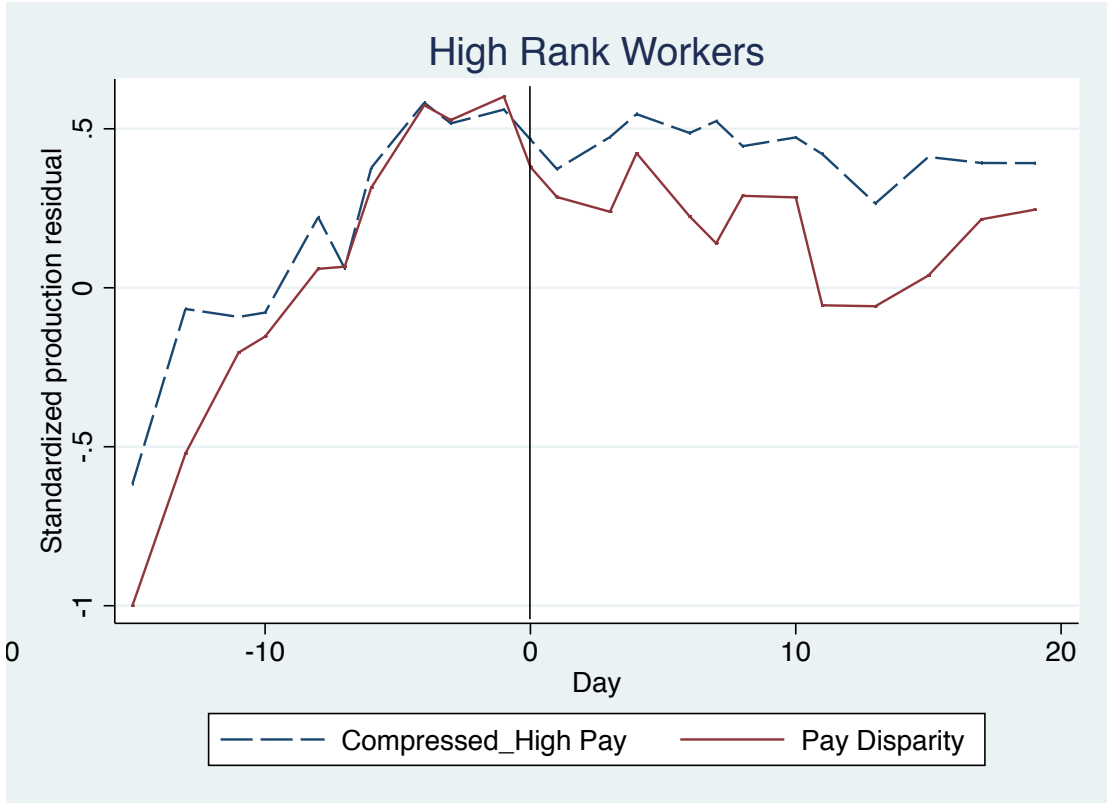
Effects of Relative Pay Differences

Worker Rank	Heterogeneous	Compressed_L	Compressed_M	Compressed_H
Low productivity	w_{Low}	w_{Low}	w_{Medium}	w_{High}
Medium productivity	w_{Medium}	w_{Low}	w_{Medium}	w_{High}
High productivity	w_{High}	w_{Low}	w_{Medium}	w_{High}



Effects of Relative Pay Differences

Worker Rank	Heterogeneous	Compressed_L	Compressed_M	Compressed_H
Low productivity	w_{Low}	w_{Low}	w_{Medium}	w_{High}
Medium productivity	w_{Medium}	w_{Low}	w_{Medium}	w_{High}
High productivity	$\boxed{w_{High}}$	w_{Low}	w_{Medium}	$\boxed{w_{High}}$



Effects of Relative Pay Differences

	Output (std dev.) (1)	Output (std dev.) (2)	Attendance (3)	Attendance (4)
Post x Pay disparity x Low wage	-0.385	-0.332	-0.113	-0.120
	(0.134)***	(0.128)***	(0.055)**	(0.053)**
Post x Pay disparity x Med wage	-0.262	-0.226	-0.126	-0.129
	(0.201)	(0.187)	(0.056)**	(0.060)**
Post x Pay disparity x High wage	-0.288	-0.172	-0.106	-0.104
	(0.199)	(0.181)	(0.076)**	(0.052)**
Individual fixed effects?	No	Yes	No	Yes
Post-treatment Compressed Mean	-0.099	-0.099	0.939	0.939
N	8375	8375	8375	8375

- Low relative pay:
  - 22% reduction in output
  - 12.7% reduction in attendance
  - Leave 9% of earnings on the table (endline data on overall earnings)
- Attendance declines for all workers

Effects of Relative Pay Differences

	Output (std dev.) (1)	Output (std dev.) (2)	Attendance (3)	Attendance (4)	Output | Attendance (5)
Post x Pay disparity x Low wage	-0.385	-0.332	-0.113	-0.120	-0.204
	(0.134)***	(0.128)***	(0.055)**	(0.053)**	(0.114)*
Post x Pay disparity x Med wage	-0.262	-0.226	-0.126	-0.129	-0.061
	(0.201)	(0.187)	(0.056)**	(0.060)**	(0.114)
Post x Pay disparity x High wage	-0.288	-0.172	-0.106	-0.104	-0.009
	(0.199)	(0.181)	(0.076)**	(0.052)**	(0.152)
Individual fixed effects?	No	Yes	No	Yes	No
Post-treatment Compressed Mean	-0.099	-0.099	0.939	0.939	0.015
N	8375	8375	8375	8375	7678

- Can attendance account for the full output decline among lower paid workers?
- Naïve back of envelope:
  - Attendance accounts for 60% of L-rank effect
  - Attendance fully accounts for effects on M and H rank workers

Perceived Justifications I: Productivity Differences

- Difference in pre-period output between yourself and your higher-paid peer (for L and M rank)

- Indicator for being above mean difference
  - Corresponds to 0.375 standard deviations

Perceived Justifications I: Productivity Differences

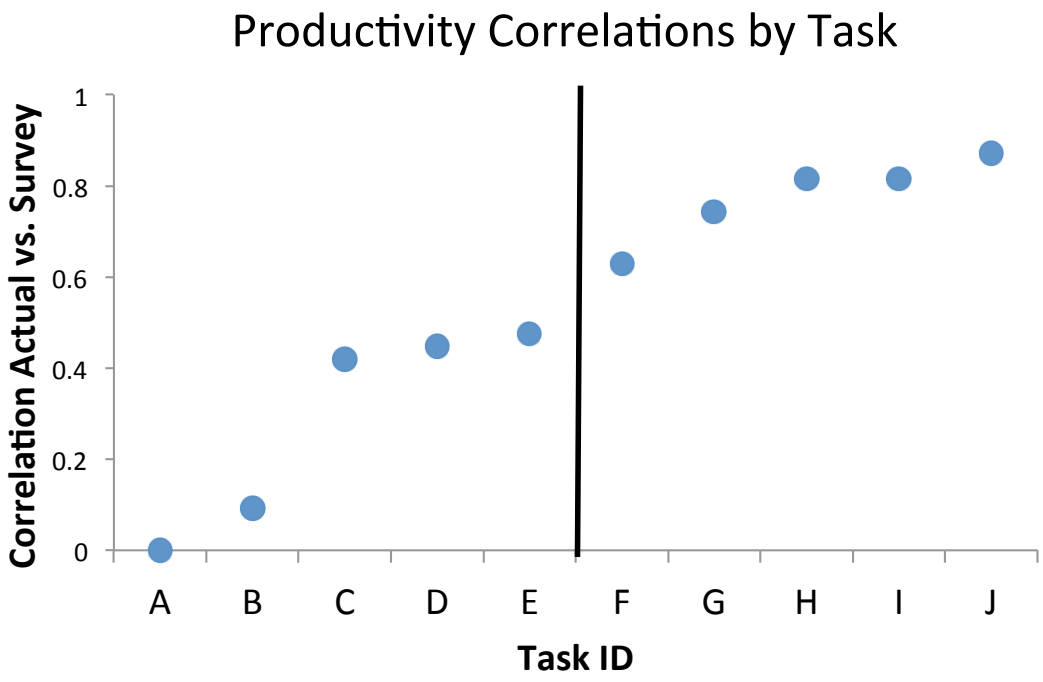
	Definition of Perceived Justification Indicator	
	Large baseline productivity difference between co-workers	
Dependent variable	Output	Attendance
	(1)	(2)
Panel A — Pooled Treatment Effects		
Post x Pay disparity	-0.358***	-0.167***
	(0.133)	(0.039)
Post x Pay disparity x Perceived justification	0.292*	0.159**
	(0.173)	(0.061)
Post x Perceived justification	0.0483	-0.0500
	(0.107)	(0.032)
Panel B — Treatment Effects Separately by Rank		
Post x Pay disparity x Low wage	-0.448***	-0.168***
	(0.147)	(0.061)
Post x Pay disparity x Low wage x Perceived justification	0.467**	0.181**
	(0.231)	(0.087)
Post x Pay disparity x Med wage	-0.270	-0.170**
	(0.224)	(0.075)
Post x Pay disparity x Med wage x Perceived justification	0.127	0.150
	(0.267)	(0.094)
Number of observations (worker-days)	8375	8375

Higher paid peer much > productive
→ no effect of pay disparity

- Results also hold for continuous difference measure
- Results robust to controls for own baseline productivity

Perceived Justifications: Observability

- 10 production tasks in each worksite
- Ex-ante quantify observability of co-worker output at baseline (using pilots)
  - Can worker accurately state own productivity relative to peers?
  - All teammates paid the same wage (no signal)
- Cut-off: 0.5 = mean (also median)



Perceived Justifications II: Observability

	Definition of Perceived Justification Indicator			
	Large baseline productivity difference between co-workers		Co-worker output is highly observable	
Dependent variable	Output	Attendance	Output	Attendance
	(1)	(2)	(3)	(4)
Panel A — Pooled Treatment Effects				
Post x Pay disparity	-0.358***	-0.167***	-0.384***	-0.153***
	(0.133)	(0.039)	(0.131)	(0.031)
Post x Pay disparity x Perceived justification	0.292*	0.159**	0.395**	0.0996**
	(0.173)	(0.061)	(0.161)	(0.046)
Post x Perceived justification	0.0483	-0.0500	-0.0518	0.0332
	(0.107)	(0.032)	(0.103)	(0.028)
Panel B — Treatment Effects Separately by Rank				
Post x Pay disparity x Low wage	-0.448***	-0.168***	-0.513***	-0.158**
	(0.147)	(0.061)	(0.160)	(0.071)
Post x Pay disparity x Low wage x Perceived justification	0.467**	0.181**	0.512**	0.121
	(0.231)	(0.087)	(0.220)	(0.077)
Post x Pay disparity x Med wage	-0.270	-0.170**	-0.248	-0.157**
	(0.224)	(0.075)	(0.227)	(0.068)
Post x Pay disparity x Med wage x Perceived justification	0.127	0.150	0.0890	0.0876
	(0.267)	(0.094)	(0.293)	(0.118)
Post x Pay disparity x High wage			-0.386	-0.139*
			(0.242)	(0.071)
Post x Pay disparity x High wage x Perceived justification			0.582**	0.0884
			(0.269)	(0.078)
Number of observations (worker-days)	8375	8375	8375	8375

Co-worker output is observable → no effect of pay disparity

Tests for Team Cohesion

- Cooperative games on last day (fun farewell)
  - Performance determined by your own effort and cooperation with others
- Paid piece rates for performance
- No benefit to the firm
  - Decrease in Heterogenous team performance is not about punishing the firm (rules out reciprocity)
- Note: conducted in later rounds only

Games 1: Tower building

	Dependent variable: Tower height			
	(1)	(2)	(3)	(4)
Pay disparity	-9.376***	-18.89**	-20.49***	-28.12***
	(3.487)	(8.068)	(5.532)	(7.729)
Pay disparity x Observable task		17.81*		
		(9.472)		
Pay disparity x Large productivity difference			17.11**	
			(6.815)	
Pay disparity x Justified (average)				32.80***
				(9.307)
Dependent variable mean	53.97	53.97	53.97	53.97
R-squared	0.291	0.397	0.397	0.429
N	80	80	80	80

Notes: All regressions include round fixed effects. Standard errors clustered by team.

- Teams with pay disparity perform 17% worse on average
  - Effects concentrated in cases where pay disparity is not clearly justified
- Lower effort even when no detriment to the firm
- Is this general disgruntlement, or specifically within-team dynamics?

Section 5

Methodology: Field Experiments

Introduction

- Field Experiments combine advantages of field studies and natural experiments:
  - Field setting (External Validity)
  - Randomization (Internal Validity)
- Common in Development, Public, Psychology and Economics, Labor
- Uncommon in IO (except for Demand estimation), Corporate Finance, Asset Pricing, Macro
- Difficulties: large sample (costly) and getting approval for implementation

Definition 1

- Definition 1. **Card, DellaVigna, and Malmendier (JEP 2011)** '*Randomized allocation to treatment and control groups for study purposes in a field setting*'
  - Excludes studies with no randomization (Bandiera et al., 2005 and on)
  - Includes social experiments run by the government
  - Includes experiments run by firms (Ausubel, 1999)
  - Excludes incidental randomization (i.e., lottery winnings, or Vietnam draft number)

Definition 2

- Definition 2. **Harrison and List (JEL 2004)**:
  - Emphasis on laboratory versus field: 4 groups
    1. *(Conventional) Laboratory Experiment*
    2. *Artefactual Laboratory Experiment.* This is laboratory experiment in the field (i.e., on non-students)
    3. *Framed Field Experiment.* Experiment in the field with natural setting, but people aware of experimental treatments
    4. *Natural Field Experiment.* Experiment in the field, subjects unaware of manipulations

1. Some Advice for Field Experiments

What to do if planning a field experiment?

Advice 1. Read how-to manuals and previous field experiments: **Duflo-Glennerster-Kremer (Handbook of Development Economics, 2007)**

- Great discussion of practical issues: Compliance, Sample Size,...
- Discussion of statistical issue, such as power tests
- Targeted toward development

2. Choose Experiment Type

Advice 2. Choose what type of Experiment

- *Large-Scale Experiment.* Example: Bandiera et al. (2005)
  - More common in Development
  - Convince large company or organization (World Bank, Government)
  - Need substantial funding
  - Examples among students:
    - Damon Jones: field experiment on tax preparers
    - However (also Damon): H&R Block experiment fell through after 1-year plans
    - Changcheng Song: Experiment on introduction of pensions in rural China
    - Gautam Rao/Jonas Tungodden: Convince several schools
    - Juan Carlos Montoy: Test incentives and default for HIV testing
    - Anne Karing: Social signalling for vaccinations

2. Choose Experiment Type

Advice 2. Choose what type of Experiment

- *Small-Scale Experiment.* Example: Falk (2008)
  - More common in Psychology and Economics
  - Need to convince non-profit or small company
  - Limited funds needed – often company will pay
  - Example among students:
    - Dan Acland: projection bias and gym attendance
    - Pete Fishman: small video store randomized advertising
    - Mariana Carrera: major grocer randomizes message on price of generics
    - Jimmy Gillan: experiment on reminding people of energy saving

3. Necessary Components

Advice 3. Need two components:

1. Interesting economic setting:
   - Charity, Gym, Village in Kenya
   - Does Video Games matter? Yes, increasingly so
2. Economic model to test
   - Examples: Self-control, reciprocity, incentives
   - Avoid pure data-finding experiments
   - Insurance. If you can, pick a case where 'either' result is interesting
   - Best scenario: Do a field experiment tied to a model to infer parameters

4. Key Issues

Advice 4. Keep in mind three key issues

1. *Power calculations.* Will your sample size be enough?
   - Crucial to do ex ante to avoid wasting time and money
   - Simple case:
     - Assume outcome binary variable, dep. variable is share p doing 1 (Ex: giving to charity, taking up comm. device)
     - Standard error will be $\sqrt{p(1-p)/n}$
     - Example: $p = .5$, s.e. is .05 with $n = 100$, .025 with $n = 400$

4. Key Issues

Advice 4. Keep in mind three key issues

2. *Pilots.* So many things can go wrong – try to do small pilot
   - Use to spot problems in implementation
   - Do not overinfer results from pilot (sample too small)
3. *Human Subjects* approval
   - Step 1 (Category): Are you exempt (file simpler form), expedited (faster eval), or full eval (2 months)?
   - Step 2 (Complete): Do form online at eProtocol
   - Step 3 (Filing): Advisor needs to file (you do not have PI status)
   - Step 4 (Revision): Often you will need to respond to points, do so quickly
   - Step 5 (Amendments): You can file amendments, those are usually handled fast

5. Before Going to Field...

Advice 5. Do a lot of work before going to the field!

- Power studies – YES
- But also: *Model*
  - To the extent possible, write down model and do Monte Carlo of data
  - Simulate and estimate: Estimate model on Monte Carlo data
  - Which parameters are identified?
  - Use that to refine design
  - Gift exchange design (DLMR above): one year before going to the field
- Also, Registration of design on AEA Registry

6. Other Practical Issues

Advice 6. Other practical issues:

- Keep in mind *implementation* of randomization
  - Example: Cross Designs hard to implement correctly
  - Example: **Green-Gerber (APSR, 2001)** on voter turnout:
    - cross-randomize phone calls, mailings, in-person visits
    - Hard to implement $\rightarrow$ Lead to loss of randomization
  - OK if just computerized implementation (ex: loan offers)
- Monitor what happens in the field *continuously*
- Build in *data redundancy* to catch errors or implementation problems
  - 'Did you see a flyer on the door?' in DellaVigna-List-Malmendier (2009)

7. Finding Funding

Advice 7. Start looking soon for funding. Some options:

- Russel Sage Small Grant Program: $7,500 (two to three months wait, once-in-career) (http://www.russellsage.org/research/behavioral-economics)
- NSF dissertation improvement grant website (http://www.nsf.gov/funding/ pgm_summ.jsp?pims_id=13453)
- CEGA has supported work in behavioral development
- Look at CVs of assistant professors in your field or job market students (Jonas' advice)
- Ask your advisor → May know of some funding sources

Section 6

Social Preference Wave III: Reciprocity and Gift Exchange

Model

- Take simple altruism model:

$$U = u(x_s) + \alpha u(x_o)$$

- Reciprocity models: Assume that α depends on actions, or intentions, of other player
  - Positive reciprocity: α higher if treated nicely
  - Negative reciprocity: α lower if treated unfairly
  - More evidence of the latter in lab experiments
- Models of reciprocity differ in whether α depends simply on actions, or intentions

Section 7

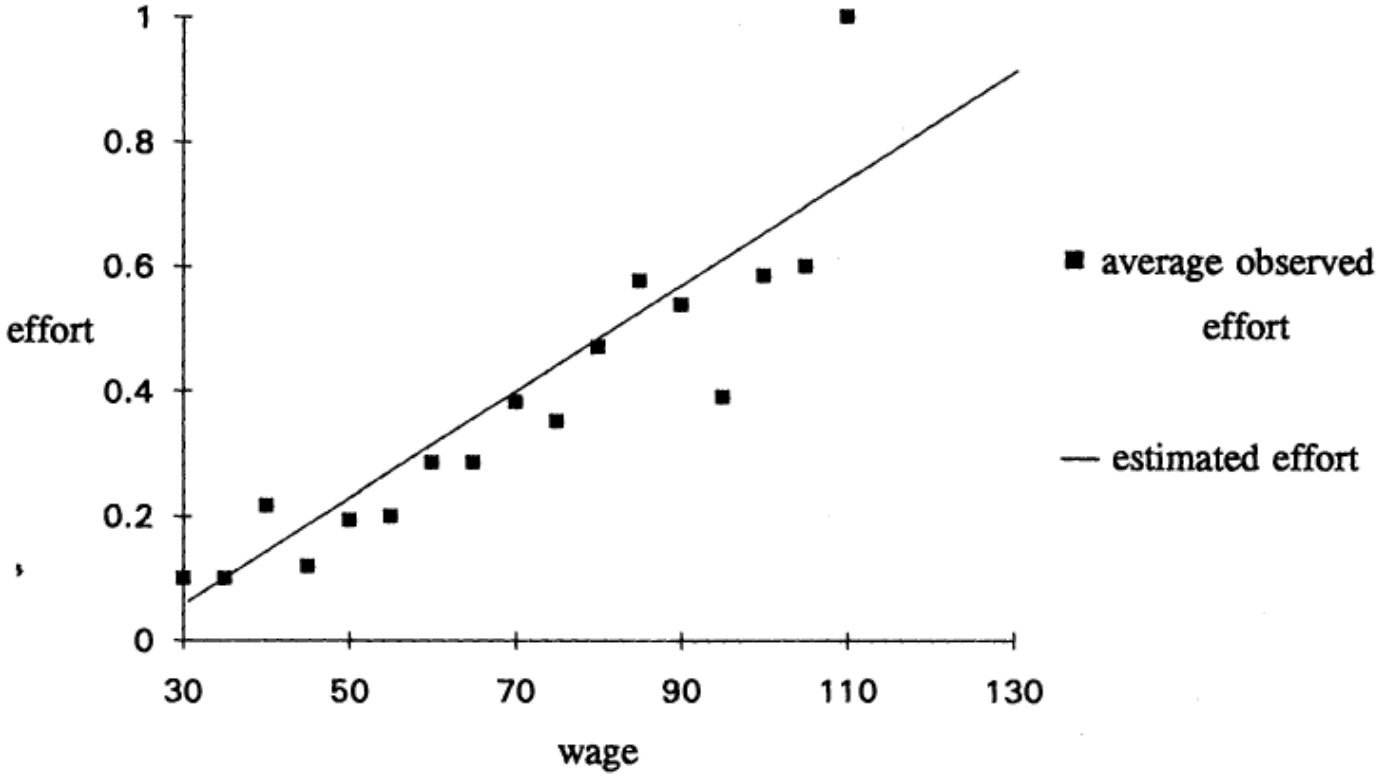
Workplace: Gift Exchange

Laboratory evidence

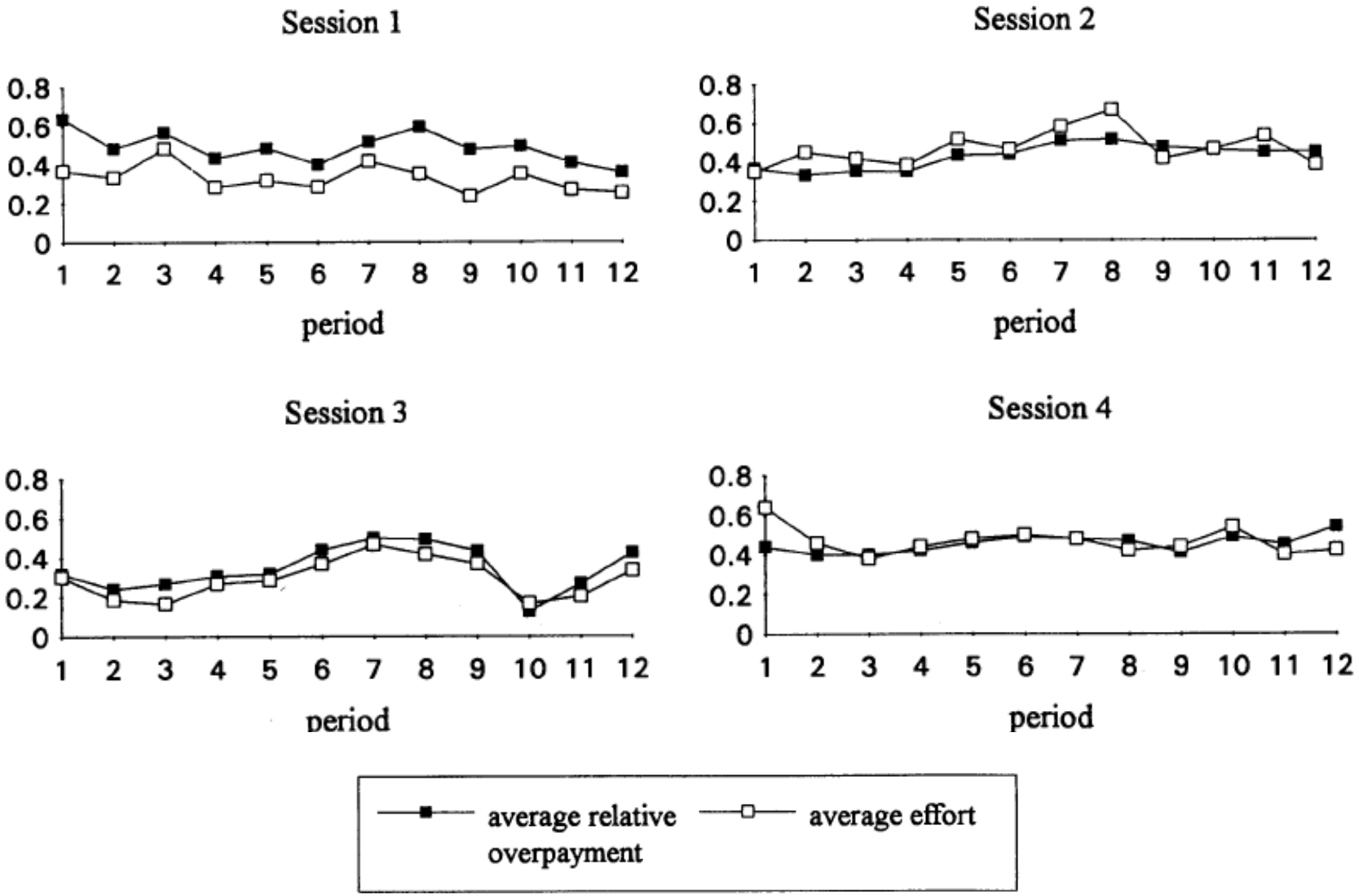
- **Fehr-Kirchsteiger-Riedl (QJE, 1993).**
  - 5 firms bidding for 9 workers
  - Workers are first paid $w \in \{0, 5, 10, \ldots\}$ and then exert effort $e \in [.1, 1]$
  - Firm payoff is $(126 - w)\, e$
  - Worker payoff is $w - 26 - c(e)$, with $c(e)$ convex (but small)
- Standard model: $w^* = 30$ (to satisfy IR), $e^*(w) = .1$ for all w

Findings

- Effort e increasing in w and $Ew = 72$



Findings Stable over Time



Which model explains this behavior?

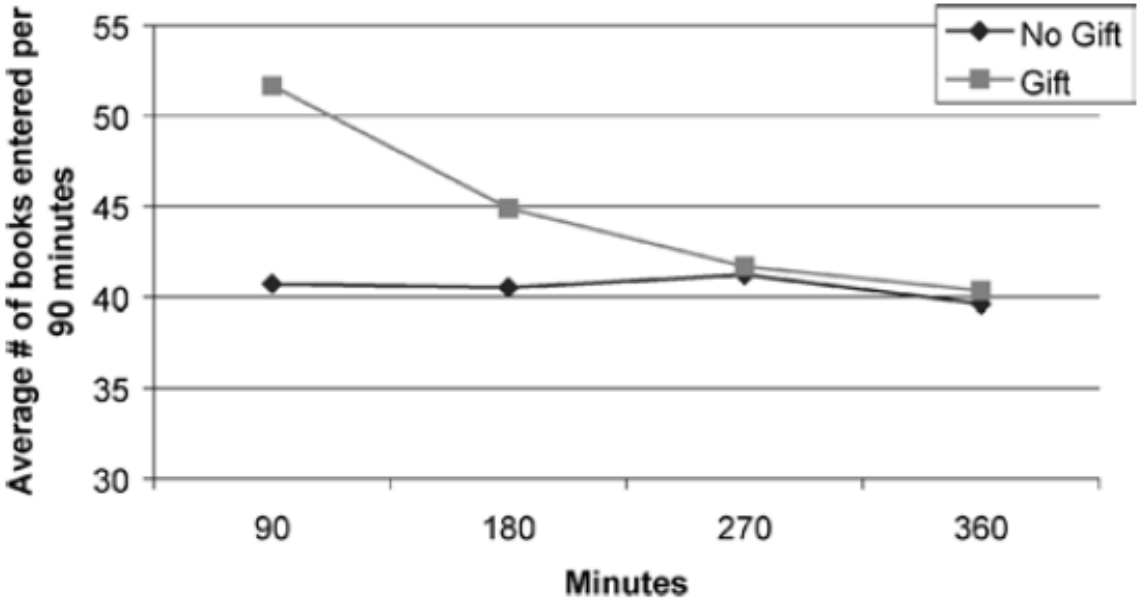
- **Fehr-Schmidt (1999)** propose: *Inequity aversion* ($\rho > 0 > \sigma$)
  - Initially, firm is ahead in payoffs
  - Assume firm pays minimum wage
    - Firm still ahead in payoffs
    - Worker does not care for firm given $\sigma < 0$
    - $\rightarrow$ Worker does not want to exert effort to benefit the firm
  - Assume now firm pays generous wage towards worker
    - Firm is *now* behind in payoffs
    - Worker now cares for firm given $\rho > 0$
    - $\rightarrow$ Worker exerts effort to decrease (advantageous) inequality
  - The higher the wage, the larger the transfer given mechanism above

Alternative model: *Reciprocity*

- Worker cares about firm with weight α
- Altruism weight is a function of how nicely workers has been treated
- Positive gift increases α
- $\rightarrow$ Worker puts more effort because he cares more about firm
- The higher the wage, the larger the transfer given mechanism above

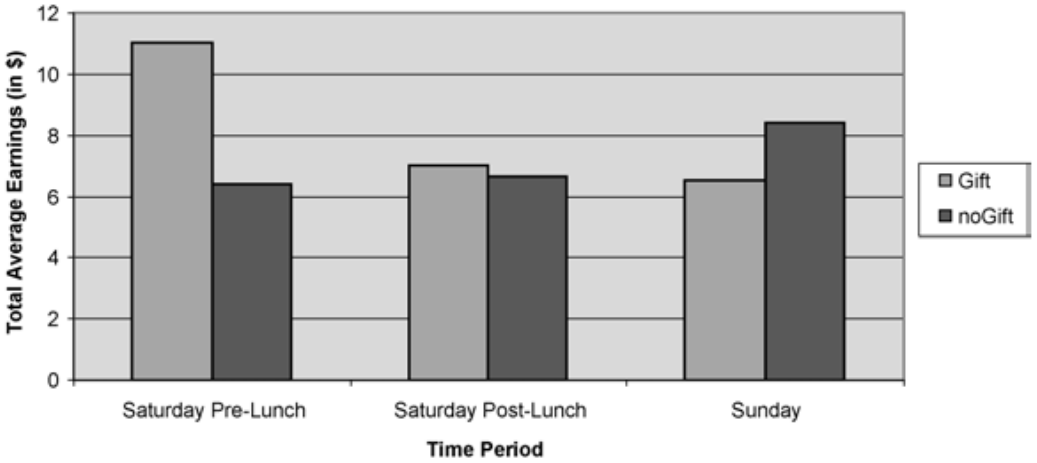
Gift Exchange in the Field

- Evidence of gift exchange in a field workplace?
- **Gneezy-List (EMA, 2006)** $\rightarrow$ Evidence from labor markets
- *Field experiment 1.* Students hired for one-time six-hour (typing) library job for \$12/hour
  - No Gift group paid \$12 ($N = 10$)
  - Gift group paid \$20 ($N = 9$)



Gift Exchange in the Field

- *Field experiment 2.* Door-to-Door fund-raising in NC for one-time weekend for \$10/hour
  - Control group paid \$10 ($N = 10$)
  - Treatment group paid \$20 ($N = 13$)



- Note: Group coming back on Sunday is subset only (4+9)
- Evidence of reciprocity, though short-lived

Positive vs. Negative Reciprocity

- Laboratory evidence: negative reciprocity stronger than positive reciprocity
- Test for positive versus negative reciprocity in the field?

- **Kube-Marechal-Puppe (JEEA 2013).**
- Field Experiment: Hire job applicants to catalog books for 6 hours

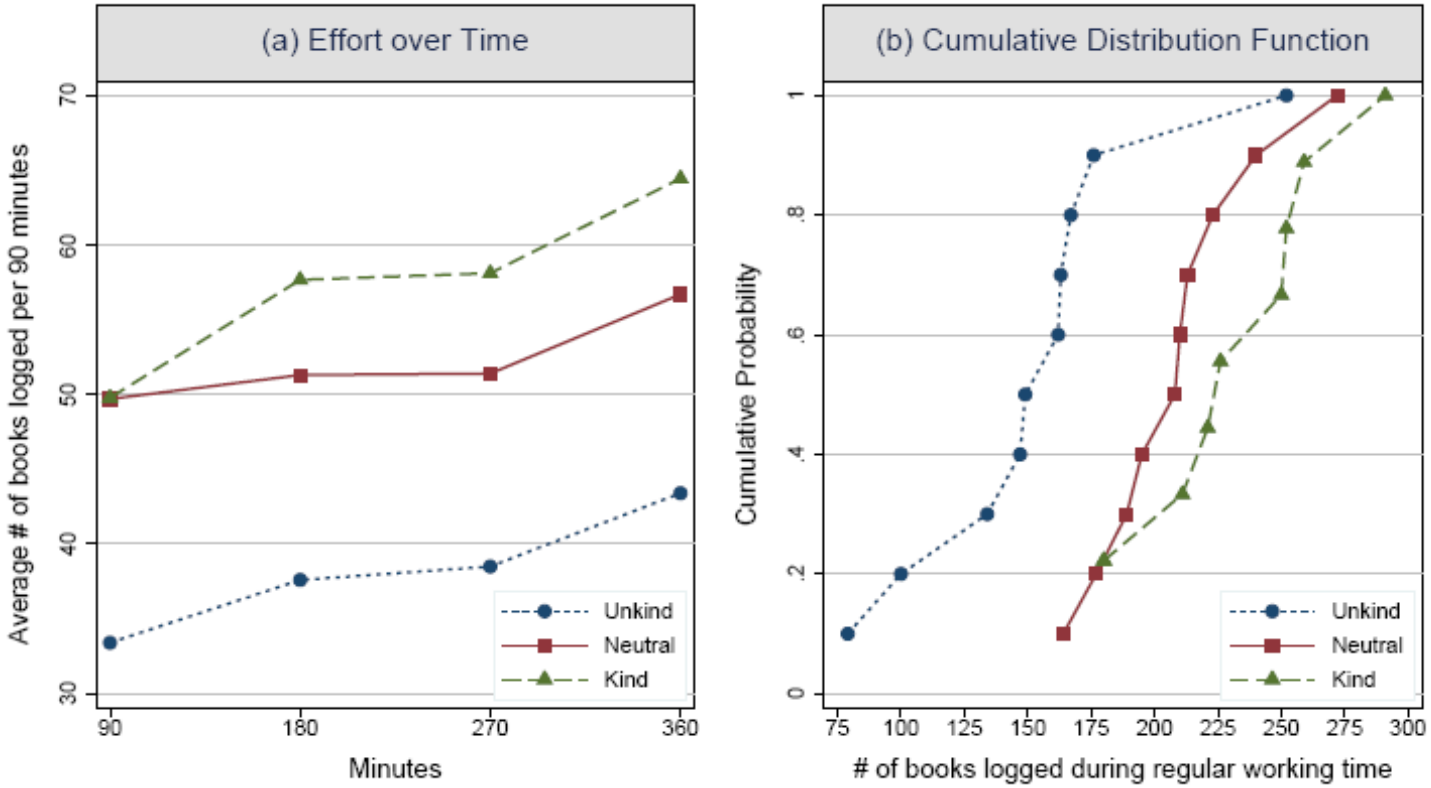
Figure 2: Screenshot: Computer Application

Design

- Announced Wage: '*Presumably*' 15 Euros/hour
  - Control ($n = 10$). 15 Euros/hour
  - Treatment 1 (Negative Reciprocity, $n = 10$). 10 Euros/hour (No one quits)
  - Treatment 2 (Positive Reciprocity, $n = 9$). 20 Euros/hour
- Offer to work one additional hour for 15 Euros/hour

Results

- Result 1: Substantial effect of pay cut
- Result 2: Smaller effect of pay increase
- Result 3: No decrease over time



Results

- Finding consistent with experimental results:
  - Positive reciprocity weaker than negative reciprocity
- Important other result:
  - No negative effect on quality of effort (no. of books incorrectly classified)
  - All treatments have near perfect coding
  - Hence, negative reciprocity does not extend to sabotage
- Final result: No. of subjects that accept to do one more hour for 15 Euro:
  - 3 in Control, 2 in Pos. Rec., 7 in Neg. Rec.
  - Positive Reciprocity does not extend to volunteering for one more hour

Kube-Marechal-Puppe (AER 2011)

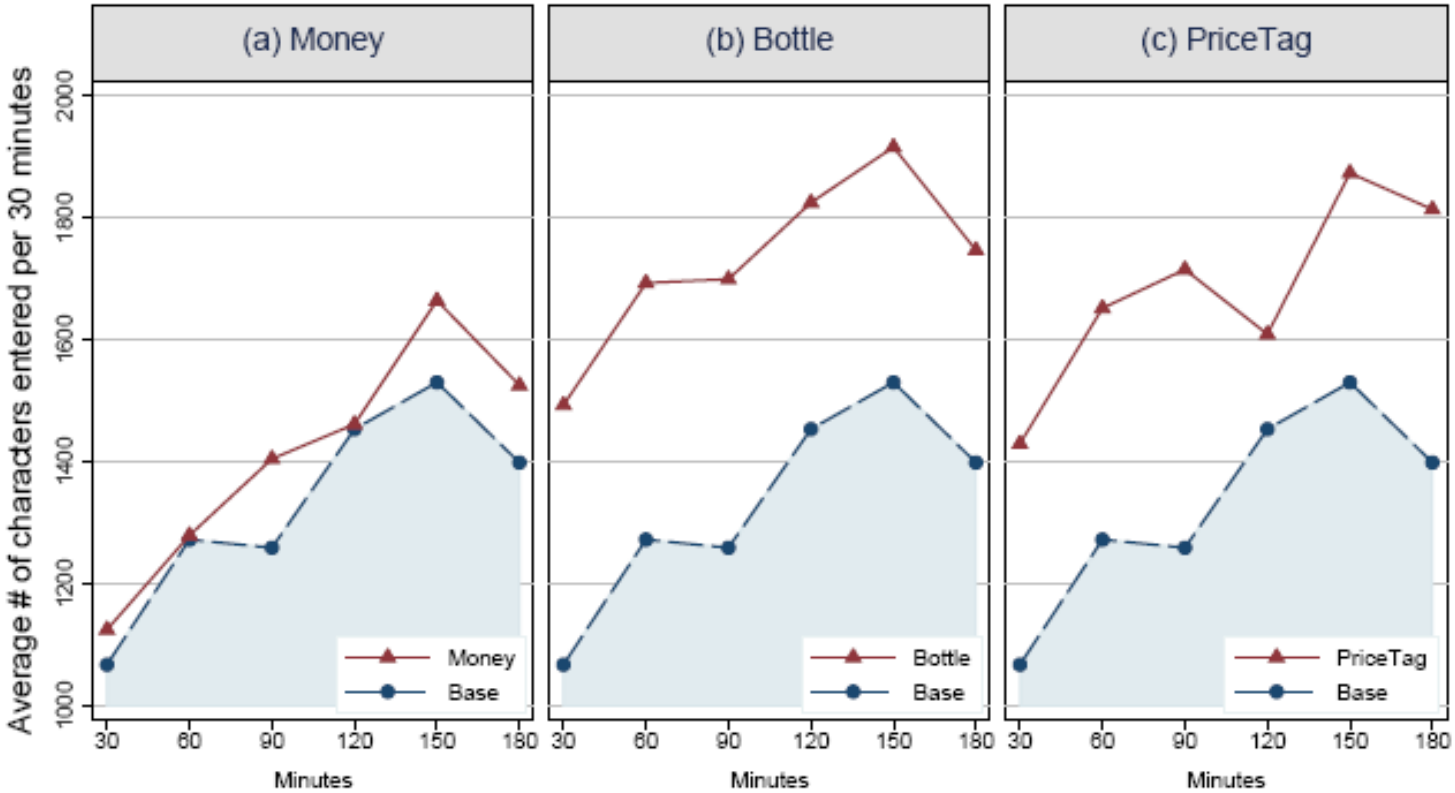
- Field Experiment 2: Hire job applicants to catalog books for 6 hours
- Announced Wage: 12 Euros/hour for 3 hours=36
  - Control ($n = 17$). 36 Euros
  - Treatment 1 (Positive Reciprocity, Cash, $n = 16$). $36 + 7 = 43$ Euros
  - Treatment 2 (Positive Reciprocity, Gift, $n = 15$). 36 Euros plus Gift of Thermos
  - Treatment 3 – Same as Tr. 2, but Price Tag for Thermos

Cash vs. Gift

- What is the effect of cash versus in-kind gift?

Results

- Result 1: Small effect of 20% pay increase
- Result 2: Large effect of Thermos → High elasticity, can pay for itself
- Result 3: No decrease over time



Possible Explanations

- Explanation 1. Thermos perceived more valuable
  - $\rightarrow$ But Treatment 3 with price tag does not support this
  - Additional Experiment:
    - At end of (unrelated) lab experiment, ask choice for 7 Euro or Thermos
    - 159 out of 172 subjects prefer 7 Euro
- Explanation 2. Subjects perceive the thermos gift as more kind, and respond with more effort
- Tentative conclusions from gift exchange experiments:
  1. Gift exchange works in lab largely as in field
  2. Negative reciprocity stronger than positive reciprocity (as in lab)
  3. Effect is sensitive to perception of gift

Model-Based Explanations

- BUT: Think harder about these conclusions using **models**
- **Conclusion 1.** Gift exchange works in lab as in field
- Fehr, Kirchsteiger, and Riedl (QJE, 1993) - Two main model-based explanations:
  - *Inequity Aversion* (Fehr and Schmidt, 1999): Worker puts effort because firm had fallen behind in payoffs by paying high wage
  - *Reciprocity* (Rabin, 1993; Dufwenberg and Kirchsteiger, 2003): Worker is nice towards firm because firm showed nice intentions

- Model for Gneezy and List (2006) and follow-up work?
  - Inequity aversion does *not* predict gift exchange in the field (Card, DellaVigna, and Malmendier, JEP 2011)
  - Firm is very likely to have substantial income M, more than worker
  - When firm transfers gift to employee, firm is still ahead on payoffs
  - $\rightarrow$ No predicted effort response
  - Intuition: Firm does not fall behind the worker just because of a pay increase

- Model for Gneezy and List (2006) and follow-up work?
  - Inequity aversion does *not* predict gift exchange in the field (Card, DellaVigna, and Malmendier, JEP 2011)
  - Firm is very likely to have substantial income M, more than worker
  - When firm transfers gift to employee, firm is still ahead on payoffs
  - $\rightarrow$ No predicted effort response
  - Intuition: Firm does not fall behind the worker just because of a pay increase
- Hence, gift exchange in the field, when occurs, is due to reciprocity, not inequity aversion

- **Conclusion 2.** Negative reciprocity stronger than positive reciprocity
  - Is that really implied?
- Pure-altruism model of utility maximization of worker in gift exchange experiment

$$\max_{e} u(e) = w - c(e) + \alpha \left[ve - w\right]$$

  - e is effort, measurable
  - w is fixed payment (could be a gift)
  - $c(e)$ is cost of effort
  - α is altruism coefficient
  - v is return to the firm for unit of effort

- Would like to estimate α, and how it changes when a gift is given

- Utility

$$\max_{e} u(e) = w - c(e) + \alpha \left[ve - w\right]$$

- First-order condition:

$$-c'\left(e^*\right) + \alpha v = 0$$

- Can we estimate α?

- Utility

$$\max_{e} u(e) = w - c(e) + \alpha \left[ve - w\right]$$

- First-order condition:

$$-c'\left(e^{*}\right) + \alpha v = 0$$

- Can we estimate α?
- Two key unobservables:
  - Value of work v: What is the value of one library book coded?
  - Cost of effort $c\left(e\right)$: How hard it is to work more on the margin?
- Second issue confounds conclusion on reciprocity
  - Positive reciprocity may be stronger than negative, but marginal cost of effort steeply increasing $\rightarrow$ Find stronger response to negative gift

DellaVigna, List, Malmendier, and Rao (2019)

- Address Issue 1 by informing of value of work to employer
- Address Issue 2 by estimating cost of effort function with piece rate variation (piece rate design)
- Only then introduce gift treatments

- Introduce piece rate in design. Utility

$$\max_e u(e) = w + pe - c(e) + \alpha \left[ve - pe - w\right]$$

- First-order condition:

$$p - c'(e^*) + \alpha [v - p] = 0$$

  - Notice

$$\frac{\partial e^*}{\partial p} = -\frac{1-\alpha}{-c''(e)}$$

  and

$$\frac{\partial e^*}{\partial v} = -\frac{\alpha}{-c''(e)}$$

  - Hence, can estimate α given

$$\frac{\partial e^*}{\partial v} / \frac{\partial e^*}{\partial p} = \frac{\alpha}{1-\alpha}$$

- We vary piece rate p as well as return v

Experiment I

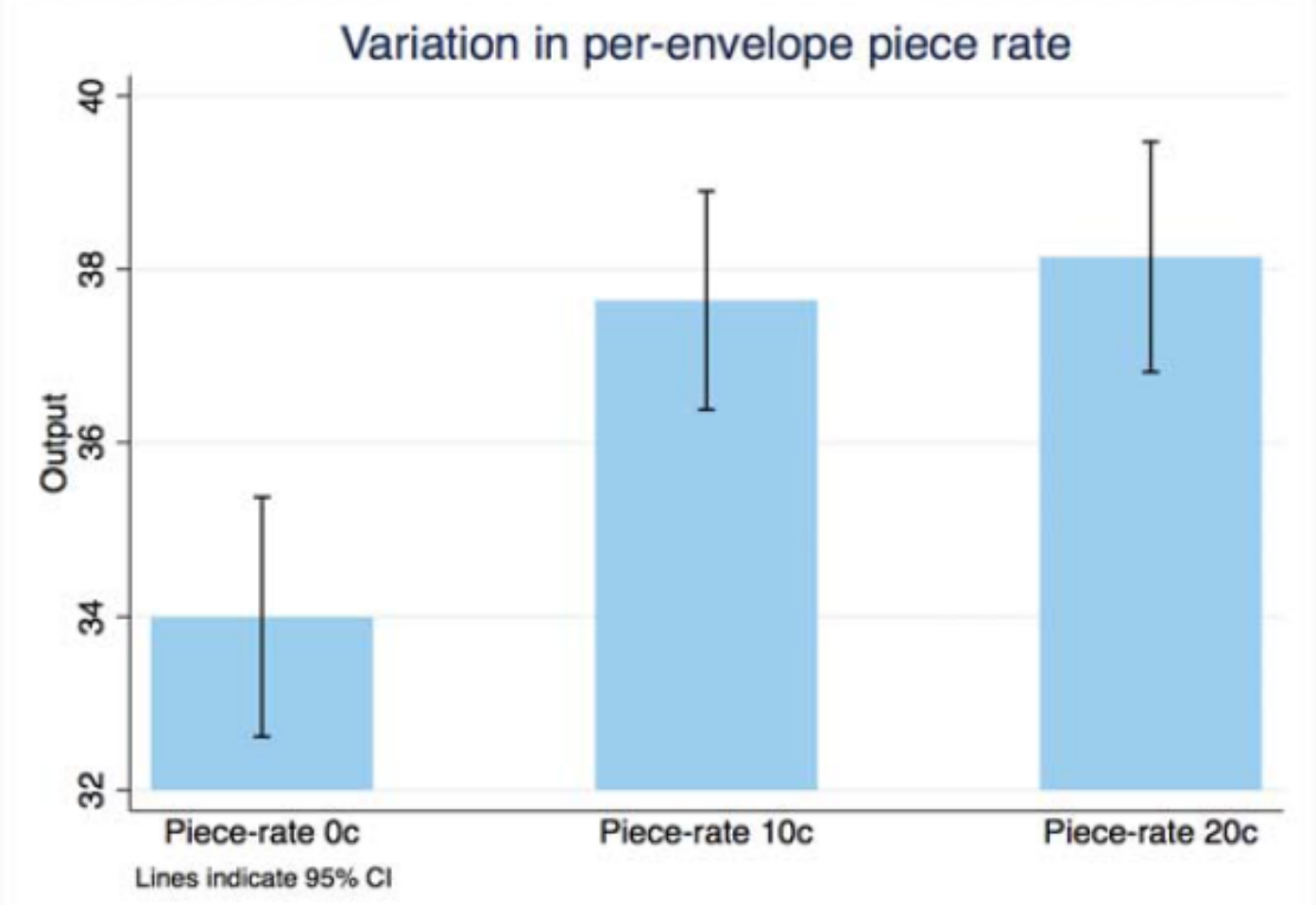
- Recruit for a one-time, 5-hour job
- Task is to fold letters, stuff into appropriate envelope, and attach mailing address
- Task is simple, but not implausible for a temp worker
- Workers are working for a charity which pays them X per envelope
- Workers are told the (expected) return Y to the charity
- Example: "The envelopes filled in this session will be used in a letter campaign of Breakthrough. As mentioned before, Breakthrough will be paying for your work. The pay is \$0.20 per envelope completed, as noted on your schedule. A number of such campaigns have been run by charities similar to Breakthrough, and historically, these charities have gotten roughly \$0.30 per mailer with such campaigns. Taking account of Breakthrough per-envelope payment for your help today, it expects to get roughly \$0.10 for each additional envelope that you prepare during this session."

Experiment I

- To estimate cost of effort, we vary the piece rate within person
  - Ten 20-minute periods of folding envelopes with 5 min breaks
  - We vary the piece rate X (0 cents vs. 10 cents vs. 20 cents)
  - We vary the return to charity Y (30 cents vs. 60 cents)
  - We introduce training sessions where output is discarded
  - Subjects work for three different charities (and a firm)
- In last 2 periods, we introduce a gift:
  - Control group – paid \$7 flat pay as before
  - Positive gift – paid \$14
  - Negative gift – paid \$3

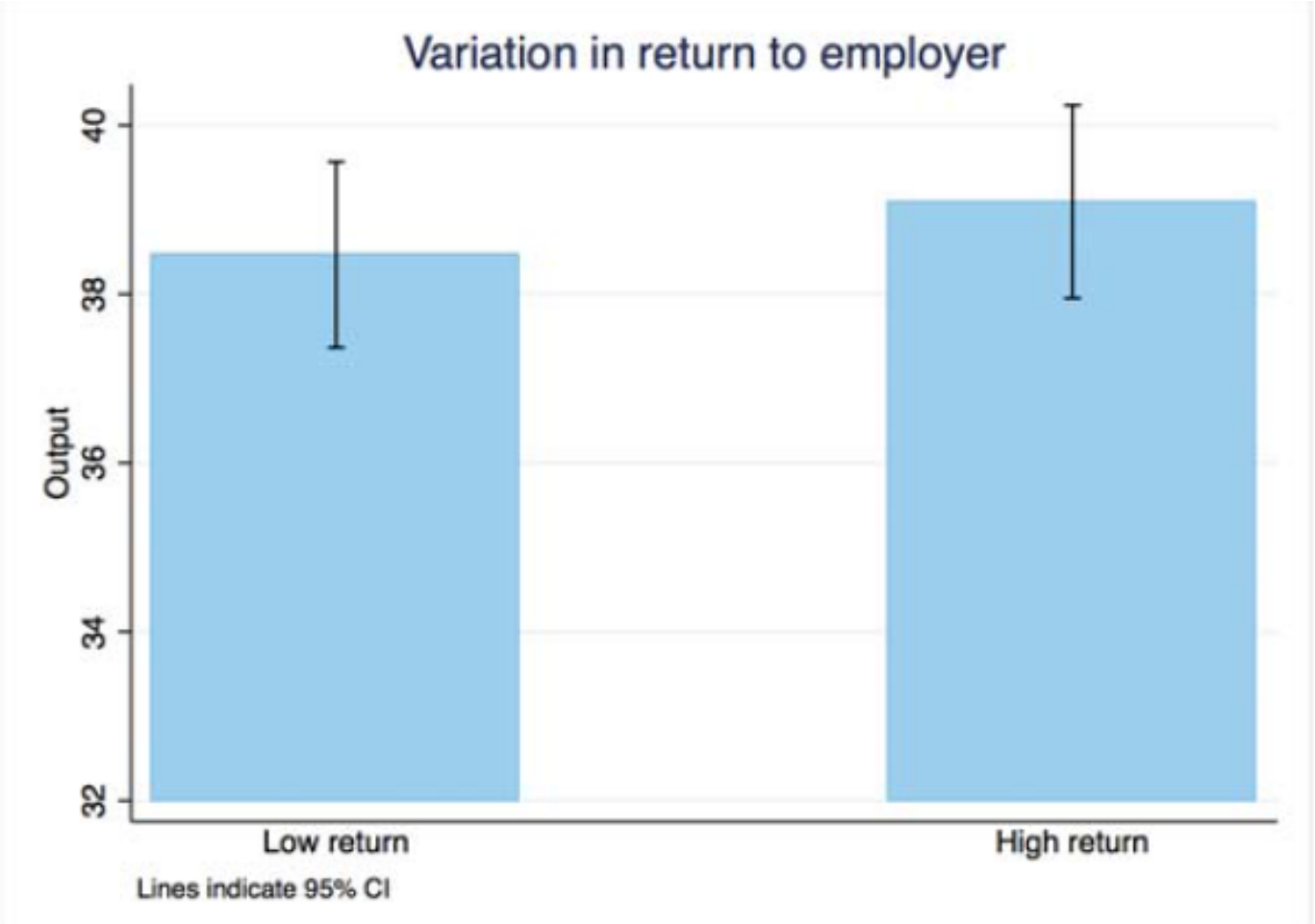
Finding 1

- Finding 1. Significant response to piece rate – critical pre-condition



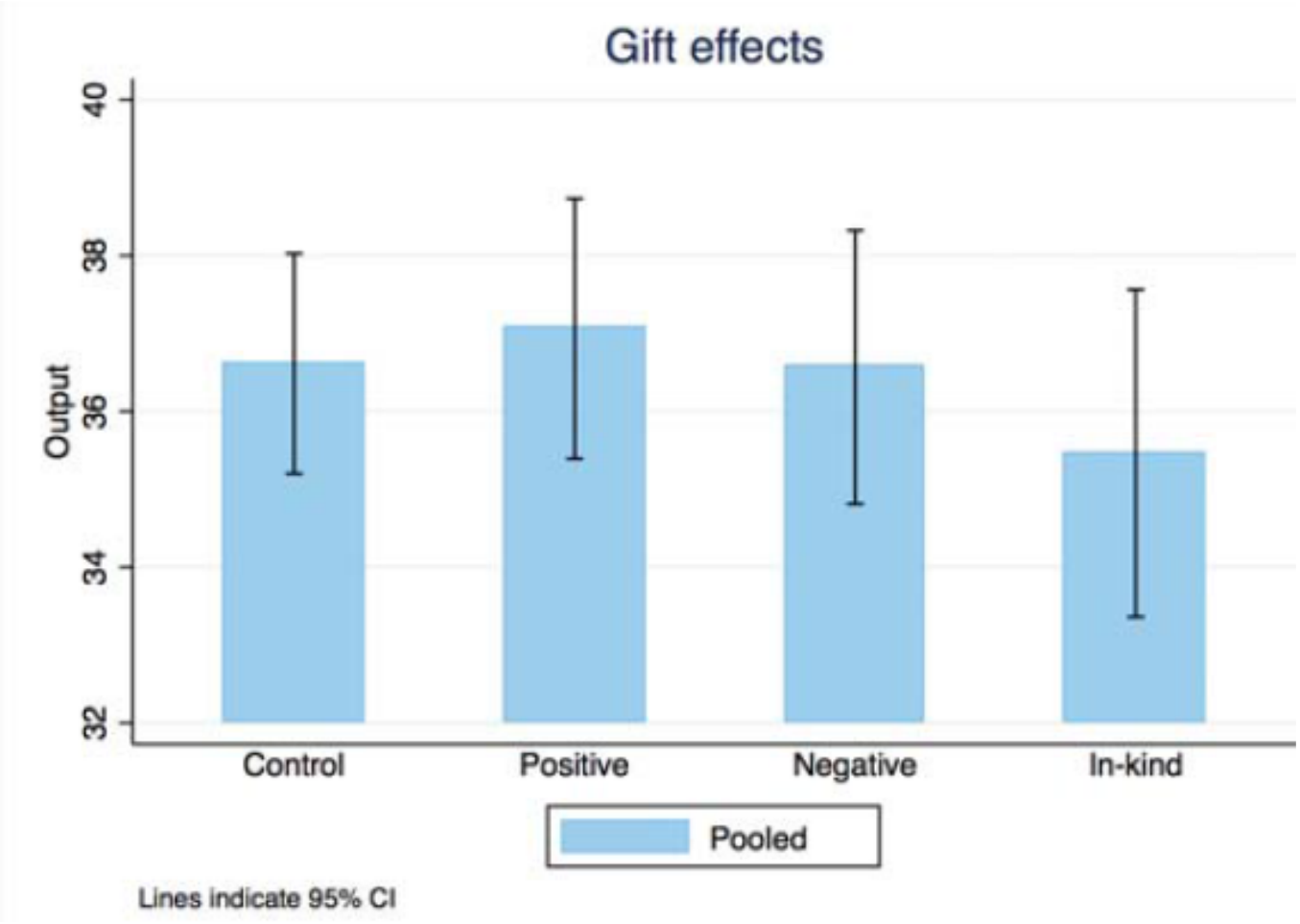
Finding 2

- Finding 2. Very small impact of match – it is not *pure altruism*



Finding 3

- No significant impact of any of the gifts

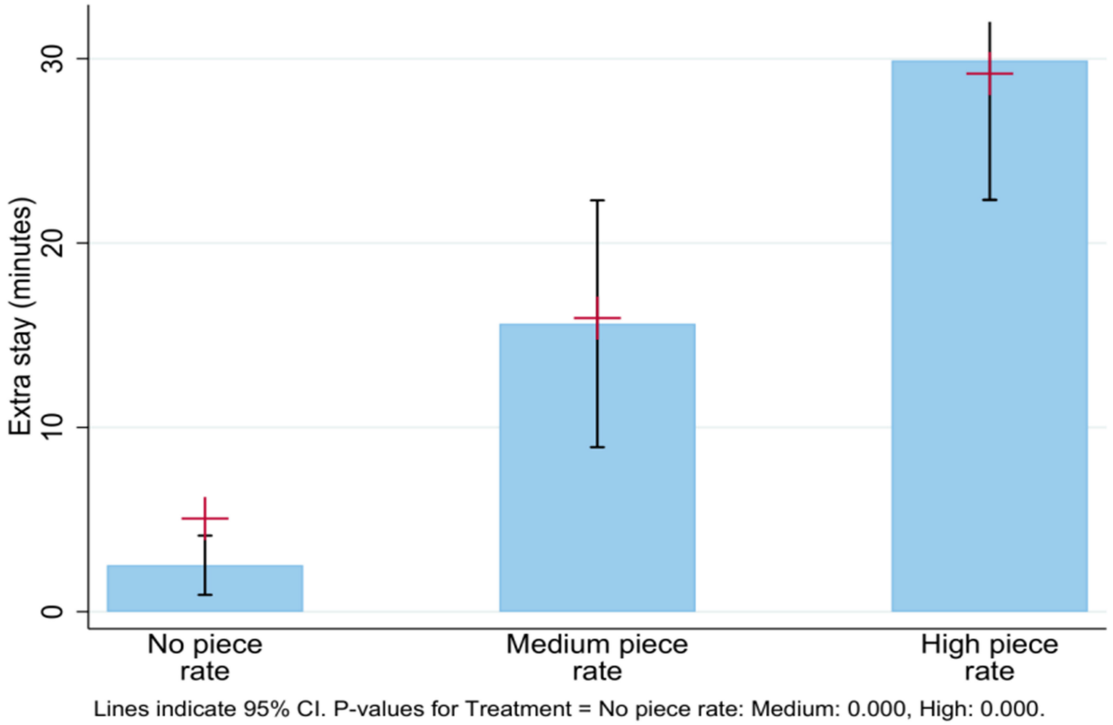


Experiment II

- Implement second design that is purely between people
- Hire workers to code data for 2 hours for $60
- After work period is over, randomize whether gift, or not
- Then ask "Would you code some more for us up to 60 extra minutes"
  - for no extra pay
  - for 25c per minute
  - for 50c per minute
- Key variable is: How long people stay (0-60 minutes)
- Pick this variable because this margin appears to be more elastic (Abeler et al., 2011)

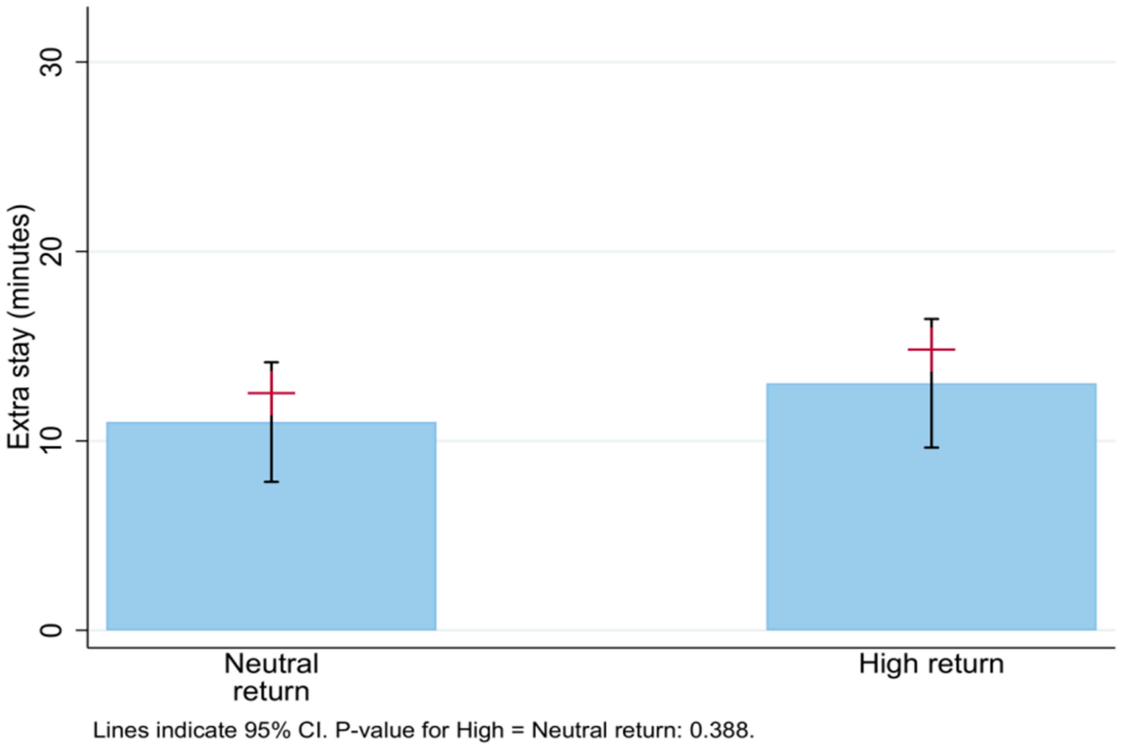
Experiment II

- Is there a response to piece rate? Yes, now massive



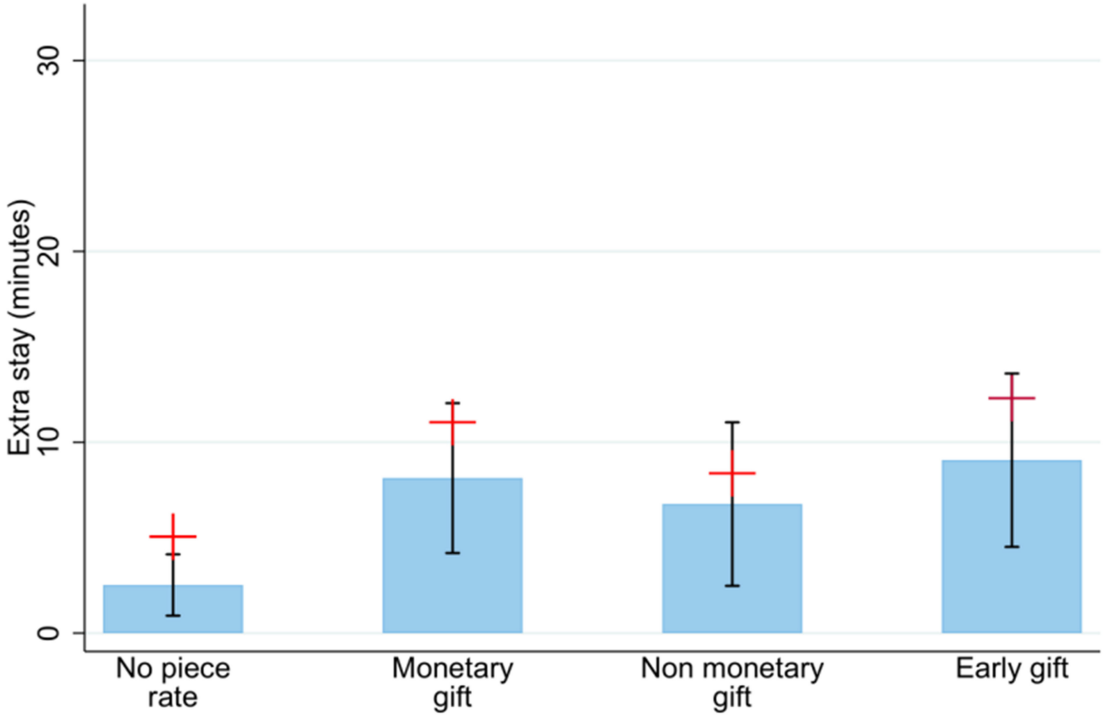
Experiment II

- Is there a response to Value of work ("Getting the extra data entered today is really valuable to us.")? No, like before



Experiment II

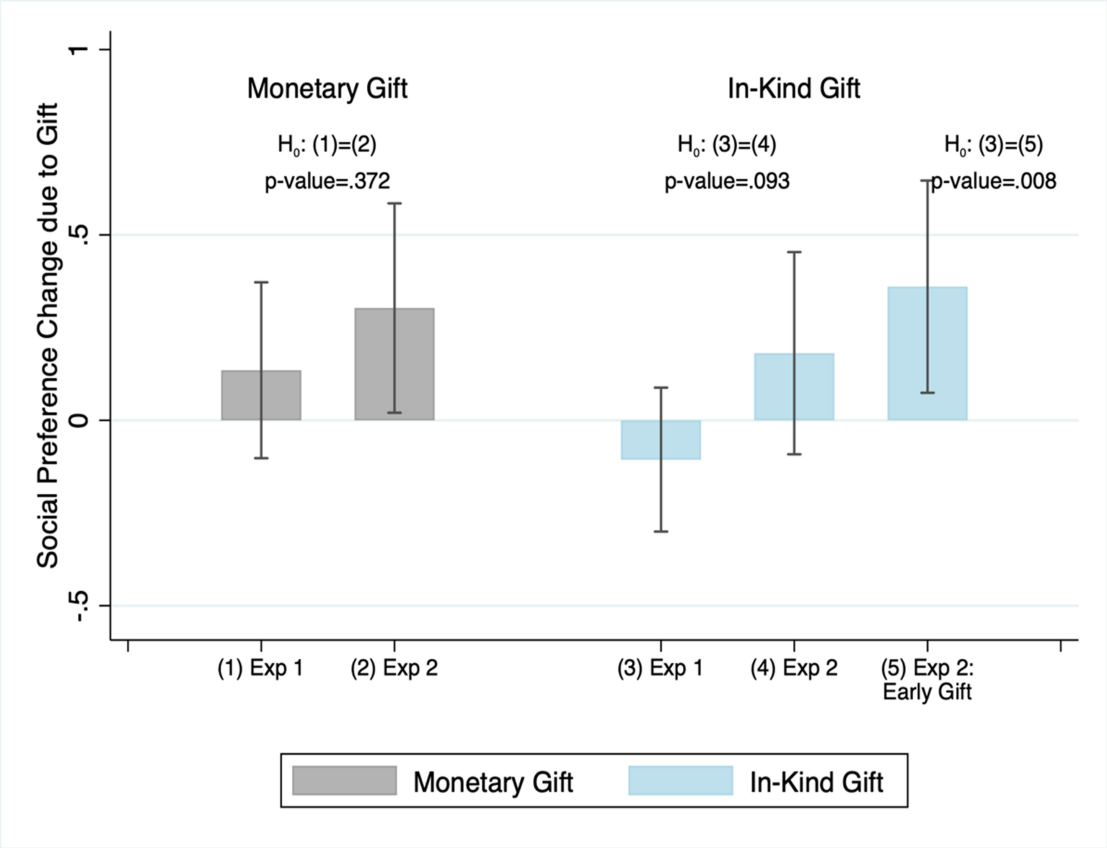
- Is there a response to Gift Exchange? Now yes!



Lines indicate 95% CI. P-values for Treatment = No piece rate: Monetary: 0.012, Non monetary: 0.074, Early gift: 0.010.

Experiment I and II

- Apparent differences largely reconciles when taking structural model (elasticity) into account



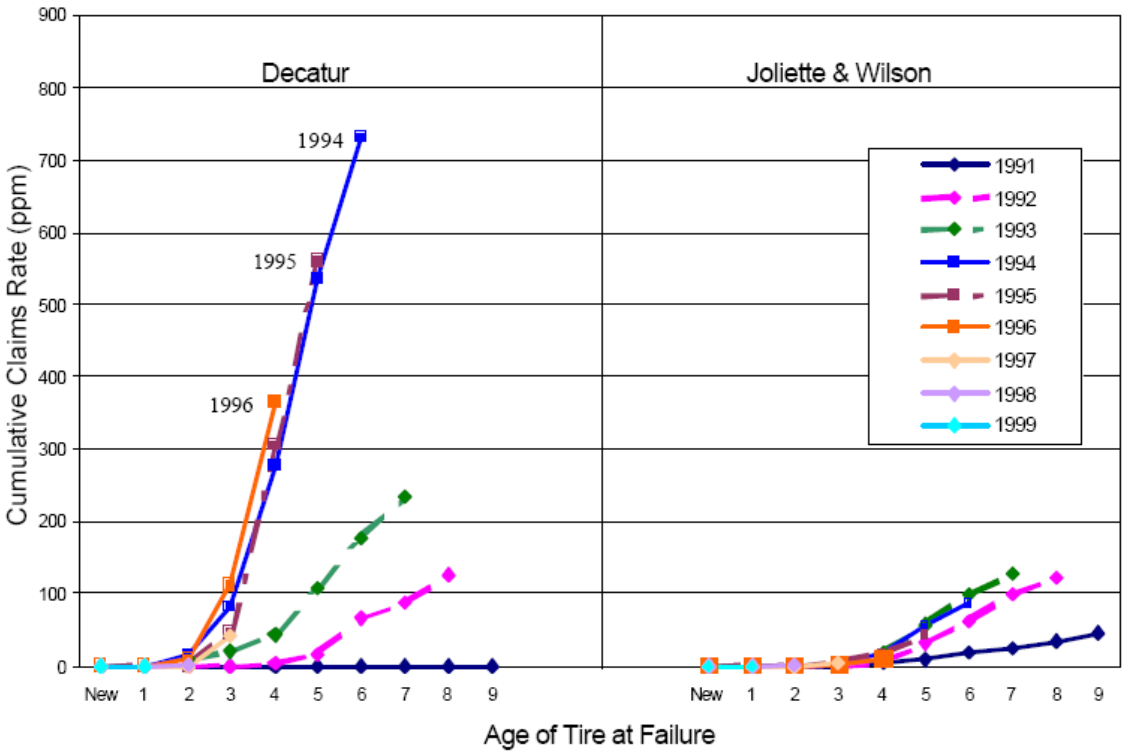
Negative Reciprocity: Sabotage?

- Is there evidence in a workplace of negative reciprocity towards unkind employer leading to sabotage?

- **Krueger-Mas (JPE, 2004).**
- Setting:
  - Unionized Bridgestone-Firestone plant
  - Workers went on strike in July 1994
  - Replaced by replacement workers
  - Union workers gradually reintegrated in the plant in May 1995 after the union, running out of funds, accepted the demands of the company
  - Agreement not reached until December 1996

Sabotage?

- Do workers sabotage production at firm?
  - Examine claims per million tires produced in plants affected
  - Compare to plant not affected by strike (Joliette & Wilson)

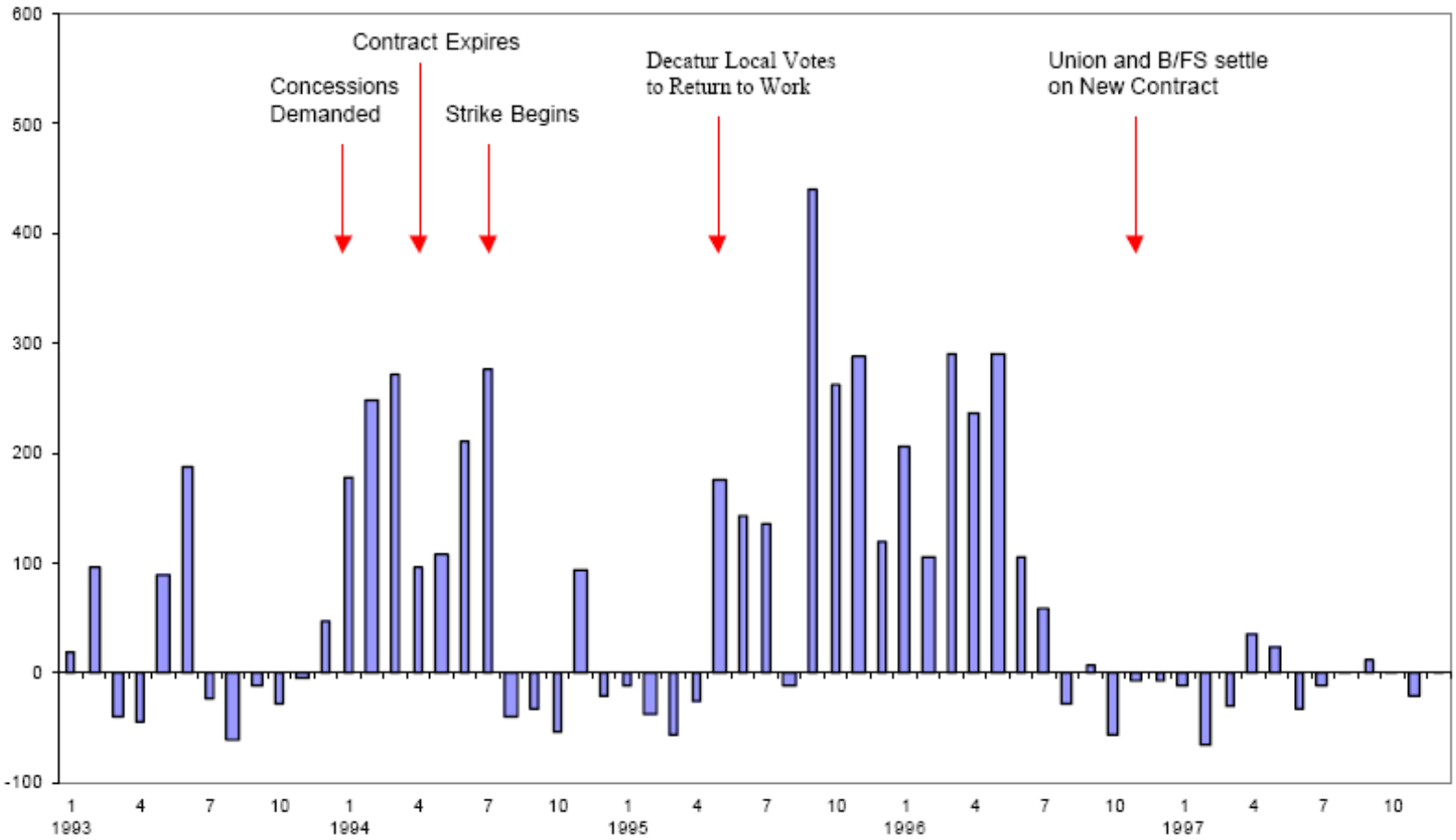


Sabotage?

- Ten-fold increase in number of claims
- Similar pattern for accidents with fatalities
- Possible explanations:
  - Lower quality of replacement workers
  - Boycotting / negative reciprocity by unionized workers
- Examine the timing of the claims

Claims Timing

Figure 8: Difference in the Number of Complaints per million Tires Produced by Month: Decatur Plant minus Joliette and Wilson Plants.



Source: Authors' calculations based on NHTSA complaints data. Records with missing data are excluded.

Claims Timing

- Two time periods with peak of claims:
  - Beginning of Negotiation Period
  - Overlap between Replacement and Union Workers
- Quality not lower during period with replacement workers
- Quality crisis due to Boycotts by union workers
- Claims back to normal after new contract settled

- Suggestive of extreme importance of good employer-worker relations

Section 8

Next Lecture

Next Lecture

- Gift Exchange: Charitable Giving
- Social Preferences Wave IV
  - Social Pressure
  - Social Signaling
  - Social Norms