RESEARCH INSTITUTE OF
INDUSTRIAL ECONOMICS

IFN Working Paper No. 1014, 2014

Luck, Choice and Responsibility: An Experimental Study of Fairness Views

Johanna Möllerström, Bjørn-Atle Reme and Erik Ø. Sørensen

Research Institute of Industrial Economics
P.O. Box 55665
SE-102 15 Stockholm, Sweden
info@ifn.se
www.ifn.se

Luck, Choice and Responsibility

An experimental study of fairness views

Johanna Mollerstrom* Bjørn-Atle Reme† Erik Ø. Sørensen‡

March 2014

We conduct a laboratory experiment where third-party spectators can redistribute resources between two agents, thereby offsetting the consequences of controllable and uncontrollable luck. Some spectators go to the limits and equalize *all* or *no* inequalities, but many follow an interior allocation rule previously unaccounted for by the fairness views in the literature. These interior allocators regard an agent's *choice* as more important than the *cause* of her low income and do not always compensate bad uncontrollable luck. Instead, they condition such compensation on the agent's decision regarding controllable luck exposure, even though the two types of luck are independent.

Keywords: fairness, responsibility, option luck, brute luck, experiment.

JEL codes: C91, D63, D81, H23.

We are grateful for financial support for this project from the Royal Swedish Academy of Science and the Choice Lab at NHH Norwegian School of Economics. For very helpful comments and suggestions, we thank Alexander Cappelen, James Konow, David Laibson, John List, and Bertil Tungodden. Johanna Mollerstrom is grateful for financing from the Marianne and Marcus Wallenberg foundation.
*Program for Evolutionary Dynamics, Harvard University, Cambridge MA, USA and Research Institute for Industrial Economics (IFN), Stockholm, Sweden. E-mail: johanna.mollerstrom@gmail.com.
†Telenor Research, Oslo and NHH Norwegian School of Economics, Bergen, Norway. E-mail:

remebjornatle@gmail.com.
‡NHH Norwegian School of Economics, Bergen, Norway. E-mail: erik.sorensen@nhh.no.

The question of what constitutes a fair distribution of resources is interesting in itself but even more important as it has implications for numerous economically relevant phenomena, such as the design of redistributive tax policies (Alesina and Angeletos, 2005; Krawczyk, 2010) and bargaining behavior (Gächter and Riedl, 2005, 2006). In this paper we study fairness preferences in risky environments and ask how people's fairness ideals differentiate between situations involving bad luck that is the result of a choice (bad *option luck*) and those involving bad luck resulting from randomness that cannot be avoided (bad *brute luck*).

Option luck is "a matter of how deliberate and calculated gambles turn out – whether someone gains or loses through accepting an isolated risk he or she […] might have declined" (Dworkin, 2000, p. 73). Brute luck, on the other hand is "a matter of how risks fall out that are not in that sense deliberate gambles" (ibid). In other words: if a person goes blind as a result of a genetic condition, her brute luck is bad, but if she buys a lottery ticket and wins, her option luck is good (Lippert-Rasmussen, 2001).

In the laboratory experiment reported in this paper we investigate how a disinterested third party (a *spectator*) divides resources between two other agents. We specifically consider the case where the resources to be divided are generated through a risky process which the agents can only partly control – i.e. both option and brute luck are present. Based on previous research, we expect (and confirm) that a significant fraction of spectators either equalize *all* inequalities between the two agents (i.e. they are *strict egalitarians*) or they equalize *no* inequalities (i.e. they are *libertarians*).[1]

The focus of this paper is, however, on the many people who are interior allocators and *sometimes*, but not always, choose the equalizing option. In both the normative and the descriptive literature on social preferences a popular candidate for this intermediate norm is one that conditions compensation for a bad outcome on its *cause*. More specifically, this norm states that a fair

[1] Strict egalitarianism and libertarianism are similar, although not always identical, to the notions of ex-post and ex-ante egalitarianism respectively, see for example Cappelen et al. (2007, 2013). In the particular experimental design described here, the behavioral predictions of strict egalitarianism and ex-post egalitarianism overlap as do the behavioral predictions of libertarianism and ex-ante egalitarianism.

distribution of resources should even out inequalities that do not reflect choices that an agent has made, and over which she therefore lacked control.

In philosophy this norm is referred to as *luck egalitarianism* which is the term we will use (canonical texts are Arneson, 1989; Cohen, 1989; and Dworkin, 2000). This norm has also been studied in economics by for example Konow (1996) who calls it the *accountability principle*. In his words, "the Accountability Principle […] requires that a person's fair allocation (e.g. of income) vary in proportion to the relevant variables that he can influence (e.g. work effort) but not according to those that he cannot reasonably influence (e.g. a physical handicap)" (Konow, 1996, p. 13).

Empirical research has indicated that luck egalitarianism provides a good description of people's actual distributive behavior. One example can be found in Konow (2000). He shows in a laboratory experiment that when the resources that are to be divided are generated randomly, outside the control of the agents, disinterested spectators almost always implement an equal split. However, when the resources come about through efforts of the agents, Konow finds that the spectators' split is proportional to the agents' respective effort levels.[2]

A key assumption underlying luck egalitarianism is that uncontrollable and controllable factors are treated separately in the sense that agents are not held responsible for behavior that did not cause or influence the outcome. However, this assumption has to our knowledge never been explicitly tested. The reason is that previous studies, including Konow (2000), have not allowed for situations in which the spectator has been aware of the agents' actions with respect to controllable factors at the same time as it has turned out that it was the uncontrollable factors that caused the outcome.

Our experimental design solves this problem by having both controllable option luck and uncontrollable brute luck present and easily distinguishable. For a luck egalitarian spectator, who conditions compensations for a bad outcome on its cause, a fair distribution only holds agents responsible for outcomes that they could control. In our experiment this would imply that she compensates agents for bad outcomes that are due to bad brute luck but not those that are due to bad option luck.

[2] For other experimental investigations of luck egalitarianism and the accountability principle, see e.g. Schokkeart and Devooght (2003) and Becker (2013).

This is, however, not the behavior we find. Instead, a large share of spectators makes bad brute luck compensation conditional on how the agent handles option luck. These spectators only compensate an agent who experiences bad brute luck when she also avoided exposure to option luck, even though the outcome would not have been affected if the agent had made a different option luck decision. We label this norm *choice compensation*.

This behavior is inconsistent with fairness views where the definition of a fair distribution depends on the *cause* of the outcome, such as luck egalitarianism. Instead, it suggests a fairness view that is agency dependent, i.e. conditional on aspects of the agent's *behavior*, regardless of whether this behavior mattered for the outcome or not. Taken together, the spectators in our experiment are well described if we assume that there are three types: libertarians, strict egalitarians and choice compensators. We find very limited support for the existence of luck egalitarians.

Our results can be related to those of Cappelen et al. (2013), who share our interest in fairness views in circumstances involving risk taking. They find support for a fairness norm that holds people responsible for their choices but not for their luck and endorses redistribution between people who make the same decision regarding risk exposure. However, as their design has only controllable option luck present they cannot test, as we do, the extent to which an agent's responsibility for a choice made in a controllable situation carries over into an uncontrollable context in which the choice was irrelevant.

From here, the paper proceeds as follows. Section I presents the experimental design. Section II investigates how agents' bad brute luck is compensated (or not) by the spectators in the experiment. Section III provides a model of the distributive choices made in the experiment and presents the result of a maximum likelihood estimation of which fairness norms the spectator behaves in accordance with. Section IV concludes.

I. The experiment

A. Design

Each experimental session was identical and consisted of three parts with all subjects participating in all parts[3]. In the first part all participants were informed that they each had been allocated an endowment of $24. They were told that at the end of part 1, one of three equally probable events would be drawn: A, B or C. If event A would be drawn for a participant, she would keep her endowment whereas if event B or C were drawn, she would lose her endowment.

Before the events were drawn, all participants were given a choice about whether or not to buy an insurance that would protect against the loss associated with event B. This insurance would not protect the agent against the loss associated with event C. Participants were informed that the price of the insurance would be $12, but that this would only have to be paid if the participant ended up keeping her endowment. This implies that a participant who chose to insure against event B would end up with $12 if event A or B were drawn (she would then keep the endowment of $24 and pay the cost of the insurance) but nothing if event C was drawn. A participant who chose *not* to insure would get $24 if event A was drawn, and nothing if event B or C were drawn.[4]

The fact that agents could insure against only one source of loss gives rise to a situation where both uncontrollable and controllable elements are present. As it was impossible to eliminate the risk associated with event C, we have that this event constitutes bad brute luck in our experiment. On the other hand, the optional insurance against the loss associated with event B guaranteed the presence of option luck.

After the participants had decided whether or not to buy the insurance, they were informed that an event had been drawn for them that would be revealed at the end of the experiment. Thereaf-

[3] Participants were told at the beginning of the session that there would be several parts and that instructions would be given for one part at a time, ahead of that part. Instructions can be found in Appendix A.

[4] Note that the insurance offered to the participants was actuarially fair as the expected value was USD 8 regardless of whether insurance was bought or not. Participants were explicitly pointed to this fact. The design choice to have a fair insurance was made in order to avoid concerns regarding an efficiency loss related to the insurance. A variation in the cost of insurance would, however, constitute an interesting avenue for future research.

ter, part 2 of the experiment started in which participants were randomly paired. They were informed that they were to make choices regarding the distribution of income from part 1 for another pair of participants referred to as Person 1 (P1) and Person 2 (P2) and that this choice would have no monetary consequences for themselves. This implies that they would make decisions as a disinterested spectator for another pair.[5]

The strategy method was used and each spectator saw, and made decisions in, several situations involving P1 and P2. In each situation the spectator was informed about the insurance choices, the events drawn and the earnings for both participants in the pair (we refer to a combination of an event and a choice as an *outcome*). There were two spectators matched to each pair and participants were informed that one of the two spectators' choices would be randomly chosen and implemented for the pair.

All spectators made distribution decisions in the 11 situations summarized in Table 1. These situations were chosen as they constitute all possible outcomes from part 1 that resulted in unequal earnings between P1 and P2 (if earnings were equal, the options in the binary choice coincided and the spectator's decision was uninteresting). The table also shows the earnings from part 1 for both people in the pair. In each situation the spectator had to decide whether to leave earnings unchanged, or to equalize them.[6]

---

[5] Previous research on social and distributive preferences has studied the behavior of both stakeholders (Cappelen et al., 2007; Cherry et al., 2002; Engelmann and Strobel, 2004; Fehr and Schmidt, 1999; Frohlich et al., 2004) and disinterested spectators (Charness and Rabin, 2002; Engelmann and Strobel, 2004; and Konow, 2000, 2009). Cappelen et al. (2013) find that agents' behavior is fundamentally determined by the same principles regardless of whether they act as stakeholder or spectators but Aguiar et al. (2013) find that this is not the case. In order to investigate whether our results would be different if the spectators had themselves not made the insurance decision, we also conducted a version of our experiment where the roles were separated and participants made decisions in either part 1 *or* in part 2. The details of this version of the experiment are reported in Appendix B where we show that all conclusions drawn here are valid also in that setting. Appendix B also investigates the relation, in the original experiment, between the spectators' own insurance decision and her choice of whether or not to equalize outcomes for other participants.

[6] If a pair ended up in a situation that was not covered by these 11 situations, i.e. a situation where they ended up with the same amount, a twelfth situation was added for the spectators matched to them which displayed what the two participants were actually experiencing. This was done in order to make sure that it was always true that the

The spectators saw, and made decisions in, the situations one at a time in the order outlined in the table. After every third choice they were showed a summary of the three most recent decisions (the summary screen after the last choice only showed the most recent two choices). The spectators then had the opportunity to revise their decisions if they so desired or to simply confirm the original decision.[7]

Table 1. The 11 decisions

Situation	P1: Outcome from part 1	P2: Outcome from part 1	P1: Earnings from part 1	P2: Earnings from part 1
1	A	B	24	0
2	A	C	24	0
3	A	B^{IN}	24	12
4	B^{IN}	C^{IN}	12	0
5	A	C^{IN}	24	0
6	B^{IN}	C	12	0
7	B^{IN}	B	12	0
8	A^{IN}	C	12	0
9	A	A^{IN}	24	12
10	A^{IN}	C^{IN}	12	0
11	A^{IN}	B	12	0

^{IN} The participant chose to buy the insurance against the loss associated with event B. For expositional ease this table presents the situations such that P1 always has higher earnings than P2 from part 1. In the experiment this ordering was not imposed.

After participants had made decisions in the 11 situations they were presented with their earnings and thereafter, in the third part of the experiment, they answered a questionnaire.[8]

division was decided by the spectators matched to the pair. Note that it was still not possible for the spectators to know which situation had occurred for their matched pair since the number of situations was not announced in advance.

[7] We gave participants this option in order to provide an additional opportunity for them to contemplate their choice. The option was not widely used: only 4.3 percent of decisions were changed on the summary screens. No results reported here are sensitive to using only original choices.

[8] The post-experimental questionnaire contained demographic questions, a question about how important fairness considerations was when making the decision about how to split earnings between the two people in the pair, and a question about personal risk preferences. Data from the questionnaire are presented in Appendix C.

B. Implementation

The experiment was conducted at the Computer Lab for Experimental Research (CLER) at the Harvard Business School in August and September 2012. A total of 152 people, who could only take part once, participated (average age 24 years, 49 percent females). They were rewarded with on average USD 20 (including a fixed show-up fee) for their participation in a session that lasted approximately 40 minutes.

The experiment was computerized using the experimental software z-Tree (Fischbacher, 2007). In order to ensure common knowledge, the experimenter read the instructions out loud in addition to them being given on the participants' computer screens. A summary of the instructions was also provided on paper. On two occasions (before the start of each of the two parts) participants had to correctly answer a quiz on the instructions in order to be able to continue. Only very few participants experienced problems with the questions (and all results are robust to excluding these observations), but those who did were provided with repeated instructions by the experimenter.

II. Situations with and without bad brute luck

We start by considering the insurance choice that participants made in the first part of the experiment. We can conclude that there was significant variation in insurance choice as 121 participants chose to insure whereas 31 did not. This, in turn, is important as it validates our interpretation of both option and brute luck being present in the experiment.[9]

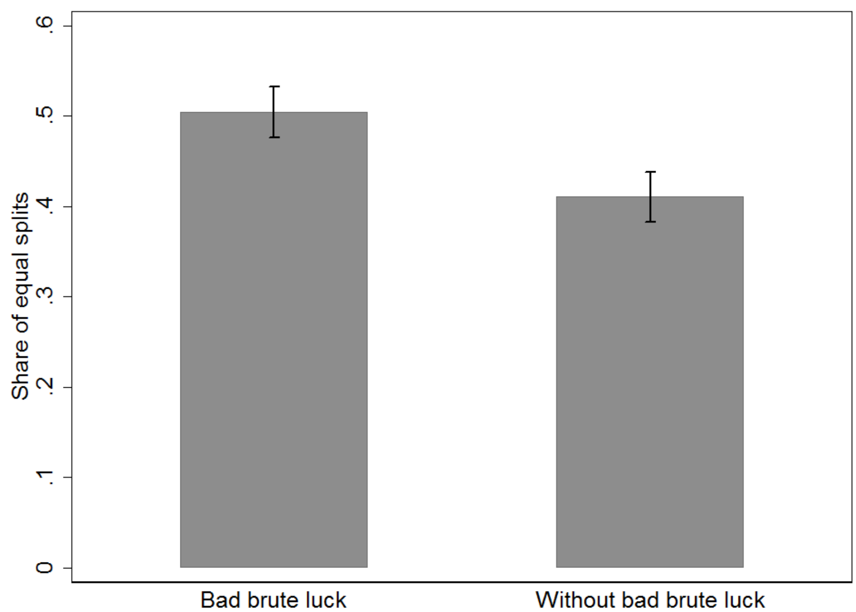
We next look at the participants' choices when acting as spectators in part 2 of the experiment. Considering again the situations that the spectators faced, which are outlined in Table 1, we note that situations 2, 4, 5, 6, 8, and 10 involved bad brute luck. In these situations event C, against which it was not possible to insure, was drawn for one person in the pair. In Figure 1 we investigate which fraction of the spectators decided to equalize earnings between P1 and P2 in these situations and compare this to their behavior in the remaining situations, which did not involve

[9] If there had been no variation in the insurance choice it could have been argued that the choice was not ”real”, and that all events hence consituted brute luck.

bad brute luck. The figure indicates that equalizing choices were more common in situations involving bad brute luck, a difference that is highly statistically significant ($p < 0.01$).[10]

This means that we, at least at an aggregate level, replicate the finding from previous studies that there is more redistribution of resources in situations that involve elements that are outside the control of the agents, such as bad brute luck. This could easily be interpreted as an indication that a significant proportion of the spectators follow a norm where they compensate agents for outcomes that are due to bad brute luck but not for those due to bad option luck, i.e. that many spectators are luck egalitarians. As an illustration, note that if 10 percent of our sample consisted of luck egalitarians, 50 percent of libertarians and 40 percent of strict egalitarians, the pattern from Figure 1 is what we would expect.

Figure 1. Share of equalizing choices in situations with and without bad brute luck



Error bars mark standard errors, clustered on participant. N= 1672 (152 spectators).

[10] All p-values reported are from t-tests with standard errors clustered on participant level. This conclusion also holds when we control for the absolute size of the difference in output between P1 and P2 (result reported in Appendix D).

We now turn to investigating whether the assumption from luck egalitarianism about spectators treating brute and option luck separately holds. Table 2 displays the data from all choices the spectators made. In order to better understand how the spectators handled situations where one of the agents suffered bad brute luck, we utilize the fact that the six situations involving bad brute luck can be divided into three pairs where the insurance choice of P1 and the outcomes for both P1 and P2 from part 1 are held constant. The only thing that differs between the two situations in each pair is whether P2 bought insurance or not.

Table 2. Spectator behavior, by situation

Situation	P1: Outcome from part 1	P2: Outcome from part 1	Percent equalized earnings
1	A	B	50.0 (4.07)
2	A	C	49.3 (4.07)
3	A	B^{IN}	54.6 (4.05)
4	B^{IN}	C^{IN}	62.5 (3.94)
5	A	C^{IN}	73.0 (3.61)
6	B^{IN}	C	27.0 (3.61)
7	B^{IN}	B	23.0 (3.42)
8	A^{IN}	C	27.0 (3.61)
9	A	A^{IN}	56.6 (4.03)
10	A^{IN}	C^{IN}	63.8 (3.91)
11	A^{IN}	B	21.1 (3.31)

^{IN} The participant chose to buy the insurance against the loss associated with event B.
Robust standard errors in parentheses. N=152.

Consider first situations 2 and 5. In situation 2, P1 chose not to insure and in part 1 event A was randomly drawn for her, leaving her with $24. The circumstances for P1 were the same in situation 5. In both situations, the event that was drawn for P2 was C, i.e. the event that it was not possible to insure against, leaving P2 with no earnings from part 1. However, in situation 2, P2 had not insured against the loss associated with event B, whereas in situation 5 she bought this insurance. As is evident from the table, this made a significant difference with regards to whether earnings were equalized or not. Whereas just below half of the spectators (49.3 percent) equalized earnings in situation 2, 73 percent did so in situation 5, a difference that is highly statistically significant ($p < 0.01$).

We now turn to situations 4 and 6. In these two situations P1 chose to insure, and got a draw of event B, leaving her with $12 from the first part. P2 again got a draw of C, but had chosen to insure against the loss associated with event B in only one of the two situations. Again, spectators were significantly more willing to equalize earnings in the situation where P2 chose to buy the insurance (62.5 percent) compared to the situation where she did not (27.0 percent) ($p < 0.01$). A similar pattern can be found in situations 8 and 10, with 63.8 percent of spectators equalizing payoffs when P2 had bought the insurance compared to 27.0 percent when she chose not to insure ($p < 0.01$).

From this we can conclude that situations where inequality had arisen because of an event of bad brute luck was treated very differently depending on which choice the agent who was subject to the bad brute luck made regarding exposure to option luck, i.e. if she had bought the insurance protecting her from the loss associated with event B or not. This was so even though this decision was irrelevant for the inequality at hand.

To summarize, we see that the uncontrollable and controllable situations are not treated separately in the way that luck egalitarianism, which conditions compensation for bad outcomes on their cause, assumes. Instead, the reason that earnings in situations involving bad brute luck on average are equalized to a large extent seems to be that many spectators compensate *some* instances of brute luck, namely those where the agent chose to minimize exposure to the risk associated with option luck. This, in turn, leads us to conclude that it may be more appropriate to describe these spectators as "choice compensators", i.e. they condition compensation for low earnings on the agent's *choice* to minimize exposure to option luck rather than on which event that actually *caused* the low earnings.

III. Estimation of fairness ideals

A. Conceptual framework

All distributive decisions in the experiment were made by spectators without any monetary self-interest in the distribution of pay-offs. We follow Cappelen et al. (2013) and assume a model in which a spectator incurs an internal cost when the amount y that she allocates to an agent deviates from F^k, i.e. from what the fair allocation would be according to the spectator's fairness ideal k:

$$V(y;\cdot) = -f(y, F^k;\cdot). \quad (1)$$

We assume that the cost of acting unfairly is increasing in the absolute value of the difference between what an agent is allocated and what her fair income would be, and focus on the case where the loss function in equation (1) is quadratic. The (trivial) solution to the spectator's optimization problem is then given by $y^* = F^k$.

Building on previous research, we hypothesize that some spectators behave in accordance with strict egalitarianism (SE) and want to equalize all outcomes, and that some are libertarians (L) who do not want to equalize any outcomes. In the setting of our experiment we then get that the fair allocation to P1 (which implicitly also defines the fair allocation to P2) for these spectators are:

$$F_1^{SE} = \frac{x_1 + x_2}{2}, \quad (2)$$

$$F_1^{L} = x_1, \quad (3)$$

where x_i denotes person i's earnings from part 1.

We also expect there to be spectators whose behavior fall in neither of these extreme categories. One alternative intermediate norm is luck egalitarianism (LE), meaning that the spectator condition compensation to the person with the lowest income on the underlying *cause*. More precisely, a luck egalitarian spectator compensates when the low income is caused by bad brute luck and then only compensates the part that was due to the bad brute luck, neutralizing the role of option luck.

To define the luck egalitarian position it is essential to discriminate between situations with and without bad brute luck. Let the events drawn for P1 and P2 be denoted $e_1, e_2 \in \mathcal{E} = \{A, B, C\}$ and partition $\mathcal{E}$ into events with bad brute luck, $BL^{bad} = \{C\}$, in which agents get paid nothing and events without bad brute luck, $BL^{good} = \{A, B\}$, in which deviations in earnings from the insurance value x^{IN} (which in our setting, with an actuarially fair insurance, is $12) is always a matter of option luck. A luck egalitarian spectator only wants to compensate an agent who suffered bad brute luck for the part of the inequality that stems directly from this source. Hence is not the case that she necessarily equalizes the full income differences just because an agent suffered bad brute luck. In our experimental setting we get the following fair allocation to P1 under luck egalitarianism (LE):

$$F_1^{LE} = \begin{cases} x_1 & \text{if} \quad e_1, e_2 \in BL^{bad} \text{ or } e_1, e_2 \in BL^{good}, \\ x_1 - \dfrac{x^{IN}}{2} & \text{if} \quad e_1 \in BL^{good} \text{ and } e_2 \in BL^{bad}. \end{cases} \tag{4}$$

Finally, given the results presented in Section II another alternative norm is choice compensation (CC), i.e. that the spectator condition compensation to the person with the lowest earnings on her *choice* regarding exposure to option luck. We denote the insurance choices for P1 and P2 $c_1, c_2 \in \mathcal{C} = \{yes, no\}$ and get, in our experimental setting, the following fair allocation to P1 under CC (remembering that P1 always has a higher earning than P2):

$$F_1^{CC} = \begin{cases} x_1 & \text{if} \quad c_2 = no, \\ \dfrac{x_1 + x_2}{2} & \text{if} \quad c_2 = yes. \end{cases} \tag{5}$$

Table 3 outlines what behavior these four fairness norms predict in the 11 situations in which spectators made decisions in our experiment.

Table 3. Predicted behavior

Situation	P1: Outcome from part 1	P2: Outcome from part 1	Strict Egalitarianism	Libertarianism	Luck Egalitarianism	Choice Compensation
1	A	B	E	NE	NE	NE
2	A	C	E	NE	Indiff	NE
3	A	B^{IN}	E	NE	NE	E
4	B^{IN}	C^{IN}	E	NE	E	E
5	A	C^{IN}	E	NE	Indiff	E
6	B^{IN}	C	E	NE	E	NE
7	B^{IN}	B	E	NE	NE	NE
8	A^{IN}	C	E	NE	E	NE
9	A	A^{IN}	E	NE	NE	E
10	A^{IN}	C^{IN}	E	NE	E	E
11	A^{IN}	B	E	NE	NE	NE

^{IN}The participant chose to buy the insurance against the loss associated with event B.
E=Equalize, NE=Not equalize, Indiff=Indifferent.

Note that luck egalitarian spectators in situations 2 and 5 are indifferent between equalizing earnings or not. Equation (4) tells us that in these situations a luck egalitarian spectator would prefer to split the total earnings of 24 in such a way that P1 receives 18 and P2 receives 6. The reason is that she only wants to compensate for the part of the inequality that stems directly from the bad brute luck of the person with the lower earnings. However, as this option was not allowed in the experiment, luck egalitarian spectators are indifferent because the available options generate the same deviation from the fair distribution.[11]

B. Exact classification of spectators

Considering all 11 choices, the data show that whereas 13.1 and 19.6 percent of spectators made decisions that are exactly in accordance with strict egalitarianism and libertarianism respectively, only one person (0.7 percent) made luck egalitarian choices. 7.8 percent made choice compensating decisions.

Table 4. Share of spectators by norm, percent

	No deviations	Max 1 deviation	Max 2 deviations
Strict egalitarians (SE)	13.2 (2.75)	15.8 (2.97)	18.4 (3.15)
Libertarians (L)	19.1 (3.20)	23.0 (3.43)	25.0 (3.52)
Luck egalitarians (LE)	0.7 (0.66)	0.7 (0.66)	4.6 (1.70)
Choice compensators (CC)	7.9 (2.19)	15.1 (2.91)	28.3 (3.67)

Standard errors in parentheses. No deviations indicate the share of spectators whose behavior exactly correspond to the predictions of the respective fairness norm. Max 1 deviation and Max 2 deviations indicates the same share but with one and two deviations from the fairness norm allowed, respectively. N=152

These data are outlined in Table 4 where we also show that the conclusion of their being comparatively few luck egalitarians is not sensitive to allowing the spectators to occasionally make small deviations from the respective fairness ideal.

[11] Since luck egalitarians are allowed to make either choice in two situations (a flexibility not granted to strict egalitarians, libertarians or choice compensators), it may seem easier for a participant to be categorized as a luck egalitarian than to be categorized as behaving in accordance with any of the other norms. However, the results reported in Table 4 and 5 are robust to removing this flexibility for luck egalitarianism and instead demanding equalizing choices in situations 2 and 5.

C. Estimation of choice model

In order to conduct a structural estimation of which norms the spectators in our experiment behave in accordance with, we continue to follow Cappelen et al. (2013) and assume a choice random utility model

$$U(y;\cdot) = \gamma_i V(y;\cdot) + \epsilon_{iy} \text{ for } y \in \{x, X/2\}, \quad (6)$$

where ϵ_{iy} is assumed to be i.i.d. extreme value. The parameter γ_i determines a spectator's willingness to trade off deviating from her fairness ideal given random utility shocks to the alternatives available in each situation. In the limit case where $\gamma_i = 0$ choice probabilities are always uniform, whereas as $\gamma_i \rightarrow \infty$ choices converge to always being in line with the prediction of the fairness ideal. We want to estimate the distribution of γ_i and the population share for each of the fairness views: λ^{SE} (share of strict egalitarians), λ^{L} (libertarians), λ^{LE} (luck egalitarians) and λ^{CC} (choice compensators).

The results of the estimations are reported in Table 5. Specification (1) confirms the conclusion from Table 4, that only very few of our spectators exhibit a behavior that is in line with the predictions of luck egalitarianism. By comparing specification (1) with specification (2), where luck egalitarianism is excluded, we note that even though luck egalitarianism does contribute marginally to the likelihood, the explanatory power of this norm is small.

Table 5. Estimation results

Parameter	(1)	(2)	(3)	(4)	(5)
Share strict egalitarian, λ^{SE}	0.334	0.343		0.383	0.461
	(0.049)	(0.049)		(0.058)	(0.057)
Share libertarian, λ^{L}	0.313	0.314	0.572		0.539
	(0.046)	(0.046)	(0.069)		(0.057)
Share luck egalitarian, λ^{LE}	0.01				
	(0.013)				
Share choice compensation, λ^{CC}	0.339	0.343	0.427	0.617	
	(0.051)	(0.051)	(0.079)	(0.058)	
μ	-0.873	-0.912	-10.821	-1.313	-1.600
	(0.179)	(0.173)	(18.884)	(0.105)	(0.157)
σ	2.149	2.141	10.990	27.124	7.158
	(0.357)	(0.334)	(18.459)	(16090)	(81.97)
log L	-817	-818	-938	-976	-904

The distribution of γ_i is parametrized such that log $\gamma \sim N(\mu, \sigma^2)$. One ideal is estimated residually, and standard errors (in parentheses) are calculated from the estimated parameters using the Delta method. The estimation approach uses BFGS to maximize the likelihood, after an initial search for starting values. Total number of decisions = 1672, total number of spectators = 152.

As is also evident from specifications (1) and (2), substantial (and about equally large) shares of the spectator can be described as strict egalitarians, libertarians and choice compensators respectively. In specifications (3)-(5) we remove, in turn, one of these three fairness norms. This leads to substantially lower likelihood values, which tells us that all three fairness norms are important in order to account for the observed choices. This conclusion is corroborated by how the estimated distribution of γ changes between specification (1)-(2) on the one hand and (3)-(5) on the other hand. The latter all have extreme values of σ, indicating numerical problems with fitting the model without one of these ideals as it then needs to predict uniform choice probabilities for a substantial fraction of the participants in order to fit data.[12]

IV. Conclusions

This paper provides evidence on fairness views in situations where the outcome is determined by luck. We jointly consider two types of luck: brute luck, which the individual cannot influence,

[12] Further details about the maximum likelihood estimation, and a measure of model fit, are available in appendix E.

and option luck, the exposure to which is in control of the individual. In the experiment we study which fairness norms people adhere to when they act as spectators and distribute resources between two other agents.

There are three main findings. First, we document that the spectators are, on average, more likely to equalize earnings between agents in situations where bad brute luck played a role in generating the initial inequality. This might lead one to believe that a significant fraction of spectators are luck egalitarians who condition compensation for a bad outcome on its cause. However, our second finding is that spectators do not treat brute and option luck separately, as they should if they were behaving in accordance with this norm. Our third finding is that instead many spectators condition compensation for bad brute luck on the agent's choice about option luck exposure. We call this fairness norm "choice compensation" and use a choice model to estimate which share of spectators adhere to the different fairness ideals. We find that our data is well explained by a model with three types: libertarians, strict egalitarians and choice compensators, who each make up about a third of our sample. We find very little support for the existence of luck egalitarians.

Our investigation is descriptive rather than normative and the finding that spectators are choice compensators rather than luck egalitarians is not an evaluation of the moral standing of these norms. It is simply a description of how the participants in our experiment handle the joint presence of uncontrollable and controllable events when making redistributive decisions. Our findings show that it may not be enough to consider the cause behind a particular situation in order to understand how fairness is assessed. Other factors preceding the situation, such as a choice, may be more important even when they do not actually influence the outcome.

How can we understand the notion of choice compensation as compared to luck egalitarianism? The two norms are similar in the sense that both have responsibility for own choices at the core. The difference is that whereas luck egalitarians apply this responsibility only in circumstances that an agent can control, the choice compensators extend it to also encompass situations where the choice neither caused nor affected the outcome.

There are several reasons why this behavior could arise. Choice compensating spectators may, for example, want to reward "good behavior" (if they regarded buying the insurance as the correct thing to do). Another possibility is that spectators use the insurance choice as a signal about a person's type (as the insurance decision involves a fair gamble it seems a natural basis for distinguishing for example between risk averse and risk loving people): If spectators care differently about different types (or simply desire to respect preferences), it is then natural that they condition their distribution decision on this signal. However, given that our experiment was not set up to distinguish between these (and other) potential underlying motivations for the existence of choice compensators we leave it for future research to pin down the exact source of this behavior .

Despite the logic behind luck egalitarianism and choice compensation being similar, their implications are potentially very different. According to luck egalitarianism a person with a risky lifestyle is to be held responsible for bad outcomes that are directly linked to her risky actions. For example a smoker is to be held more responsible than a non-smoker for contracting a smoking-related disease, such as lung cancer, but she is *not* to be held more responsible if she suffers from an illness that is unrelated to smoking. Similarly, a person who makes risky investment decisions, is frequently seen at casinos, and speeds with his car should, according to luck egalitarianism, not be compensated for losses related to his risky behavior. However, if he experiences bad luck that is unrelated to these behaviors, for example unemployment, he should not be treated differently than a person who has never set his foot in a casino, has his money in the mattress, and drives 10 mph below the speed limit.

Choice compensators are different. They hold the smoker more responsible than the non-smoker, regardless of whether the disease she contracts is related to smoking or not. Likewise, they regard the notorious risk-taker as less deserving of unemployment compensation than his risk minimizing colleague even if the risk-taking of the former had nothing to do with the risk of unemployment.

These differences between luck egalitarians and choice compensation have policy implications. If society would endorse choice compensation rather than luck egalitarianism it would imply a step up in the extent to which agents are held responsible for their actions. This, in turn, could be of importance for example for which treatments a publicly financed health insurance should pay for, and the extent to which publically financed treatments should be made conditional on an individual's general risk taking behavior.

References

Aguiar, Fernando, Alice Becker and Luis Miller. 2013. Whose impartiality? An experimental study of veiled stakeholders, involved spectators and detached observers. *Economics and Philosophy*, 29(2): pp. 155-174.

Alesina, Alberto, and George-Marios Angeletos. 2005. “Fairness and Redistribution.” *American Economic Review*, 95(4), pp. 960-980.

Arneson, Richard. 1989. “Equality and equal opportunity for welfare,” *Philosophical Studies*, 56(1), pp. 159-194.

Becker, Alice. 2013. “Accountability and the fairness bias : the effects of effort vs. luck”, *Social Choice and Welfare*, 41(3), pp. 685-699.

Brock, J. Michelle, Andreas Lange, and Erkut Y. Ozbay (2013). ”Dictating the Risk: Experimental Evidence on Giving in Risky Environments.” *American Economic Review*, 103(1), pp. 415-437.

Cappelen, Alexander, Astrid D. Hole, Erik Ø. Sørensen and Bertil Tungodden. 2007. ”The pluralism of fairness ideals: An experimental approach,” *American Economic Review*, 97 (3), pp. 818-827.

Cappelen, Alexander W., James Konow, Erik Ø. Sørensen, and Bertil Tungodden. 2013. "Just Luck: An Experimental Study of Risk-Taking and Fairness." *American Economic Review*, 103(4), pp. 1398-1413.

Charness, Gary, and Rabin, Matthew, 2002. “Understanding social preferences with simple tests.” *Quarterly Journal of Economics*, 117(3), pp. 817-869.

Cherry, Todd L., Peter Frykblom and Lason F.Shogren.2002. “Hardnose the dictator,” *American Economic Review*, 92(4), pp. 1218–1221.

Cohen, G.A., 1989. ”On the Currency of Egalitarian Justice.” *Ethics*, 99(4), pp. 906-944.

Dworkin, Ronald. 1981a. “What is equality? Part 1: equality of welfare,” *Philosophy & Public Affairs*, 10(3), pp. 283–345.

Dworkin, Ronald. 1981b. “What is equality? Part 2: equality of resources,” *Philosophy & Public Affairs*, 10(4), pp. 283–345.

Dworkin, Ronald, 2000. *Sovereign Virtue: The Theory and Practice of Equality*. Cambridge MA: Harvard University Press.

Engelmann, Dirk and Strobel, Martin, 2004. „Inequality Aversion, Efficiency, and Maximin Preferences in Simple Distribution Experiments.” *American Economic Review*, 94(4), pp. 857-869.

Fehr, Ernst and Klaus M. Schmidt. 1999. “A theory of fairness, competition and cooperation,” *Quarterly Journal of Economics*, 114(3), pp. 817-868

Fischbacher, U. (2007). “z-Tree: Zurich toolbox for ready-made economic experiments.” *Experimental Economics*, 10(2), pp. 171-178.

Frohlich, Norman, Joe Oppenheimer, and Anja Kurki. 2004. ”Modeling other-regarding preferences and an experimental test,” *Public Choice*, 119(1-2), pp. 91–117.

Gächter, Simon, and Arno Riedl.2005. “Moral Property Rights in Bargaining with Infeasible Claims,” *Management Science*, 51(2), pp. 249-263.

Gächter, Simon, and Arno Riedl. 2006. “Dividing Justly in Bargaining Problems,” *Social Choice and Welfare*, 27(3), pp. 571-594.

Konow, James. 1996. “A positive theory of economic fairness”, *Journal of Economic Behavior and Organization*, 31(1), pp. 13–35.

Konow, James. 2000. “Fair shares: Accountability and cognitive dissonance in allocation decisions,” *American Economic Review*, 90(4), pp. 1072–1091.

Konow, James, 2009. “Is Fairness in the Eye of the Beholder? An Impartial Spectator Analysis of Justice.” *Social Choice and Welfare*, 33(1), pp. 101-127.

Krawczyk, Michal. 2010. “A glimpse through the veil of ignorance: Equality of opportunity and support for redistribution?,” *Journal of Public Economics*, 94 (1-2), pp. 131-141.

Lippert-Rasmussen, Kasper. 2001. ”Egalitarianism, Option Luck, and Reponsibility.” *Ethics*, 111(3): 548-579.

Schokkaert, Erik and Kurt Devooght. 2003. Responsibility-sensitive fair compensation in different cultures, *Social Choice and Welfare*, 21(2), pp. 207–242.

Appendix A

General instructions

Hi and welcome! You will see instructions on your screen and we will also read the instructions to you, so please follow along.

In this study you can earn money. The amount will depend on your decisions, the decisions of other participants and on luck.

All cell-phones must be turned off. You are not allowed to talk with any of the other participants during the study. If you have questions or need help, please raise your hand and one of us will help you in private.

Also, note that all participants are anonymous and that you will only be identified with the code number that you can find on a small piece of paper on your desk.

The study has several parts. We will now go over the instructions for part 1.

Part 1 instructions

All participants have now been given 24 dollars.

At the end of part 1, one of three events will occur. The events are called A, B and C and they are all equally likely to happen. The consequences of these events are as follows:

- If event A occurs, you will keep your 24 dollars.

- If event B occurs, you will lose your 24 dollars.

- If event C occurs, you will lose your 24 dollars.

Before the random draw between events A, B and C is made, you have the possibility to buy an insurance against the loss associated with event B. The price of the insurance is 12 dollars, but the cost must only be paid if you get to keep your money.

This means that the following will happen if you decide to buy the insurance:

- If event A occurs, you keep your 24 dollars, pay 12 dollars for the insurance and hence keep 12 dollars.

- If event B occurs, you keep your 24 dollars, pay 12 dollars for the insurance and hence keep 12 dollars.

- If event C occurs, you lose your 24 dollars and hence keep nothing.

And the following will happen if you decide to not buy the insurance.

- If event A occurs, you keep your 24 dollars.

- If event B occurs, you lose your 24 dollars and hence keep nothing.

- If event C occurs, you lose your 24 dollars and hence keep nothing.

In sum, the insurance does not affect the expected value of your earnings. If you buy insurance, you have a probability of 2/3 to get 12 dollars and if you don't buy the insurance, you have a probability of 1/3 to get 24 dollars. This means that the expected value is 8 dollars in both cases.

On the next screen we will ask you some questions regarding the choice situation described above. Note that the sheet on your desk sums up all the information needed to answer the questions.

Part 1 control questions

Question 1: How much money is each participant allocated at the start of part 1?

Question 2: How many dollars does it cost to insure against the loss associated with event B?

Question 3: Which of event A, B and C is most likely to happen? Alternatives: 1) Event A. 2) Event B. 3) Event C. 4) They are all equally likely.

Question 4: How much will you have after part 1, if event A happens to you? Alternatives: 1) I will have 24 dollars regardless of if I bought insurance or not. 2) I will have 24 dollars if I did not buy the insurance and 12 dollars if I did buy it. 3) I will have 0 dollars if I did not buy the insurance and 12 dollars if I did buy it.

Question 5: How much will you have after part 1, if event B happens to you? Alternatives: 1) I will have 24 dollars regardless of if I bought insurance or not. 2) I will have 24 dollars if I did not buy the insurance and 12 dollars if I did buy it. 3) I will have 0 dollars if I did not buy the insurance and 12 dollars if I did buy it.

Question 6: How much will you have after part 1, if event C happens to you? Alternatives: 1) I will have 0 dollars regardless of if I bought insurance or not. 2) I will have 24 dollars if I did not buy the insurance and 12 dollars if I did buy it. 3) I will have 12 dollars regardless of if I bought insurance or not.

End of part 1

You have now completed part 1 and one of the events A, B and C has been drawn. You will learn which event that was drawn for you at the end of the study.

We now move on to part 2.

Part 2 Instructions

This part of the study is about the distribution of the earnings from part 1.

Two other participants in this room will be randomly put together to form a pair. Your task is to decide how this pair's total earnings from part 1 will be split between the two of them.

You will see several such situations where you have to make this decision. One of the situations that you will see has in fact happened to the pair. With 50 percent probability your decision in that situation will determine these participants' payoff from part 1 (with 50 percent probability it is determined by another participant, but it is never determined by anyone in the pair).

In the same way, you have also been placed in a pair with another participant, and someone else in this room will determine how the total earnings in your pair will be split between the two of you.

Please note that you will make the distribution decision for two other people, i.e. NOT for yourself and the one you are paired with. In the same way, someone else will make the distribution decision for you and whoever you are paired with.

Part 2 control questions

We will now make sure that everyone has understood the instructions for part 2 correctly. When you have answered the questions below, please click "I understand". If any of your answers are incorrect, the computer will tell you so and you get to answer that question again.

Question 1: In this part you will be matched to two other participants. Who decides how their earnings from part 1 are split between them? Alternatives: 1) They decide together. 2) One of them decides. 3) I or another participant decides (but none of the people in the pair).

Question 2: In this part you have also been matched with one other participant to form a pair. Who decides how your earnings from part 1 are split between you? Alternatives: 1) Another participant (but not the other person in the pair) decides. 2) I decide. 3) The other person in the pair decides.

End of part 2

You have now completed part 2.

Earnings

You can now see your earnings from the study.

Part 3

While we prepare your earnings, please answer the following questions.

Appendix B

In the experiment described in the main text all participants both made the insurance decisions in part 1 and acted as disinterested spectators in part 2. Participants who chose to insure did make different choices as spectators than those who chose not to insure, with the former being more prone to equalize the payoffs between the two agents in the pair that they were matched to (they decided to equalize choices in 50.6 percent (se=2.92) of the situations on average, compared to 29.5 percent (se=5.37) for those who did not buy the insurance). The difference is highly statistically significant with p<0.01.

Table B1 shows the result of the estimation of the choice random utility model, with the sample divided into those who choose to buy insurance and those who choose not to. When we break the estimation down by whether spectators chose to buy insurance for themselves or not, we see that those who chose not to buy insurance are more libertarian. In neither group is there any substantial number of luck egalitarians.

Table B1. Estimation results, split by spectator's insurance decision.

	No insurance bought		Insurance bought	
Parameter	(1)	(2)	(3)	(4)
Share strict egalitarian, λ^{SE}	0.105	0.119	0.392	0.397
	(0.071)	(0.077)	(0.056)	(0.056)
Share libertarian, λ^{L}	0.650	0.679	0.225	0.225
	(0.116)	(0.112)	(0.046)	(0.046)
Share luck egalitarian, λ^{LE}	0.063		0.009	
	(0.087)		(0.012)	
Share choice compensation, λ^{CC}	0.182	0.202	0.374	0.378
	(0.096)	(0.100)	(0.058)	(0.059)
μ	-0.682	-0.871	-0.902	-0.935
	(0.388)	(0.388)	(0.200)	(0.193)
σ	10.252	11.993	1.989	1.981
	(264)	(392)	(0.338)	(0.326)
log L	-162.8	-163.1	-646.8	-647.4

The distribution of γ_i is parametrized such that $\log \gamma \sim N(\mu, \sigma^2)$. One ideal is estimated residually, and standard errors (in parentheses) are calculated from the estimated parameters using the Delta method. The estimation approach uses BFGS to maximize the likelihood, after an initial search for starting values. Total number of decisions in (1) and (2): 341 (31 spectators). Total number of decisions in pooled data 1672 (total number of spectators 152).

The above analysis tells us that those who themselves chose to insure acted differently as spectators than those who did not insure. This does in itself not say that the spectators in our main experiment would have acted differently if they would not have made the insurance decision themselves, but it bids the question of whether the results would have been different if we had completely separated the roles in the experiment.

In order to investigate this, we conducted additional experimental sessions in November 2012. In these sessions participants made decisions *either* in part 1 or part 2, but never in both. Instead of being compensated via the earnings in part 1, the spectators were given a fixed sum of $8 (equal to the expected earnings in part 1) for making the distribution decisions in part 2. It was randomly determined in which part a particular participant would make decisions. We made minimal changes to the instructions to reflect these changes, but in all other respects the design and instructions were identical to the main experiment. All participants (also those who would act as spectators in part 2 and hence would not make the insurance decision) participated in the quiz in part 1 in order to ensure that the spectators had a similar understanding of the situation as they had in the original experiment.

70 people made decisions as spectators in these sessions. Their average age was 22 years and 49 percent were female. Their average earnings were $20 (including a fixed show-up fee).

Just as in the main experiment, we find that the spectators were more prone to equalize earnings between the two participants in the pair that they were matched to when one of the people in the pair had experienced bad brute luck. In these situations payoffs were equalized on average 50.48 percent (se=3.90) of the time. In the situations without bad brute luck the corresponding percentage was 38.29 percent (se=3.54). This difference is statistically significant with $p<0.01$.

In the main text we utilized the fact that the six situations involving bad brute luck can be divided into three pairs (2 and 5, 4 and 6, and 8 and 10 respectively) where the insurance choice of person 1 and the outcomes for both P1 and P2 from part 1 are held constant. The only thing that differed between the two situations in each pair is whether person 2 bought insurance or not. In the November-sessions, where the spectators had not made the insurance decision themselves, we found the same pattern as in the original experiment, namely that spectators redistributed more when the person who suffered bad brute luck had also chose to insure against bad option luck. In situation 2, 51.43 percent (se=6.02) chose to equalize which is significantly less ($p<0.01$) than in situation 5 where 72.86 percent (se=5.35) equalized. The difference in situations 4 and 6 (where 61.43 percent, se=5.86 and 24.29 percent, se=5.16 chose to equalize) and in situations 8 and 10 (where 30.0 percent, se=5.52 and 62.86 percent, se=5.82 chose to equalize) were also highly statistically significant ($p<0.01$).

Lastly, Table B2 shows the result of the estimation of the choice random utility model, both for the sessions in November only, and for the pooled data.

Table B2. Estimation results, November sessions and pooled data.

	November-sessions		All observations pooled	
Parameter	(1)	(2)	(3)	(4)
Share strict egalitarian, λ^{SE}	0.234	0.234	0.306	0.309
	(0.060)	(0.060)	(0.039)	(0.039)
Share libertarian, λ^{L}	0.495	0.495	0.369	0.370
	(0.072)	(0.073)	(0.040)	(0.040)
Share luck egalitarian, λ^{LE}	0.000		0.007	
	(0.000)		(0.009)	
Share choice compensation, λ^{CC}	0.271	0.271	0.318	0.321
	(0.066)	(0.066)	(0.041)	(0.041)
μ	-0.580	-0.580	-0.720	-0.742
	(0.187)	(0.187)	(0.143)	(0.138)
σ	19.98	7.975	2.325	2.333
	(38460)	(84.9)	(0.432)	(0.429)
log L	-435.4	-435.4	-1255	-1256

The distribution of γ_i is parametrized such that log $\gamma \sim N(\mu, \sigma^2)$. One ideal is estimated residually, and standard errors (in parentheses) are calculated from the estimated parameters using the Delta method. The estimation approach uses BFGS to maximize the likelihood, after an initial search for starting values. Total number of decisions in (1) and (2): 770 (70 spectators). Total number of decisions in pooled data: 2442 (222 spectators).

We conclude that the conclusions drawn from the main experiment holds also when the spectators did not themselves make the insurance decision: 1) There are more equalizing decisions when one of the agents in the pair experienced bad brute luck. 2) Brute luck and option luck are not treated separately as is required by luck egalitarianism. 3) There are very few luck egalitarians among our spectators but significant shares of strict egalitarians, libertarians and choice compensators.

Appendix C

The post-experimental questionnaire asked the following questions:

Question 1: Did you choose to insure against the loss associated with event B in part 1? Alternatives: 1) Yes. 2) No.

Question 2: When making the decision about how to split the earnings between the two other participants, how concerned were you about making a fair decision? [Participant indicates on a scale from 1-10 where 1 is ”Not at all concerned” and 10 is ”Very concerned about fairness”]

Question 3: Would you say that you are a person who generally tries to take very little risk or who takes a lot of risk? [Participant indicates on a scale from 1-10 where 1 is ”Take very little risk” and 10 is ”Take a lot of risk”]

Question 4: Gender? Alternatives: 1) Male. 2) Female.

Question 5: Year of birth?

For the interested reader we provide an overview of the results from the questionnaire here. For more details, please contact the authors.

On the question regarding how concerned the individual was about fairness when making the distribution decision the average answer was 7.66 (N=152, se=0.22). Spectators whose behavior was exactly in accordance with strict egalitarianism, libertarianism, luck egalitarianism and choice compensation respectively had average answer of 7.95 (N=20, se=0.456), 7.83 (N=29, se=0.636), 10 (N=1, se=N/A), 8.58 (N=12, se=0.260).

The average answer regarding personal risk aversion was 5.45 (N=152, se=0.190). For those who decided to buy the insurance in part 1 of the experiment the answer was 5.01 (N=120, se=0.20), for those who did not the average answer was 7.13 (N=32, se=0.386). Spectators whose behavior was exactly in accordance with strict egalitarianism, libertarianism, luck egalitarianism and choice compensation respectively had average answer of 5.1 (N=20, se=0.624), 6.17 (N=29, se=0.481), 6 (N=1, se=N/A), 5.167 (N=12, se=0.534).

Our sample consisted of 48.7 percent women (N=74) and 51.3 percent men (N=78). Women choose to equalize the earnings of the participants in the pair in, on average, 49.75 percent (se=3.59) of their distributive decisions. The corresponding percentage for men was 42.77 (se=3.85). The gender split between spectators whose behavior was exactly in accordance with one of the norms considered was 55 percent women (N=11) and 45 percent men (N=9) for strict egalitarianism, 34.5 percent women (N=10) and 65.6 percent men (N=19) for libertarianism, 0 percent women and 100 percent men (N=1) for luck egalitarianism, and , 58.3 percent women (N=7) and 41.7 percent men (N=5) for choice compensation.

Note that this appendix describes the questionnaire data from the original experiment. For corresponding questionnaire data for the November sessions (described in Appendix B), please contact the authors.

Appendix D

Table D1: More equalizing splits in situations with bad brute luck.

	(1)	(2)	(3)	(4)
Bad brute luck	0.0939***	0.191***	0.379***	0.837***
	(0.0174)	(0.0213)	(0.0707)	(0.102)
Gender		0.0698		0.301
		(0.0527)		(0.228)
d_12		-0.201***		-0.851***
		(0.0266)		(0.117)
d_2412		0.109***		0.474***
		(0.0372)		(0.159)
Constant	0.411***	0.413***	-0.362***	-0.394*
	(0.0280)	(0.0453)	(0.116)	(0.203)
N	1672	1672	1672	1672

* p < 0.1, ** p < 0.05, *** p < 0.01. The table shows results of a regression where the dependent variable is a dummy equal to 1 if an equal split was chosen and 0 otherwise. Specifications (1) and two are Ordinary Least Square (OLS) whereas (2) and (3) are Ordered Probit (OP). Bad brute luck is a dummy equal to 1 if event C happened to any of the two persons in the pair, and 0 otherwise. Gender is a dummy equal to 1 if the decision-making spectator is female and zero otherwise. d_12 is dummy equal to 1 if the outcome was 12 to person 1 and 0 to person 2. d_1224 is dummy equal to 1 if the outcome was 24 to person 1 and 12 to person 2. The reference outcome is hence 24 to person 1 and 0 to person 2. Standard errors clustered at spectator level (152 spectators).

Appendix E

In this appendix we present details on the estimated choice model and show how our model predictions compare to the "exact" classifications of Table 4 in the main paper.

As noted in the paper, the assumed utility function is

$$U(y;\cdot) = \gamma_i V(y;\cdot) + \epsilon_{iy} \text{ for } y \in \{x, X/2\}.$$

We assume that the utility loss function, V, is quadratic and equal to

$$V(y;\cdot) = -\frac{(y - F^{k(i)})^2}{X},$$

which is the same normalization as in Cappelen et al. (2013). Choices are made to maximize utility, and ϵ_{iy} are assumed to be extreme value iid, which gives rise to logit choice probabilities. The heterogeneity consists of $(\gamma_i, k(i))$ in which γ_i measures the strength of the fairness motivation compared to the behaviorally stochastic terms ϵ_{iy}, and $k(i)$ is the fairness ideal of individual i. For an individual, this gives rise to logit choice probabilities,

$$\Lambda_{ij}(\gamma \cdot \Delta_{ij}V) = \frac{1}{1 + \exp(-\gamma \cdot \Delta_{ij}V)},$$

where $\gamma \cdot \Delta_{ij}V$ is the difference in the deterministic utility loss between the actually chosen alternative and that of the non-chosen alternative in situation j. Integrating out the unobserved heterogeneity, we have the likelihood of observing the choices of an individual as

$$L_i = \sum_k \lambda_k \int_0^\infty \left[\prod_{j=1}^{J} \Lambda(\gamma \cdot \Delta_{ij}V)\right] f(\gamma; \mu, \sigma) d\gamma,$$

where λ_k is the population share holding ideal k and $f(\gamma; \mu, \sigma)$ is the density of γ. We assume that $\log \gamma \sim N(\mu, \sigma^2)$.

The (log) likelihood function is maximized with the BFGS method, after an initial Nelder-Mead search for good starting values. We use the stats4 library of R.

Since we are estimating with individual heterogeneity, showing model fit at the individual level is not feasible. Instead we simulate the model with the preferred specification (Column 2 in Table 5 of the paper), and calculate the predicted analog of Table 4 in the paper. In Table E1 we see that the qualitative patterns of Table 4 are preserved in the simulations.

Table E1. Share of spectators by norm in percent, simple classification on predicted data.

	No deviations	Max 1 deviation	Max 2 deviations
Strict egalitarians (SE)	10.8	15.1	19.2
Libertarians (L)	10.7	15.2	19.8
Luck egalitarians (LE)	0.1	1.2	6.1
Choice compensators (CC)	9.9	13.9	18.1

Predicted analog of Table 4 in the paper. Based on simulations of 10 000 datasets in which (γ_i,$k(i)$) are allocated according to the distribution estimated in Column 2, Table 5 in the paper.