CES Lecture 2: An experimental approach to responsibility and fairness: fairness norms in dictator games with production

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Motivation

- What should people be held responsible for?
- This is a core question in the normative literature
- This is also a crucial question when we evaluate the fairness of the market outcome.
  - An efficient labor market effectively holds people responsible for all factors determining their production value.
  - Classical inequality measures implicitly assumes that people are not responsible for anything.
- This question has, however, received little attention in the experimental literature

Focus of this paper

- What do people hold each other responsible for?
  - In particular: do people consider the market outcome as fair?
- Are people's notion of fairness, and the weight they attach to fairness, shaped by the institutions of society?
  - education
  - the labor market
- We designed an experiment to study these questions.
  - Presentation based on the paper "Responsibility for What? Fairness and Individual Responsibility", co-authored with Erik Ø. Sørensen.
  - the labor market

What we take from the literature

- Well established that people care about fairness considerations.
  - ultimatum game
  - dictator game (no strategic motivation)
- These games are not well designed for studying the issue of responsibility.
  - manna from heaven
  - need to introduce production
- People are heterogeneous in two dimensions.
  - the weight they attach to fairness
  - their notion of fairness.

1. The distributive situation and fairness ideals
2. The choice problem
3. Experimental design
4. Descriptive statistics
5. Empirical model
6. Estimates/interpretations/robustness analysis
7. Concluding remarks

1. The distributive situation and fairness

Two people with possibly different individual productivity (a_1 and a_2) have chosen to work for a shorter or longer period of time (q_1 and q_2), and they have randomly been given different prices on their production (p_1 and p_2).

Individual production value is $x_i(a_i, q_i, p_i) = a_i q_i p_i$.

Total production value is $X(\boldsymbol{a}, \boldsymbol{q}, \boldsymbol{p}) = x_1(a_1, q_1, p_1) + x_2(a_2, q_2, p_2)$.

The fairness ideal concerns the just distribution m of X between the two persons, indexed such that 1 gets m and 2 gets $X - m$.

Fairness and responsibility

Total production depends on $\boldsymbol{a}$, $\boldsymbol{q}$ and $\boldsymbol{p}$.

Reasonable fairness ideals correspond to different views on where to draw the responsibility cut (Roemer).

A *responsibility set* r^k is a subset of $\{a, p, q\}$.

We consider four fairness ideals: Strict egalitarianism, two versions of equal opportunity ethics and libertarianism.

These four ideals correspond to different responsibility sets.

The fairness ideals and the responsibility set

Strict egalitarianism:	$r^{SE} = \emptyset$
Choice egalitarianism:	$r^{CE} = \{q\}$
Meritocratism:	$r^{M} = \{q, a\}$
Libertarianism:	$r^{L} = \{q, a, p\}$

The fairness ideals and the fair solution

Strict egalitarianism:	$m^{SE} = X/2$
Choice egalitarianism:	$m^{CE} = q_1 X/(q_1 + q_2)$
Meritocratism:	$m^{M} = a_1 q_1 X/(a_1 q_1 + a_2 q_2)$
Libertarianism:	$m^{L} = x_1$

We consider alternative formulations of choice egalitarianism and meritocratism in the robustness analysis.

2. The choice problem

People care about money, y, but are willing to trade money for fairness:

$$V_i(y_i; \boldsymbol{a}, \boldsymbol{q}, \boldsymbol{p}) = y_i - \beta_i \frac{(y_i - m^{k(i)}(\boldsymbol{a}, \boldsymbol{q}, \boldsymbol{p}))^2}{2X(\boldsymbol{a}, \boldsymbol{q}, \boldsymbol{p})}, \quad k(i) \in \{SE, CE, M, L\}.$$

An individual i with fairness ideal $k(i)$ puts a weight $\beta_i \geq 0$ on deviations from the fairness ideal.

If there is an interior solution, this is

$$y_i^* = m^{k(i)}(\boldsymbol{a}, \boldsymbol{q}, \boldsymbol{p}) + X(\boldsymbol{a}, \boldsymbol{q}, \boldsymbol{p})/\beta_i.$$

3. Experimental design

The aim was to design an experiment that would provide data, repeated observations of each individual,

$$(i, y, \boldsymbol{a}, \boldsymbol{q}, \boldsymbol{p}),$$

that would allow us to infer both the prevalence of different ideals (shares $\lambda_{SE}, \lambda_{CE}, \lambda_M, \lambda_L$ of different ideals in the population) and the distribution of the strength of fairness attachment (β).

The experiment was conducted at the Norwegian School of Economics and Business Administration and was web-based in two computer labs.

Subject groups

group	# of participants
First year students	82
Second year students	84
Fourth year students	72
Alumni (2-10 years of work experience)	57
Total	295

1. We invited participants to take part in a short or a long version of an experiment.
2. They then worked for 10 or 30 minutes typing one of two randomly drawn texts (with prices of 0.5 or 1.0 NOK/correct word).
3. After the production ended, they were anonymously matched with a sequence of other participants, and asked to propose a distribution of the total output $X(\boldsymbol{a}, \boldsymbol{q}, \boldsymbol{p})$ in those situations.
4. After having confirmed proposed distributions, one of the proposals was randomly drawn (with equal probability) to determine the actual (anonymous) payoff.
5. All participants got NOK 100 in show-up fee.
6. All the rules were known before production started.

Statistics on productivity.

	duration in minutes		
price/word (NOK)	10	30	total
0.5	25.72	25.22	25.43
	$n = 62$	$n = 85$	$n = 147$
1.0	23.28	21.33	22.17
	$n = 64$	$n = 84$	$n = 148$
total	24.48	23.28	23.80
	$n = 126$	$n = 169$	$n = 295$

The cells show average productivity and the number of observations in each of the four categories.

4. Descriptive statistics

	Share, $(X-y)/X$				
	1st year	2nd year	4th year	alumni	total
mean	0.396	0.338	0.383	0.430	0.385
standard deviation	0.188	0.233	0.223	0.172	0.208
minimum	0	0	0	0	0
maximum	0.789	0.944	0.862	0.973	0.973
	Amount, $X-y$, in NOK				
	1st year	2nd year	4th year	alumni	total
mean	274	253	266	361	286
standard deviation	189	223	199	203	207
maximum	1000	1000	850	900	1000
share offering nothing	0.043	0.135	0.156	0.040	0.093

5. Empirical model

The choice of y is restricted to the set

$$\mathbf{Y}(\mathbf{a}, \mathbf{q}, \mathbf{p}) = \{0, 25, 50, \ldots, X(\mathbf{a}, \mathbf{q}, \mathbf{p})\},$$

and we introduce random variation that is idiosyncratic to each choice,

$$\begin{aligned} U_i(y; \mathbf{a}, \mathbf{q}, \mathbf{p}, k) &= \gamma y - \beta_i \frac{(y - m^k(\mathbf{a}, \mathbf{q}, \mathbf{p}))^2}{2X(\mathbf{a}, \mathbf{q}, \mathbf{p})} + \epsilon_{yi}, \\ &= \overline{U}(y; \mathbf{a}, \mathbf{q}, \mathbf{p}, k, \gamma, \beta_i) + \epsilon_{yi}. \end{aligned}$$

The constant γ determines the weight given to money relative to ϵ_{yi}.

We assume that the ϵ_{yi}'s are i.i.d. extreme value distributed and that individuals choose a y, call it y^*, such that $U_i(y^*; \cdot) \geq U_i(y; \cdot)$ for all y in $\mathbf{Y}(\mathbf{a}, \mathbf{q}, \mathbf{p})$.

This model has a mixed logit structure where each person is characterized by their fairness ideal, $k(i)$, and the strength they attach to fairness, β_i. All individuals share the parameter γ.

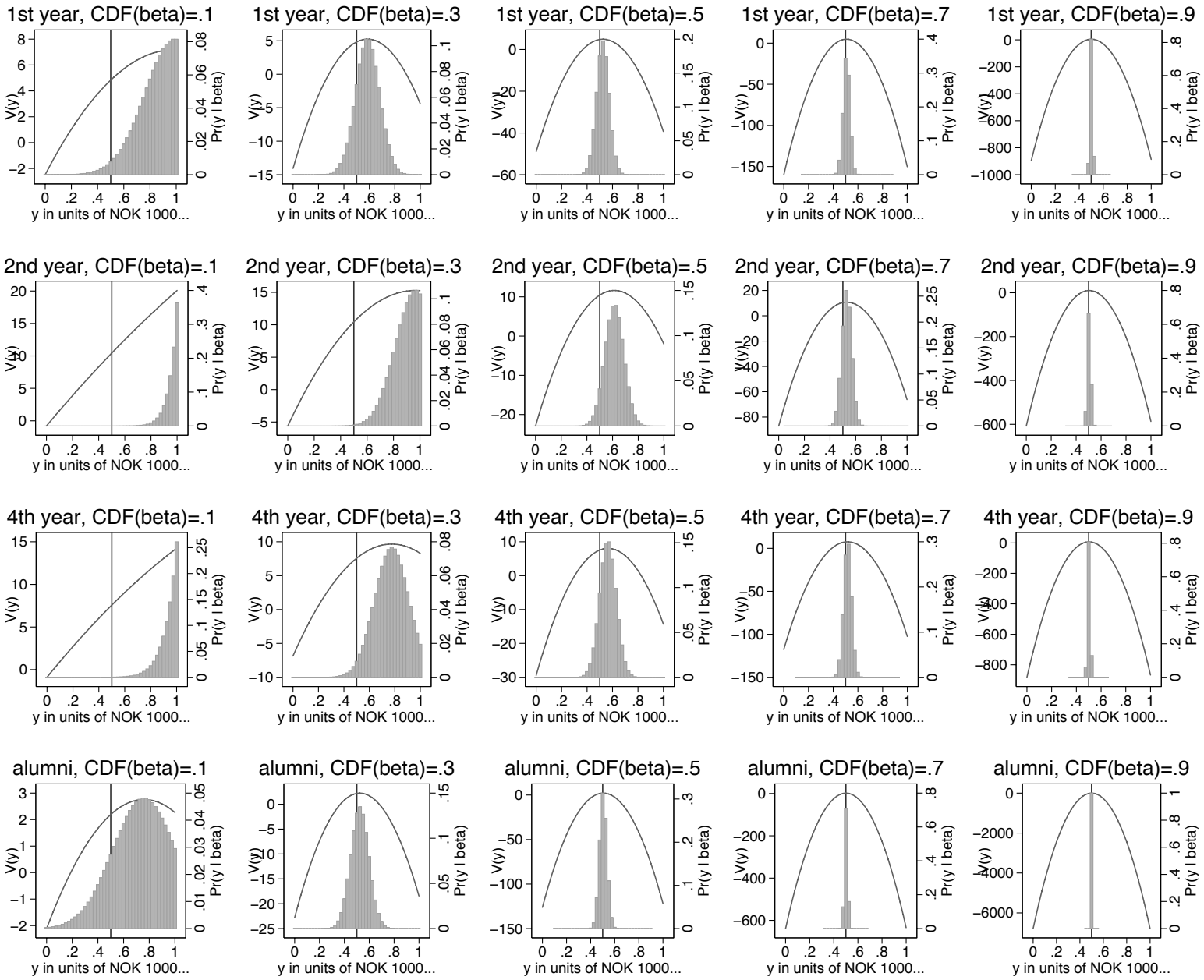
The distribution of fairness ideals is discrete. We approximate the distribution of β by a log-normal distribution, such that $\log \beta \sim N(\zeta, \sigma^2)$.

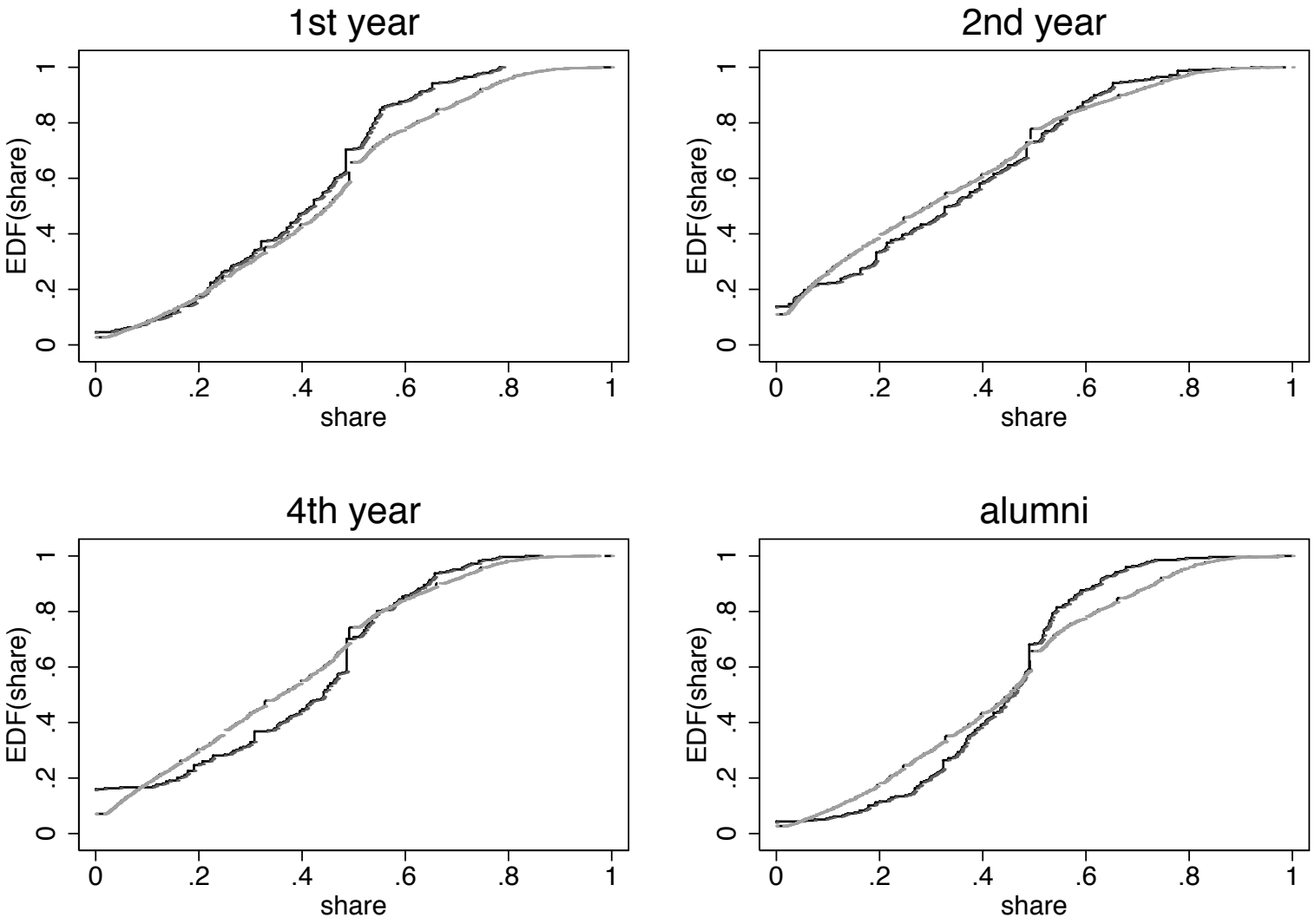
Let the subscript $j = 1, \ldots, J_i$ index the situations an individual i faces and let λ_k denote the proportions that hold the different fairness ideals. The likelihood of an individual i making proposals $(y_{i1}, \ldots, y_{iJ_i})$ from the sets of feasible proposals $(\mathbf{Y}_{i1}, \ldots, \mathbf{Y}_{iJ_i})$ given a parameter vector θ is then

$$L_i(\theta) = \sum_k \lambda_k \int_0^\infty \left(\prod_{j=1}^{J_i} \frac{e^{\overline{U}(y_{ij};\mathbf{a}_{ij},\mathbf{q}_{ij},\mathbf{p}_{ij}.k,\beta,\gamma)}}{\sum_{s \in \mathbf{Y}_{ij}} e^{\overline{U}(s;\mathbf{a}_{ij},\mathbf{q}_{ij},\mathbf{p}_{ij}k,\beta,\gamma)}} \right) dF(\beta;\zeta,\sigma).$$

6. Estimates and interpretations

parameter	1st year	2nd year	4th year	alumni	total
λ_{SE}, share strict egalitarian	0.225	0.210	0.215	0.129	0.180
	(0.066)	(0.062)	(0.063)	(0.062)	(0.030)
λ_{CE}, share choice egalitarian	0.066	0.078	0.060	0.023	0.046
	(0.047)	(0.047)	(0.051)	(0.024)	(0.019)
λ_M, share meritocratic	0.415	0.425	0.578	0.403	0.469
	(0.078)	(0.081)	(0.089)	(0.083)	(0.042)
λ_L, share libertarian	0.284	0.286	0.147	0.445	0.305
	(0.076)	(0.073)	(0.067)	(0.088)	(0.038)
ζ, mean of $\log \beta$	5.994	5.182	5.432	6.881	5.673
	(0.319)	(0.340)	(0.369)	(0.463)	(0.180)
σ, standard deviation of $\log \beta$	2.293	2.585	2.681	3.143	2.672
	(0.298)	(0.342)	(0.330)	(0.478)	(0.168)
γ, marginal utility of money	9.669	20.879	15.143	4.383	12.433
	(1.547)	(2.035)	(1.251)	(0.853)	(0.617)
Log likelihood		-2718.40			-2754.90


1st year, CDF(beta)=.1
1st year, CDF(beta)=.3
1st year, CDF(beta)=.5
1st year, CDF(beta)=.7
1st year, CDF(beta)=.9
2nd year, CDF(beta)=.1
2nd year, CDF(beta)=.3
2nd year, CDF(beta)=.5
2nd year, CDF(beta)=.7
2nd year, CDF(beta)=.9
4th year, CDF(beta)=.1
4th year, CDF(beta)=.3
4th year, CDF(beta)=.5
4th year, CDF(beta)=.7
4th year, CDF(beta)=.9
alumni, CDF(beta)=.1
alumni, CDF(beta)=.3
alumni, CDF(beta)=.5
alumni, CDF(beta)=.7
alumni, CDF(beta)=.9
V(y)
Pr(y | beta)
y in units of NOK 1000...


1st year
2nd year
4th year
alumni
EDF(share)
share
0
.2
.4
.6
.8
1

Main findings (1)

- Most participants do not consider the market outcome as fair (beyond individual control)
- Most participants hold others responsible for working time (within individual control)
- Most people hold others responsible for individual productivity (personal characteristics)

Main findings (2)

- Labor market experience
  - small but positive effect on the weight people attach to fairness considerations
  - substantial effect on people's notion of fairness; more likely to view the market outcome as fair
- Business education
  - small but negative effect on the weight people attach to fairness considerations
  - moderate effect on people's notion of fairness; make the students more homogeneous, but less likely to be libertarians.

7. Concluding remarks

- Considerable heterogeneity both in people's notion of fairness and the weight they attach to fairness considerations.
- Institutions important in shaping fairness preferences.
- Need for further study: Why do most people hold others responsible for their productivity.
  - control vs. personal characteristics