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Discussion paper

Just Luck: An Experimental Study of Risk Taking and Fairness

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This series consists of papers with limited circulation, intended to stimulate discussion.

Just Luck: An Experimental Study of Risk Taking and Fairness

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Abstract

Choices involving risk significantly affect the distribution of income and wealth in society, but there is probably no more contentious question of justice than how to allocate the gains and losses that inevitably result from risky choices. This paper reports the results from the first experiment, to our knowledge, to study fairness views about risk-taking, where the main aim is to examine whether people's fairness considerations mainly focus on ex ante opportunities or ex post outcomes. The experiment was a two stage dictator game where the distribution phase was preceded by a risk-taking phase. Our analysis provides four main findings. First, we show that even though many participants focus exclusively on ex ante opportunities, the majority favors some redistribution ex post. Second, we find that, among the participants who redistribute ex post, a substantial share make a distinction between ex post inequalities that reflect differences in luck and ex post inequalities that reflect differences in choices. Third, we show that the appeal of the ex ante view is independent of how costly it is to avoid exposure to risk. Fourth, we find that the choices of stakeholders and impartial spectators reflect the same set of fairness considerations.

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1 Introduction

Choices involving risk significantly affect the distribution of income and wealth in society, but there is probably no more contentious question of justice than how to allocate the gains and losses that inevitably result from risky choices. This is reflected in the many heated debates about the fairness of public policies dealing with consequences of risk-taking, including welfare and social security policies, income and profit taxation, and, as illustrated by the recent financial crisis, government bailouts of distressed industries.

How to deal fairly with risk-taking is often cast in terms of the question of whether to focus on *ex ante* opportunities or *ex post* outcomes.¹ The conflict between these two views is most clearly seen when people have equal opportunities. In such cases, the *ex ante* view, which focuses on initial opportunities, provides a fairness argument for no redistribution of gains and losses from risk-taking. The *ex post* view, on the other hand, focuses on outcomes, and provides a fairness argument for eliminating all inequalities resulting from risk-taking. Clearly, such fairness considerations need to be balanced against efficiency concerns, but this conflict illustrates how, potentially, people's fairness views about risk-taking could significantly impact the support for and, consequently, the design of public policies. Such views are arguably important for understanding behavior in a wide range of economic contexts, including the behavior of workers, labor unions, managers, and government regulators.

This paper reports the results from the first experiment, to our knowledge, to study fairness views about risk-taking.² The study focuses on cases in which it is costly to avoid risk; thus, we do not consider gambling or other risk-seeking behavior. The experiment consisted of two stages, a risk-taking phase followed by a distribution phase. In the risk-taking phase, participants faced a sequence of choices between a risky and a safe alternative, where the value of the safe alternative varied. In the distribution phase, for each risk-taking situation, the participants were anonymously paired with other participants who had faced the same choice and the earnings of each pair were pooled. In all distributive

¹There is an extensive literature on how to evaluate risky situations within both economics and philosophy. See, among others, Harsanyi (1955); Diamond (1967); Hammond (1981); Fried (2003); Harel, Safra, and Segal (2005); Fleurbaey (2007).

²Various recent experimental and theoretical studies have examined possible trade-offs between the desire to achieve a fair distribution and the desire to avoid risk (Babicky 2003; Babicky and Ortmann 2005; Brennan, González, Güth, and Levati 2008; Krawczyk and Le Lec 2008). The work of Zizzo (Zizzo 2003, 2004), including a paper with Oswald (Zizzo and Oswald 2001), comes closest to our study. In a series of interesting experiments, subjects first choose how much to invest in a risky gamble, earnings are distributed and then subjects can (and often do) destroy the earnings of other participants. Our study differs in several respects, but most importantly we place no restrictions on how the participants choose to distribute the money in the distribution phase and this allows us to focus on the fairness preferences of individuals rather than on envy.

situations, therefore, we had ex ante equality in opportunities, but possibly ex post inequalities in individual earnings. The participants were then informed about the choices and the outcomes of the risk-taking phase for both parties and asked to distribute the total earnings.

This design enables us to focus on our two main questions. First, do people in situations of equal opportunities deviate from the ex ante fairness view and redistribute gains and losses from risk-taking? Second, do people make a distinction between ex post inequalities that reflect differences in luck and ex post inequalities that reflect differences in choices? An intermediate fairness position, which we refer to as choice egalitarianism, holds people responsible for their choices, but not for their luck. Such a view would endorse ex post redistribution between lucky and unlucky risk-takers but not between risk-takers and participants who choose the safe alternative.³ The design also allows us to study whether the attractiveness of the ex ante view depends on how costly it is to avoid risks, as captured by the value of the safe alternative. A conjecture in this regard is that the ex ante position would be considered less appealing in cases where the safe alternative is very unattractive, and, as a result, the risky alternative appears virtually unavoidable.

In addition to the “stakeholder” described thus far, who made decisions about risk-taking and redistribution, we also randomly assigned some participants to the role as “spectator” in the experiment. The spectators did not make choices in the risk-taking phase but instead acted as third parties who were paid a fixed fee to allocate the total earnings of other subjects in the distribution phase. Specifically, spectators distributed the pooled earnings of pairs of stakeholders in a randomly selected subsample of the situations. By comparing the behavior of the two groups, one can examine the extent to which the fairness considerations of stakeholders deviate from the fairness views of impartial spectators. In particular, this allows us to study whether the involvement in the risk-taking phase makes stakeholders assign more importance to choices in the distribution phase. This comparison is also of considerable importance from a methodological point of view. Previous empirical research on the nature of social preferences has relied on both spectator (Konow, Saijo, and Akai 2009; Konow 2000, 2009) and stakeholder behavior (Cappelen, Hole, Sørensen, and Tungodden 2007b; Cherry, Frykblom, and Shogren 2002; Engelmann and Strobel 2004; Fehr and Schmidt 1999; Frohlich, Oppenheimer, and Kurki 2004), but this is the first study to look at whether these two approaches support the same set of findings within a given experiment.

Our analysis provides four main findings. First, we show that, although the ex ante fairness view is the most prominent among the participants, the majority of participants favor some ex post redistribution, even when, as here, people had

³This fairness perspective has been discussed extensively in the philosophical literature (see Dworkin 1981a,b; Arneson 1989; Lippert-Rasmussen 2001; Fleurbaey 2002; Vallentyne 2002; Fried 2003).

the same ex ante opportunities. Second, we find that, among the participants who redistribute earnings, a substantial share make a distinction between ex post inequalities resulting from different choices versus ex post inequalities that result from differences in luck. Overall, most participants find it fair not to equalize ex post inequalities that result from different choices, but most also find it fair to equalize ex post inequalities resulting from differences in luck among risk-takers. Third, we show that the appeal of the ex ante view is independent of how costly it is to avoid exposure to risk. Fourth, we find that the choices of stakeholders and spectators reflect the same set of fairness considerations. Thus, the two approaches support the same set of conclusions about fairness preferences over the gains and losses from risk-taking.

The paper is organized as follows. Section 2 presents the experimental design. Section 3 analyzes the choices of spectators. Section 4 introduces a model of distributive choice that we estimate for both spectators and stakeholders. Section 5 concludes.

2 Design and procedures

We recruited participants among students at the Norwegian School of Economics and Business Administration (NHH) in Bergen, Norway. A total of 119 subjects participated in the four sessions that lasted about 40 minutes and that all took place on the same day. Including a 100 NOK show up fee, subjects earned, on average, 472 Norwegian Kroner (NOK) or about 75 USD. The experiment was conducted in a computer lab using web-based interface and was double blind, i.e., neither subjects nor experimenters could associate decisions with particular subjects. Moreover, earnings were paid anonymously by wire using payment codes through an independent accounting division, a fact that was communicated to all subjects.

At the beginning of the experiment, the participants were randomly assigned to be either stakeholders (78 subjects) or spectators (41 subjects). There were two decision-making phases: a risk-taking phase and a distribution phase. Only stakeholders participated in the risk-taking phase, in which they were asked to choose between a safe alternative and a risky alternative. In all four risk-taking situations, the risky alternative contained two equally likely outcomes of 800 NOK and 0 NOK. Hence, the expected value of the risky alternative was always 400 NOK. The safe alternative varied across the four situations and took on the values 400 NOK, 300 NOK, 200 NOK or 25 NOK. The four situations were presented in random order.

Table 1 provides an overview of the choices made by the 78 stakeholders in the risk-taking phase. Only 7 participants made choices that reflected potentially risk-loving preferences. Hence, almost all participants were weakly risk averse, but none so risk averse as to choose the safe alternative when it had a value of

25 NOK. Considering the complete set of choices of each stakeholder, we observe that the preferences of all but five obey monotonicity, i.e., a subject who chooses the risky alternative for a high value of the safe alternative also does so for lower values of the safe alternative.

[Table 1 about here.]

In the distribution phase, stakeholders were anonymously and randomly paired with a sequence of eight other stakeholders. For each pair, one of the four situations from the risk-taking phase was randomly drawn and the stakeholder was asked to determine how the pooled earnings of the two stakeholders should be distributed among them. Before they made their choice, the participants were informed about the choices and outcomes of the risk-taking phase for both parties. Thus, there was no uncertainty about the source of inequality in earnings. Moreover, given that this was a one-shot experiment, incentive considerations should not influence the choices of the participants. The distributive situations were presented in random order, and after making their decisions, the participants were given a final opportunity to revise all of them, if desired. Correspondingly, the spectators made eight distributive choices from a randomly selected subsample of the distributive situations faced by the stakeholders. The spectators were provided with the same information as the stakeholders. In total, we have 530 distributive situations with positive total earnings; 112 distributive situations where one stakeholder chose the risky alternative and the other stakeholder chose the safe alternative, 152 distributive situations where both stakeholders choose the safe alternative, and 266 distributive situations where both chose the risky alternative and at least one of them was lucky. Spectators made choices in 283 distributive situations with positive earnings.

At the beginning of the experiment, stakeholders were told that the computer would randomly choose one of the situations they were involved in to determine their final outcome. Spectators received a fixed payment of NOK 350 unrelated to their decisions.

3 Ex ante or ex post?

We begin by analyzing the distributive choices of spectators, presented in panels A-E in Figure 1.

We observe in panel A that the most common choice among spectators is to distribute equally among the two participants. This is predominantly the case when there is equality in individual earnings (panel C), but, interestingly, equal split is also the most common choice when ex post earnings are unequal (panel B). Clearly, therefore, many spectators deviate from the ex ante position in their distributive choices and deem it fair to redistribute earnings ex post.

[Figure 1 about here.]

Many spectators, however, make a distinction between different sources of ex post inequalities. As shown in Figure 1, spectators choose to equalize earnings in more than 40 percent of the distributive situations where lucky and unlucky risk-takers meet (panel D), whereas this only happens in about 20 percent of the distributive situations where a risk-taker is paired with a participant choosing the safe alternative (panel E). It is evident, therefore, that many spectators consider ex post inequalities between participants who have made different choices acceptable but find ex post inequalities due to luck unfair (even in cases where people have equal opportunities and risk is avoidable).

Is deviation from the ex ante perspective more frequent in situations where it is very costly for the participants to avoid risk? To study this question, we look at the level of redistribution among spectators in situations where lucky risk-takers are paired with unlucky risk-takers. In such situations, the total earnings to be distributed is always 800 NOK, i.e., equal to the individual ex post earnings of the lucky risk-taker. Table 2 shows how much of this is transferred ex post to the unlucky risk-taker. We observe that the share transferred is invariant to the value of the safe alternative; in all three cases, the unlucky risk-taker receives on average about 30 percent of the total earnings. Hence, spectators do not make a distinction between situations where risk is almost unavoidable and situations where the cost of avoiding risk is relatively small.

[Table 2 about here.]

Overall, the data show that the ex ante, the ex post and the choice egalitarian fairness views can account for almost 80 percent of the distributive choices made by the spectators, i.e., almost all choices are in line with at least one of these fairness views. Hence, given that there is always some stochastic behavior in an experiment, the three views seem to capture the fairness considerations of the spectators. This does not, however, provide us with a precise measure of the frequency of each of the fairness views among the spectators, since these views coincide in a number of distributive situations, for example, when there is equality in ex post earnings. In order to address this issue, we formulate a model of individual distributive preferences and then estimate which distribution of fairness views best explains the behavior of the participants. This also allows us to compare the fairness views of the spectators and the stakeholders. As can be observed from panel F in Figure 1, stakeholders equalize much less frequently than spectators. Stakeholders equalize in only about 20 percent of the distributive situations, in the majority of the remaining situations they take everything for themselves. The latter is consistent with stakeholders being motivated by self-interest in their distributive choices, but a model is needed to determine whether these choices also are consistent with the fairness considerations made by the spectators.

4 A model of distributive choice

In this section we introduce a model of distributive choice that enables us to study further the frequency of the different fairness views and the role of self-interest.

We assume that a stakeholder is motivated by fairness considerations and by income when considering how to distribute the total earnings X generated in the risk-taking phase. More specifically, we assume that stakeholder i is maximizing the following utility function when making distributive choices:

$$V_i^{k(i)}(y_i; \cdot) = \gamma y_i - \beta_i (y_i - F^{k(i)})^2 / 2X, \quad (1)$$

where y_i is what a stakeholder i allocates to him- or herself, and $F^{k(i)}$ is what a stakeholder considers to be his or her fair income. Stakeholders might differ both in the weight they attach to fairness considerations and in what they consider to be a fair distribution. For an interior solution, the optimal proposal, y_i^* , is

$$y_i^* = F^{k(i)} + \gamma / \beta_i X. \quad (2)$$

Hence, a stakeholder takes at least what he or she considers fair, and more depending on how much weight he or she assigns to fairness. We assume that spectators maximize the same utility function, with two exceptions: the first term is always zero, and the second term is defined for the spectator's preferences over the income of one of the two stakeholders in a pair. Hence, trivially, the interior solution for a spectator is to choose what he or she considers the fair allocation of the total earnings between the two stakeholders.

Informed by our analysis of spectators in Section 3, we assume that the individuals endorse the ex post (EP), ex ante (EA), or choice egalitarian (CE) fairness views.

$$F_i^{EP} = \frac{1}{2}X, \quad (3)$$

$$F_i^{EA} = x_i, \quad (4)$$

$$F_i^{CE} = \begin{cases} \frac{1}{2}X & \text{if } C_i = C_j, \\ x_i & \text{if } C_i \neq C_j \end{cases} \quad (5)$$

where x_i is individual i 's earnings and C_i takes the value 1 if the individual chooses the risky alternative and the value 0 otherwise.

4.1 Estimates of the choice model

We assume a discrete choice random utility model of the form

$$U_i(y; \cdot) = V_i^{k(i)}(y; \cdot) + \epsilon_{yi}, \quad \text{for } y = 0, 25, \dots, X, \quad (6)$$

where the ϵ_{yi} are assumed to be iid extreme value. For each individual, with a fixed (k, β) , the choice probabilities then have a simple logit form. We assume that β_i has a log normal distribution, such that $\log \beta \sim N(\zeta, \sigma^2)$.

Let the vector θ represent all parameters to be estimated. We can now write the likelihood contribution of an individual conditional on a fairness perspective k as,

$$L_i^k(\theta) = \int_0^\infty \left(\prod_{j=1}^{J_i} \frac{e^{V^k(y_{ij}; \beta, \cdot)}}{\sum_{s \in \mathcal{Y}_{ij}} e^{V^k(s; \beta, \cdot)}} \right) dF(\beta; \zeta, \sigma). \quad (7)$$

The index $j = 1, \dots, J_i$ indicates the number of choices made by individual i and \mathcal{Y}_{ij} is the choice set $\{0, \dots, X\}$ for individual i in situation j . For the total likelihood contribution of an individual, we must weight with the population shares of individuals with different fairness views, λ^{EA} , λ^{CE} , and λ^{EP} ,

$$L_i(\theta) = \sum_k \lambda^k L_i^k(\theta). \quad (8)$$

Table 3 reports estimates for different specifications of the model. The population share for each of the fairness views is the estimated proportion of the participants motivated by this particular fairness standard.

[Table 3 about here.]

From the estimates in (1), we observe that the ex ante standard is the most frequent fairness view among the participants, accounting for the behavior of around 40 percent of the individuals. Still, a majority of the participants endorses ex post redistribution when ex post inequalities reflect differences in luck. Only a minority of around 30 percent endorses equalization of all ex post inequalities.

In specification (1) of Table 3, stakeholders and spectators are assumed to have different distributions of β , but are restricted to have the same population shares of individuals holding the different fairness views. In specification (2), we loosen the restriction that the population shares are the same among stakeholders and spectators. It turns out that this restriction is not binding, as can be seen from the very similar estimates of λ^{EA} , λ^{CE} , and λ^{EP} for the two groups, as well as from the small change in the likelihood value. Thus, the model provides strong evidence of spectators and stakeholders making the same set of fairness considerations in this experiment, their choices differing only in that the stakeholders also are motivated by self-interest. In specifications 3-5, we show that all three fairness views are needed in order to explain the data; dropping any of them would substantially reduce the log likelihood value.⁴

⁴Note that since the hypothesis that one of the λ^k is zero is on the boundary of the parameter space, standard likelihood ratio tests do not apply (Andrews 2001).

4.2 How well does the estimated model fit the data?

To study how well the model fits the data, we use the model to simulate and predict the actual distribution of data in different situations.

[Figure 2 about here.]

As we can see from Figure 2, the model fits very nicely the behavior of both stakeholders and spectators. One might have expected more noise in the choices of spectators than among stakeholders, since spectators do not have any economic incentives in the choices they make, but this is not borne out in the data. This most likely reflects that the moral incentives created by the distributive situations being real is sufficient to motivate spectators in distributive choices, which is consistent with evidence from other studies, e.g., (Konow 2009).

4.3 Fairness preferences and political views

A motivation for this study was the prominent role played by arguments of fairness in political debates on public policies dealing with consequences of risk-taking. Hence, it is interesting to examine whether the fairness views identified in this experiment relates in any systematic manner to the participants' political views. Is it the case that the ex ante view, holding individuals responsible for both their choices and luck, is more prominent among right-wing people, and that the ex post fairness view, opposing all inequalities, is more prominent among left-wing people?

At the end of the experiment we asked the participants about their political views, to place themselves on a seven point scale with very left-wing and very right-wing as the extreme points. The distribution of responses is reported in Table 4.

[Table 4 about here.]

We observe that the majority of students identified themselves as right-wing, which might reflect that these are students at a business school. In order to obtain equally sized groups in the following analysis, we have classified "slightly right-wing" as moderate, and grouped the rest into left-wing and right-wing, respectively.

In order to compare these responses to individual behavior in the experiment, we need to use the estimates reported in specification (1) Table 3 to identify the likelihood of any specific individual holding a particular fairness view. Given an individual's choices, we calculate the individual a posteriori probabilities by applying Bayes' theorem,

$$P(k|y, Z) = \frac{P(y|k, Z)P(k|Z)}{P(y|Z)} \quad \text{for } k \in \{EA, CE, EP\}, \quad (9)$$

where $P(k|y, Z)$ is the a posteriori probability of having the fairness view k given that the choice y is made in a situation described by the vector Z . These probabilities can be calculated by applying (7) and (8).⁵

Figure 3 shows how well the model identifies fairness views at the individual level, by reporting the distribution of the a posteriori probability of the most likely fairness ideal for each individual. We observe that almost all spectators are identified very precisely, and almost half of the stakeholders.⁶

[Figure 3 about here.]

Table 5 reports how the average a posteriori probability of having each of the three fairness views relates to political views. Interestingly, we observe that moderate and right-wing individuals are much more likely to hold the ex ante fairness view, whereas the ex post fairness view is most likely among left-wing individuals. This suggests that the fairness preferences expressed in this experiment reflect deeper political convictions, and, consequently, that the observed heterogeneity in fairness views also is present in situations outside the lab where gains and losses from risk-taking are to distributed.

[Table 5 about here.]

5 Concluding remarks

Our experiment provides strong evidence that many people consider fairness to go beyond equalizing opportunities in the context of risk-taking. Still, mirroring the political debate, the experiment also reveals considerable disagreement on how to allocate fairly the gains and losses from risk-taking. A substantial share of the participants endorse the ex ante view, but a substantial share also endorse the ex post view. However, if we look separately at how to deal with inequalities between lucky and unlucky risk-takers and between risk-takers and people choosing the safe alternative, we find, on each issue, that the majority of the participants endorse the choice egalitarian consideration. On the issue of how to distribute between lucky and unlucky risk-takers, the majority finds it fair to eliminate inequalities. On the issue of how to distribute between risk-takers and people choosing the safe alternative, the majority finds inequalities in outcomes justifiable.

⁵The expression $P(y|k, Z)$ corresponds to $L_i^k(\theta)$ as defined in (7), $P(k|Z)$ is simply the population share λ^k , and $P(y|Z)$ is the total likelihood contribution $L_i(\theta)$ defined in (8). For further discussion of this approach, see Cappelen, Drange Hole, Sørensen, and Tungodden (2007a).

⁶There is also a substantial share of stakeholders that are hard to identify, mainly because they took everything for themselves.

If these estimates reflect general political views, as indicated by our analysis, it has interesting implications for which public policies could gain political support from the majority of voters. To illustrate, consider the case of smoking. Smoking is a risky activity; some smokers, but not all, end up with a need for costly treatment. Given equal opportunities, what would be a fair distribution of costs of such health care? The choice egalitarian view implies that the fair solution is that non-smokers are not required to contribute to financing such treatment, but that the costs of treatment are shared equally among lucky and unlucky smokers (Cappelen and Norheim 2005).

To highlight that risk-taking raises new questions of fairness, the present study has focussed on how to deal with risk-taking in a setting of equal opportunities. Important avenues for future research would be to study people's fairness views on risk-taking where there is inequality in initial opportunities, and the extent to which they vary across contexts and cultures.

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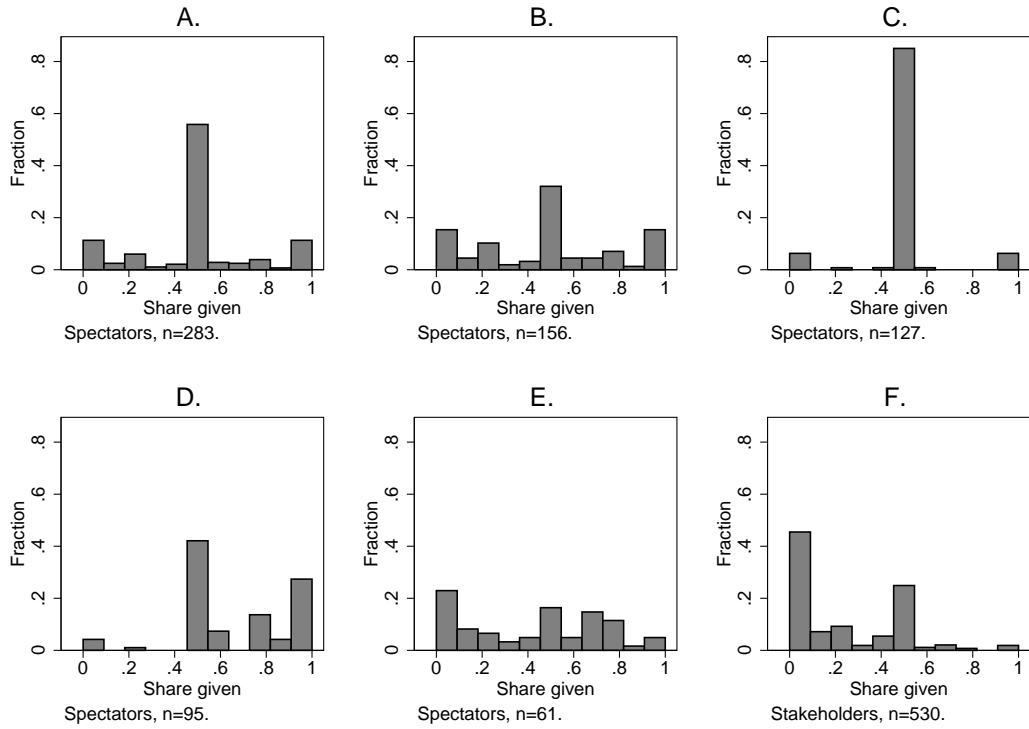


Figure 1: Histograms of share given

Note: A: Distribution of all spectator decisions, share given to one of the stakeholders (randomly defined). B: Distribution of spectator decisions where there are unequal ex post earnings, share given to one of the stakeholders (randomly defined). C: Distribution of spectator decisions when ex post earnings are equal, share given to one of the stakeholders (randomly defined). D: Distribution of spectator decisions when lucky meets unlucky, share given to lucky risk-taker. E: Distribution of spectator decisions when risk-taker meets safe, share given to risk-taker. F: Distribution of all stakeholder decisions, share given to the other participant.

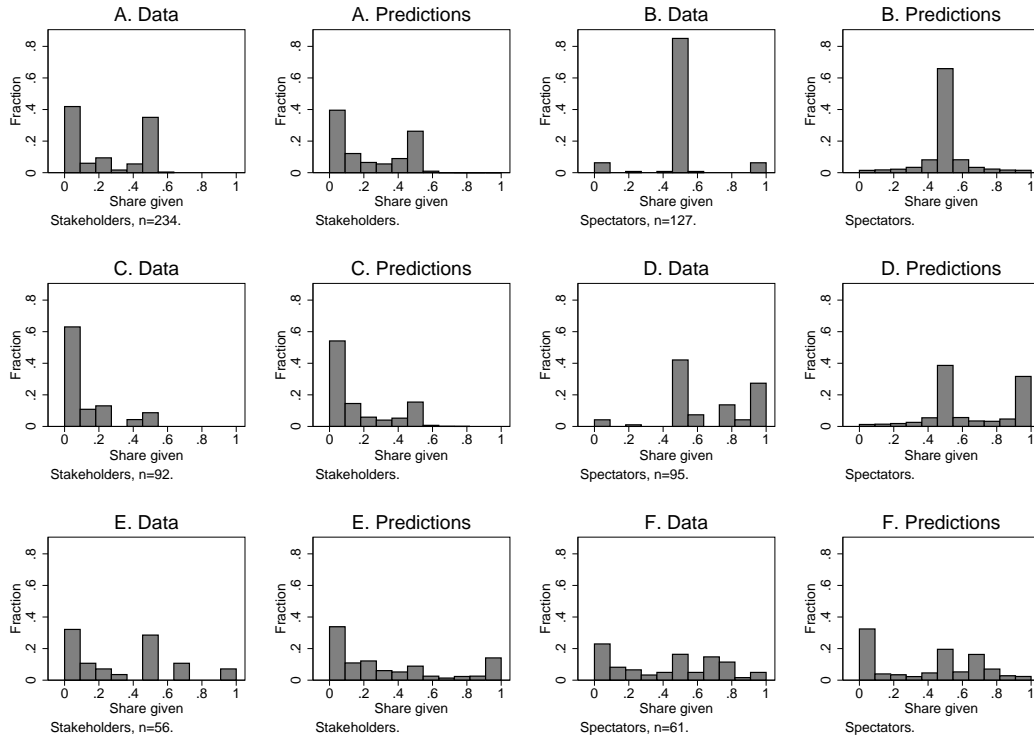


Figure 2: Actual and predicted share given by stakeholders and spectators in various situations

Note: A: Distribution of stakeholder decisions when ex post earnings are equal, share given to the other participant. B: Distribution of spectator decisions when ex post earnings are equal, share given to one of the stakeholders (randomly defined). C: Distribution of stakeholder decisions when lucky meets unlucky, share given to the other participant. D: Distribution of spectator decisions when lucky meets unlucky, share given to lucky risk-taker. E: Distribution of stakeholder decisions when risk-taker meets safe, share given to the other participant. F: Distribution of spectator decisions when risk-taker meets safe, share given to risk-taker.

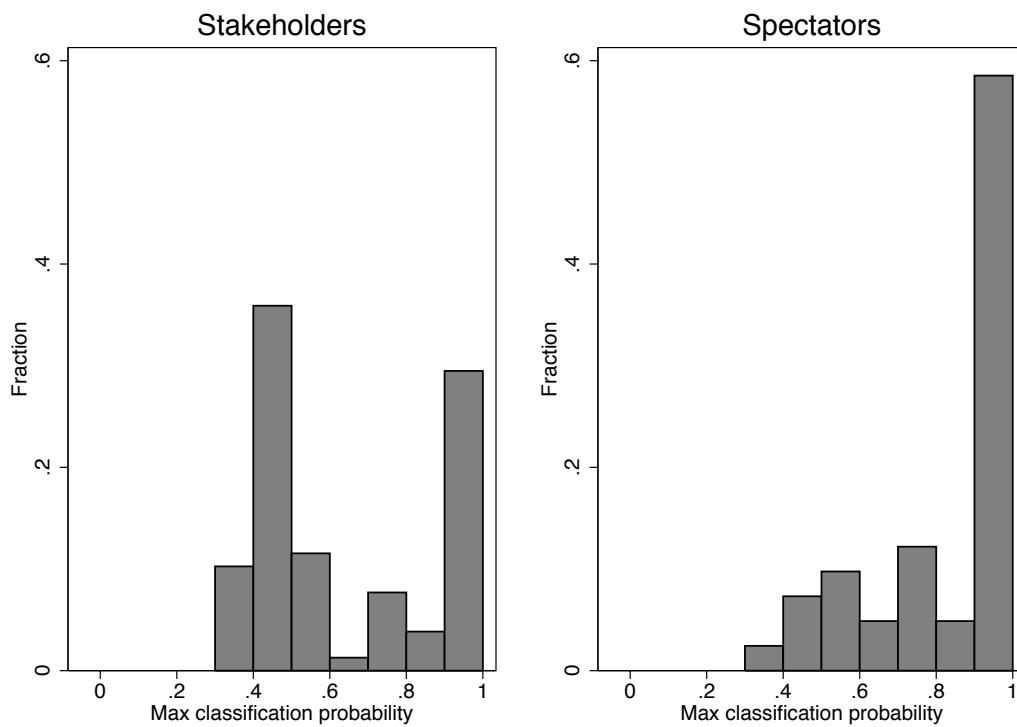


Figure 3: Identification of fairness views at the individual level
Note: The histograms shows the distribution of the a posteriori probability of the most likely fairness ideal for each individual, $\max_k\{P(k|y, Z)\}$, for stakeholders and spectators. Calculations are based on specification (1) in Table 3.

Table 1: Risk choices made by participants.

Value of safe alternative	Risk choice		Total
	safe alternative	risky alternative	
25	0	78	78
200	5	73	78
300	28	50	78
400	71	7	78
	104	208	312

Table 2: Redistribution when a lucky risk-taker meets an unlucky risk-taker (spectators)

Value of safe alternative	Average share redistributed
25	0.338 (0.041) $n = 41$
200	0.321 (0.045) $n = 36$
300	0.319 (0.053) $n = 18$

Note: Share redistributed is defined as share of total earnings transferred to the unlucky risk-taker. Standard errors in parantheses.

Table 3: Estimates of the choice model

parameter	(1)		(2)		(3)		(4)		(5)	
	Stakeholder	Spectator	Stakeholder	Spectator	Stakeholder	Spectator	Stakeholder	Spectator	Stakeholder	Spectator
λ^{EP}	0.288 (0.061)		0.274 (0.086)	0.302 (0.119)	0.381 (0.080)		0.500 (0.063)			
λ^{CE}	0.293 (0.066)		0.315 (0.095)	0.272 (0.136)	0.619 (0.080)				0.569 (0.066)	
λ^{EA}	0.419 (0.064)		0.411 (0.091)	0.427 (0.090)			0.500 (0.063)		0.431 (0.066)	
ζ	3.094 (0.501)	6.959 (0.680)	3.094 (0.503)	6.960 (0.683)	1.612 (0.590)	3.554 (0.886)	3.039 (0.491)	4.984 (0.676)	3.012 (0.486)	4.901 (0.686)
σ	4.379 (0.653)	4.661 (0.706)	4.378 (0.655)	4.660 (0.706)	4.667 (0.639)	5.102 (0.907)	4.059 (0.593)	4.227 (0.642)	3.910 (0.564)	4.381 (0.670)
γ	15.571 (0.498)		15.577 (0.509)		10.718 (0.259)		14.525 (0.488)		13.241 (0.458)	
$\log L$	-1807.19		-1807.13		-2067.62		-1930.85		-1971.60	

Note: The likelihood is maximized using the FmOpt library (Ferrall 2005). One population share (λ^k) and its standard error is calculated residually. Standard errors (in parentheses) are calculated using the outer product of the gradient (Berndt, Hall, Hall, and Hausman 1974).

Table 4: Distribution of responses on political views

	frequency	share	cumulative share
1. very left wing	0	0	0.0
2. left wing	7	0.059	0.059
3. slightly left wing	9	0.076	0.135
4. moderate	24	0.202	0.336
5. slightly right wing	40	0.336	0.672
6. right wing	33	0.277	0.950
7. very right wing	6	0.050	1.0

Note: The question stated was: “Below is a seven-point scale on which the political views that people might hold are arranged from very left-wing to very right-wing. Where would you place yourself on this scale?”

Table 5: Fairness views and political beliefs

	Political view		
	left	moderate	right
$P(EP PV)$	0.368 (0.052)	0.246 (0.050)	0.250 (0.046)
$P(CE PV)$	0.319 (0.045)	0.304 (0.050)	0.255 (0.045)
$P(EA PV)$	0.313 (0.049)	0.451 (0.059)	0.495 (0.061)
N	40	40	39

Note: $P(k|PV)$ is the average a posteriori probability of holding fairness view $k \in \{EA, CE, EP\}$ among those who reported political view PV , calculated according to (9) and using the estimates of specification (1) in Table 3. Standard errors in parentheses.



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