Just luck: an experimental study of risk taking and fairness

Cappelen, Alexander W and Konow, James and Sorensen, Erik O and Tungodden, Bertil

Norwegian School of Economics and Business Adminstration, Loyola Marymount University

10 March 2010

Just Luck:
An Experimental Study of Risk Taking and Fairness

Alexander W. Cappelen James Konow Erik Ø. Sørensen
Bertil Tungodden*

March 10, 2010

Abstract

Choices involving risk significantly affect the distribution of income and wealth in society. This paper reports the results of the first experiment, to our knowledge, to study fairness views about risk-taking, specifically whether such views are based chiefly on ex ante opportunities or on ex post outcomes. We find that, even though many participants focus exclusively on ex ante opportunities, most favor some redistribution ex post. Many participants also make a distinction between ex post inequalities that reflect differences in luck and ex post inequalities that reflect differences in choices. These findings apply to both stakeholders and impartial spectators

JEL codes: C91, D63

Keywords: fairness, justice, risk

*Cappelen: Norwegian School of Economics and Business Administration, Bergen, email: alexander.cappelen@nhh.no; Konow (corresponding author): Loyola Marymount University, email: jkonow@lmu.edu; Sørensen: Norwegian School of Economics and Business Administration, email: erik.sorensen@nhh.no; Tungodden: Norwegian School of Economics and Business Administration, Bergen, email: bertil.tungodden@nhh.no. We should like to thank Dirk Engelmann, Astri D. Hole, Michal Krawczyk, Andrew Oswald, and Jason F. Shogren for extremely valuable comments and suggestions on the paper. We are grateful for excellent research assistance from Pablo Barrera and Jan Vidar Håtuft. The project was partly financed by the Research Council of Norway, research grant 185831, and by the research centres Centre for the Study of Mind in Nature (CSMN) and Equality, Social Organization, and Performance (ESOP), University of Oslo.

People make choices involving risk in all spheres of life, and the outcomes of these choices fundamentally affect the distribution of income and wealth in society. At the same time, people often disagree about the fair allocation of 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 situations, therefore, we had ex ante equality in opportunities, but possibly ex post inequalities in

[1] There 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).

[2] Various 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; Krawczyk 2010; Magdalou, Dubois, and Nguyen-Van 2009). The experiments of Zizzo and Oswald (2001) and Zizzo (2003, 2004) come 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. See also Shogren (1992) for an experimental study of bargaining over ex ante lotteries and ex post rewards.

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 allocated the pooled earnings of pairs of stakeholders in a randomly selected subsample of the distributive 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 (Charness and Rabin 2002; Engelmann and Strobel 2004; Konow, Saijo, and Akai 2009; Konow 2009, 2000) 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 the same ex ante opportunities.

[3]This 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).

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, even though the choices of stakeholders clearly reflect a selfish motive, we find that stakeholders and spectators act on 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 1 presents the experimental design. Section 2 analyzes the choices of spectators. Section 3 introduces a model of distributive choice that we estimate for both spectators and stakeholders. Section 4 concludes.

1 Design and procedures

We recruited participants among students at a Norwegian business school. 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 four different risk-taking situations. In each of the four cases, 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 total 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. All allocations were restricted to multiples of 25 NOK.

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

2 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 around 75 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.[4] 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

[4]In total, 248 out of 328 spectator distributions are exactly equal to one of the fairness ideals.

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, and, 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.

3 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:

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

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

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

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 2, we assume that the individuals

endorse the ex post (EP), ex ante (EA), or choice egalitarian (CE) fairness views,

$$F_i^{EP} = \frac{1}{2}X, \tag{3}$$

$$F_i^{EA} = x_i, \tag{4}$$

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

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.

3.1 Estimates of the choice model

We assume a discrete choice random utility model of the form

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

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 $\boldsymbol{\theta}$ represent all parameters to be estimated. We can now write the likelihood contribution of an individual conditional on a fairness perspective k as,

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

The index $j = 1, \ldots, J_i$ indicates the number of choices made by individual i and $\mathcal{Y}_{ij}$ is the choice set $\{0, \ldots, X_{ij}\}$ 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, $\lambda^{EA}, \lambda^{CE}$, and λ^{EP},

$$L_i(\boldsymbol{\theta}) = \sum_k \lambda^k L_i^k(\boldsymbol{\theta}). \tag{8}$$

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 substantially reduces likelihood.[5]

3.2 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. Charness and Rabin 2002; Engelmann and Strobel 2004; Konow 2009).

3.3 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

[5]Note 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).

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 with very left-wing and very right-wing as the extreme points. The distribution of responses is reported in Table 4.[6]

[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 Table 3 (specification 1) to identify the likelihood of any specific individual holding a particular fairness view. Given an individual's choices, we apply Bayes' theorem,

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

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).[7]

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 a large majority of the spectators and a substantial share of the stakeholders are identified very precisely.[8]

[Figure 3 about here.]

[6]Of course, the cut-off point for distinguishing left- and right-wing political positions can differ across countries, and our pool of Norwegian business students might or might not be average compared to a more international sample. Nevertheless, that should not matter for our purposes, since Norwegians conceptualize left and right as pointing roughly toward the same poles as do those in other countries, irrespective of where they place the cut-off points.

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

[8]It is hard to identify the fairness view of some stakeholders, mainly because they took everything for themselves.

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 is also present in situations outside the laboratory where gains and losses from risk-taking are distributed.

[Table 5 about here.]

4 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 endorses the ex ante view, but a substantial share also endorses the ex post view. Nevertheless, 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 favors the choice egalitarian distribution. 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.

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 not be required to contribute to financing such treatment, but that the costs of treatment be shared equally among lucky and unlucky smokers (Cappelen and Norheim 2005). In short, this provides a justification for a tax on cigarettes, whereby the revenues are used to finance the treatment of tobacco related health problems.

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.

References

Andrews, Donald W. K. (2001). "Testing when a parameter is on the boundary of the maintained hypothesis," *Econometrica*, 69(3): 683–734.

Arneson, Richard (1989). "Equality and equal opportunity for welfare," *Philosophical Studies*, 56(1): 159–194.

Babicky, Vitezslav (2003). "Fairness under risk: Insights from dictator games," CERGE-EI Working Paper No. 217.

Babicky, Vitezslav and Andreas Ortmann (2005). "Fairness in risky environments: Theory and evidence," Working paper.

Berndt, Ernst R., Bronwyn H. Hall, Robert. E. Hall, and Jerry A. Hausman (1974). "Estimation and inference in nonlinear structural models," *Annals of Economic and Social Measurement*, 3(4): 653–665.

Brennan, Geoffrey, Luis G. González, Werner Güth, and M. Vittoria Levati (2008). "Attitudes toward private and collective risk in individual and strategic choice situations," *Journal of Economic Behavior & Organization*, 67(1): 253–262.

Cappelen, Alexander W., Astri Drange Hole, Erik Ø. Sørensen, and Bertil Tungodden (2007a). "The importance of moral reflection and self-reported data in a dictator game with production," Discussion paper SAM 40/07, Department of Economics, Norwegian School of Economics and Business Administration.

Cappelen, Alexander W., Astri Drange Hole, Erik Ø. Sørensen, and Bertil Tungodden (2007b). "The pluralism of fairness ideals: An experimental approach," *American Economic Review*, 97(3): 818–827.

Cappelen, Alexander W. and Ole Frithjof Norheim (2005). "Responsibility in health care – a liberal egalitarian approach," *Journal of Medical Ethics*, 31(8): 476–480.

Charness, Gary and Matthew Rabin (2002). "Understanding social preferences with simple tests," *Quarterly Journal of Economics*, 117(3): 817–869.

Cherry, Todd L., Peter Frykblom, and Jason F. Shogren (2002). "Hardnose the dictator," *American Economic Review*, 92(4): 1218–1221.

Diamond, Peter A. (1967). "Cardinal welfare, individualistic ethics, and interpersonal comparisons of utility: Comment," *Journal of Political Economy*, 75(5): 765–766.

Dworkin, Ronald (1981a). "What is equality? Part 1: Equality of welfare," *Philosophy and Public Affairs*, 10(3): 185–246.

Dworkin, Ronald (1981b). "What is equality? Part 2: Equality of resources," *Philosophy and Public Affairs*, 10(4): 283–345.

Engelmann, Dirk and Martin Strobel (2004). "Inequality aversion, efficiency, and maximin preferences in simple distribution experiments," *American Economic Review*, 94(4): 857–869.

Fehr, Ernst and Klaus M. Schmidt (1999). "A theory of fairness, competition and cooperation," *Quarterly Journal of Economics*, 114(3): 817–868.

Ferrall, Christopher (2005). "Solving finite mixture models: Efficient computation in economics under serial and parallel execution," *Computational Economics*, 25(4): 343–379.

Fleurbaey, Marc (2002). "Equality of resources revisited," *Ethics*, 113(1): 82–105.

Fleurbaey, Marc (2007). "Assessing risky social situations," mimeo, CNRS-CERSES, France.

Fried, Barbara H. (2003). "Ex ante/ex post," *The Journal of Contemporary Legal Issues*, 13: 123–160.

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

Hammond, Peter J. (1981). "Ex-ante and ex-post welfare optimality under uncertainty," *Economica*, 48(191): 235–250.

Harel, Alon, Zvi Safra, and Uzi Segal (2005). "Ex-post egalitarianism and legal justice," *Journal of Law, Economics and Organization*, 21(1): 57–75.

Harsanyi, John C. (1955). "Cardinal welfare, individualistic ethics, and interpersonal comparisons of utility," *Journal of Political Economy*, 63(4): 309–321.

Konow, James (2000). "Fair shares: Accountability and cognitive dissonance in allocation decisions," *American Economic Review*, 90(4): 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): 101–127.

Konow, James, Tatsuyoshi Saijo, and Kenju Akai (2009). "Morals and mores? Experimental evidence on equity and equality," Mimeo, Loyola Marymount University.

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

Krawczyk, Michal and Fabrice Le Lec (2008). "Social decisions under risk. Evidence from the probabilistic dictator game," Manuscript.

Lippert-Rasmussen, Kasper (2001). "Egalitarianism, option luck, and responsibility," *Ethics*, 111(3): 548–579.

Magdalou, Brice, Dimitri Dubois, and Phu Nguyen-Van (2009). "Risk and inequality aversion in social dilemmas," mimeo, Université des Antilles et de la Guyane.

Shogren, Jason F. (1992). "An experiment on Coasian bargaining power over ex ante lotteries and ex post rewards," *Journal of Economic Behavior and Organization*, 17(1): 153–169.

Vallentyne, Peter (2002). "Brute luck, option luck, and equality of initial opportunities," *Ethics*, 112(3): 529–557.

Zizzo, Daniel John (2003). "Money burning and rank egalitarianism with random dictators," *Economics Letters*, 81(2): 263–266.

Zizzo, Daniel John (2004). "Inequality and procedural fairness in a money burning and stealing experiment," in Frank Cowell (ed.), "Inequality, Welfare and Income Distribution: Experimental Approaches," volume 11 of *Research on Economic Inequality*, Elsevier, pp. 215–247.

Zizzo, Daniel John and Andrew Oswald (2001). "Are people willing to pay to reduce others' incomes?" *Annales d'Economie et de Statistique*, 63-64: 39–62.

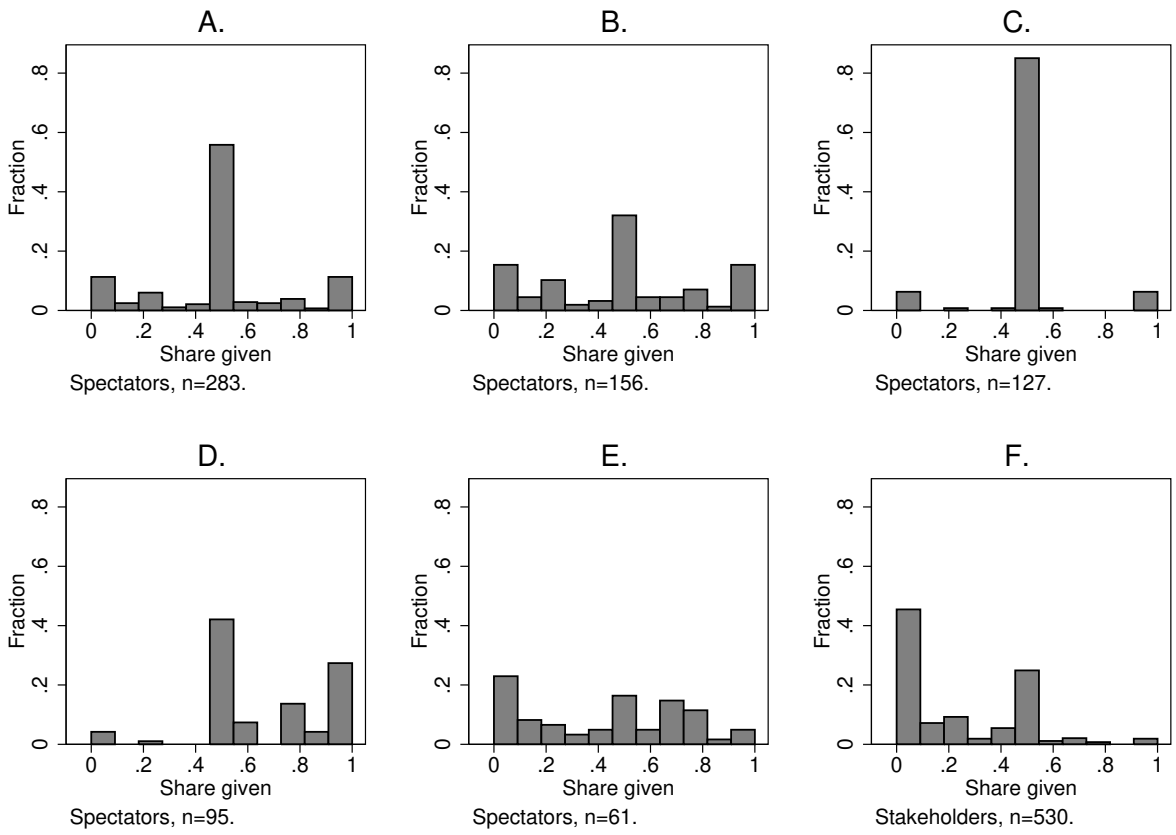

Figure 1: Histograms of share given

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.

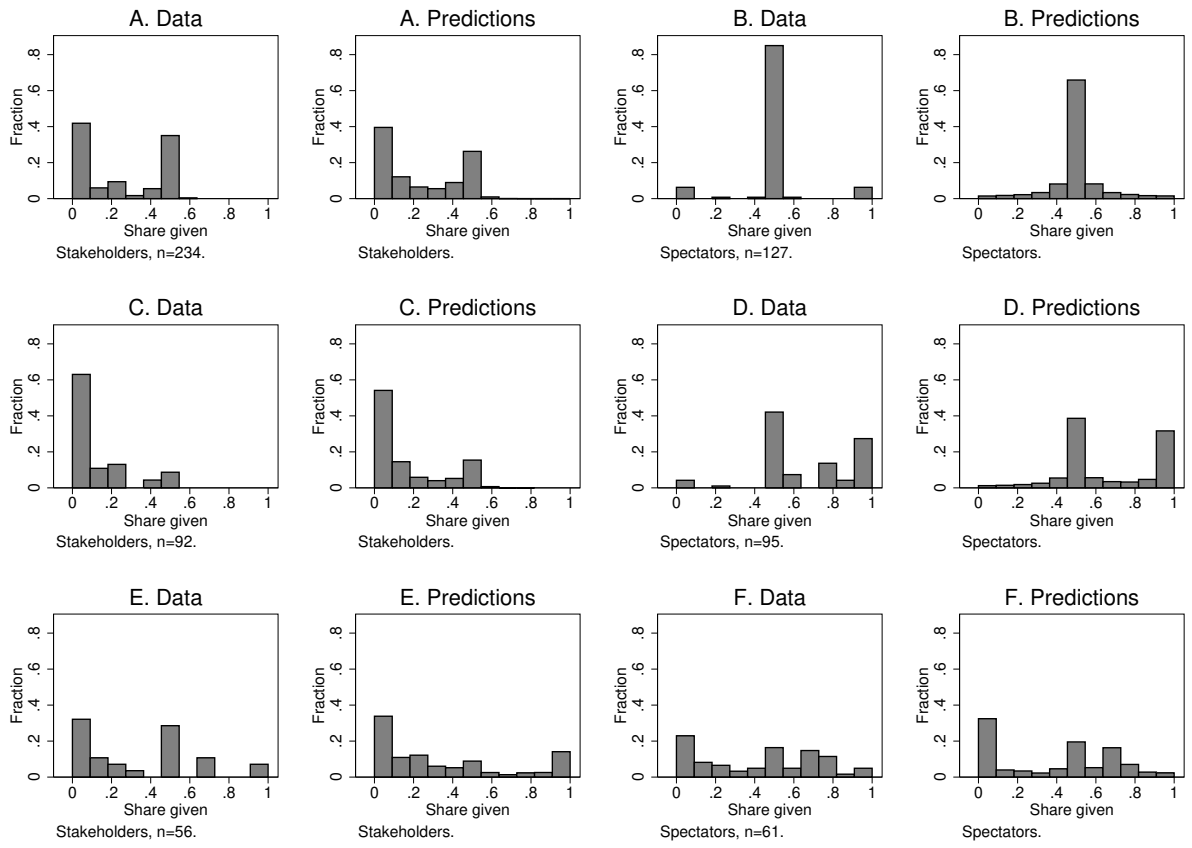

Figure 2: Actual and predicted share given by stakeholders and spectators in various situations

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.

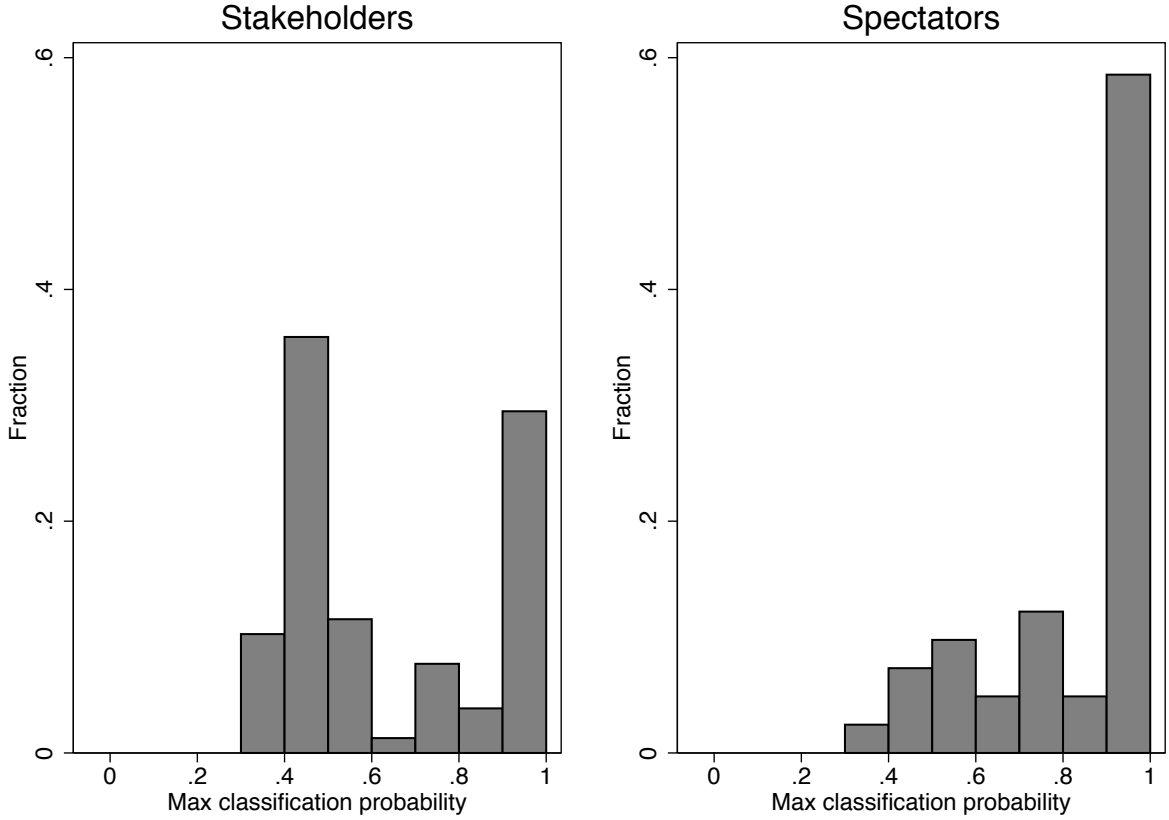

Figure 3: Identification of fairness views at the individual level

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.

	Risk choice		
Value of safe alternative	safe alternative	risky alternative	Total
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. Given that we only have seven individuals choosing the risky choice when the value of the safe alternative is 400 NOK, we have not included these observations in the table.

Table 3: Estimates of the choice model

	(1)		(2)		(3)		(4)		(5)	
parameter	Stakeholder	Spectator	Stakeholder	Spectator	Stakeholder	Spectator	Stakeholder	Spectator	Stakeholder	Spectator
λ^{EP}	0.288		0.274	0.302	0.381		0.500			
	(0.061)		(0.086)	(0.119)	(0.080)		(0.063)			
λ^{CE}	0.293		0.315	0.272	0.619				0.569	
	(0.066)		(0.095)	(0.136)	(0.080)				(0.066)	
λ^{EA}	0.419		0.411	0.427			0.500		0.431	
	(0.064)		(0.091)	(0.090)			(0.063)		(0.066)	
ζ	3.094	6.959	3.094	6.960	1.612	3.554	3.039	4.984	3.012	4.901
	(0.501)	(0.680)	(0.503)	(0.683)	(0.590)	(0.886)	(0.491)	(0.676)	(0.486)	(0.686)
σ	4.379	4.661	4.378	4.660	4.667	5.102	4.059	4.227	3.910	4.381
	(0.653)	(0.706)	(0.655)	(0.706)	(0.639)	(0.907)	(0.593)	(0.642)	(0.564)	(0.670)
γ	15.571		15.577		10.718		14.525		13.241	
	(0.498)		(0.509)		(0.259)		(0.488)		(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	0.246	0.250
	(0.052)	(0.050)	(0.046)
$P(CE\|PV)$	0.319	0.304	0.255
	(0.045)	(0.050)	(0.045)
$P(EA\|PV)$	0.313	0.451	0.495
	(0.049)	(0.059)	(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.

Appendix, not for publication:

General Instructions

Introduction

In this session participants will make decisions that determine their earnings and the earnings of other participants.

Please note that your participation is voluntary. You have the right to withdraw at any time and forfeit all payments you have received and will receive from your participation.

Rules of Conduct

The results from this experiment will be used in a research project. It is therefore very important that everyone who participates in the experiment follows certain rules of conduct. All cell-phones must be turned off, and you are not permitted to access any internet sites other than the one for this experiment. You are not allowed to talk with any of the other participants during the experiment. If you have questions or need help with the computer, please raise your hand and one of us will help you privately.

Anonymity

All interaction between the participants will take place via a web-based interface. The experiment will be conducted under complete anonymity, that is, no one, including the researcher and other participants, will ever know who made which decisions during the experiment.

Participants and Phases

In this experiment, there are two phases and two types of participants. A Type I Person makes decisions in both Phase 1 and Phase 2 of the experiment. A Type II Person makes decisions only in Phase 2 of the experiment. You will be randomly assigned to Type I or II later in the experiment. We will now describe Phase 1.

Phase 1 Instructions

Investment Phase
Phase 1 is the investment phase. Type I Persons, but not Type II Persons, make decisions in this phase. If you are randomly chosen to be a Type I Person, the following procedures will apply to you.

In this phase, you will face four separate situations. In each situation, you will be asked to choose between two alternatives: alternative A and alternative B. The value of alternative A is a fixed amount of money with certainty. Alternative B, on the other hand, is risky, that is, the value of this alternative will depend, in part, on chance. The four decisions you will make all involve the same risky alternative B, but they differ with respect to the value of alternative A. We will now describe these alternatives in greater detail.

Alternative A (certain)
Alternative A has a different but certain value in each of the four separate situations. The four possible values of this alternative are 400 NOK, 300 NOK, 200 NOK and 25 NOK.

Alternative B (risky)
The risky alternative B is always the same for all four situations. If you choose alternative B in a given situation, you have a fifty percent probability of earning 800 NOK and a fifty percent probability of earning nothing. Thus, the expected value of alternative B is 400 NOK. In other words, the value of this alternative is, on average, 400 NOK.

Summary of Investment Situations
The four situations are summarized in the following table, where p represents the probability of a given outcome in alternative B.

	Investment Situations			
Alternative A	400 NOK	300 NOK	200 NOK	25 NOK
Alternative B	0 NOK with p = 0.5 800 NOK with p = 0.5	0 NOK with p = 0.5 800 NOK with p = 0.5	0 NOK with p = 0.5 800 NOK with p = 0.5	0 NOK with p = 0.5 800 NOK with p = 0.5

If you choose alternative B in a given situation, the computer will select with random and with equal probability a value of 0 or 800 NOK. The situations will be presented in randomized order, that is, they will not necessarily be presented in the order they appear in this table.

Overview of Phase 2
Phase 2 of the experiment concerns the distribution of earnings from Phase 1. Details of the second phase will be provided after the first phase is complete.

When you logon to the experiment, you will be informed whether you are a Type I or Type II Person. Please follow the instructions on your screen.

This concludes the introduction. Throughout the experiment we will update progress on the experiment on the status page, which is displayed on the screen. If there are any questions now or at any point in the experiment, please raise your hand, and one of us will approach you individually.

Please enter the following code on your computer: XXX, and press the button to continue. You should then just wait until everyone has registered.

Everyone has now registered, and in moment you will automatically be transferred to a page that informs you whether you have been randomly selected to be a Type I or Type II Person. If you have been selected to be a Type II Person, please press the button and sit quietly without talking until you are asked to continue.

If you have been selected to be a Type I Person, please press the button to continue to your first investment situation. When you are finished with the first situation, press the button and continue in this manner until you have made decisions in all four situations. Then please sit quietly without talking until you are asked to continue.

Phase 2 Instructions

Distribution Phase
Phase 2 is the distribution phase. In this phase, both Type I and Type II Persons will make decisions about the distribution of earnings from Phase 1. Every participant will make decisions in different distributional situations involving two Type I Persons who are anonymously matched to form a pair. The task in each distributional situation is to distribute the sum of earnings of these two persons from one of their four investment situations.

Decisions of Type I Persons
If you are a Type I Person, you will be asked to make choices in a total of eight different distributional situations. In each distributional situation, you will be *randomly* matched with another Type I Person. You will then be asked to distribute the sum of what you earned and what the person you are matched with earned in one of the four investment situations. Before you decide how you want to distribute the money, you will both be informed about what alternatives the two of you faced in that particular investment situation, the decision you and the other person made in that situation, and the outcome for each of you.

Decisions of Type II Persons
If you are a Type II Person, you will also be asked to make choices in a total of eight different distributional situations that involve only Type I Persons but not yourself. In each distributional situation, you will be *randomly* matched with a pair consisting of two Type I Persons. You will then be asked to distribute the sum of what the two Type I Persons earned in one of the four investment situations. Before you decide how you want to distribute the money, you will be informed about what alternatives the two Type I Persons faced in that particular investment situation, the decisions they made in that situation, and the outcome for each of them.

Payments to Type II Persons
All Type II Persons will be paid the same fixed sum unrelated to their decisions about the distribution of earnings among Type I Persons. If you are a Type II Person, the amount of your fixed payment will appear on your screen before you make your decision.

Payments to Type I Persons

If you are a Type I Person, payments are determined in the following way. For each distributional situation, at most three proposals will be made, one by each of the two Type I Persons and one by a Type II Person. When all Type I and Type II Persons have made their decisions, the computer will randomly select one of the situations you have participated in and will randomly select one of the proposals in that situation as the one that will determine the payments to you.

When the experiment is finished, you will be assigned a payment code, which will be regarded as an identification card for receiving anonymously your payment for the experiment.

In a moment, everyone will be taken automatically to the first distribution situation. When that occurs, you may begin making your decisions. When you are finished with the first decision, continue to the next one until you have completed making all distribution decisions. Then go on to review and confirm your choices. You will be given the opportunity to revise your choices. You have completed the distribution phase when you have confirmed all of your choices. Then, please sit quietly until everyone has completed this phase.

Everyone has now completed the distribution phase. In a moment, you will be moved automatically to a page where you will be shown your payment details. You can then move to answer a few questions. When you are finished answering the questions, you can go on to obtain your payment code. You should write this payment code on the payment form in your folder. It is important that you fill in the correct payment code. Please sit quietly until you are notified that you may leave.

In order to receive your payment, you must complete the payment form, put it in the envelope, and return it. You may either leave the envelope in the box before you leave, or you may put it in the mail. If you wish to mail it, we can provide you with a stamp now.

You may now leave when you are ready. Thanks for participating in the experiment.