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The Role of Equality and Efficiency  
in Social Preferences

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# The Role of Equality and Efficiency in Social Preferences\*

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Abstract: Engelmann and Strobel (AER 2004) claim that a combination of efficiency seeking and minmax preferences dominates inequity aversion in simple dictator games. This result relies on a strong subject pool effect. The participants of their experiments were undergraduate students of economics and business administration who self-selected into their field of study and learned early on that efficiency is desirable. We show that for non-economists the preference for efficiency is much less pronounced. We also find a gender effect indicating that women are more egalitarian than men. However, perhaps surprisingly, the dominance of equality over efficiency is unrelated to political attitudes.

Keywords: Social Preferences, Inequity Aversion, Efficiency Preferences,

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## Introduction

There is now considerable evidence indicating that many people are not only interested in their own material payoffs but that they are motivated by “social” concerns as well (Camerer 2003). Experimental and field evidence suggest that the existence of people exhibiting social preferences may have a profound impact on incentive provision, contract formation, organizations, and markets (Fehr and Schmidt 2003a). A major puzzle in the literature on social preferences concerns the fact that a large majority of subjects behaves as if completely self-interested in some circumstances, such as in competitive experimental markets with standardized goods or in the final rounds of public goods experiments, while social concerns seem to motivate a large majority of subjects in other circumstances, e.g. in competitive markets with incomplete contracts or in public goods experiments with punishment opportunities. Recently developed models of inequity aversion (Bolton and Ockenfels 2000, Fehr and Schmidt 1999) assume the existence of a heterogeneous population of selfish and inequity averse subjects, thus providing an explanation for these puzzling facts. Engelmann and Strobel (2004, henceforth E&S) question the relevance of inequity aversion in simple dictator game experiments in a recent paper<sup>1</sup>, claiming that a combination of a preference for efficiency<sup>2</sup> and a Rawlsian<sup>3</sup> motive for helping the least well-off is more important than inequity aversion.

In this paper, we show that Engelmann and Strobel overstate the relevance of efficiency motives. The participants of the E&S experiments were undergraduate students of economics and business administration. These subjects self-selected into their field of study (economics) and learned early in their studies that efficiency is something desirable. Non-economists, however, may value efficiency much less than economists do. We replicated the most relevant experiments E&S conducted with various subject pools and

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<sup>1</sup> A dictator game is a non-strategic game in which only one subject (the dictator) makes a decision that affects the payoffs of several people. In the E&S experiments, the dictator decides on the material payoff two other subjects receive, while the dictator’s own monetary payoff is constant or varies little. E&S refer to this special class of dictator games as “simple distribution games”.

<sup>2</sup> “Efficiency” in Engelmann and Strobl (2004) is not defined as Pareto-efficiency but as surplus maximization. Thus, any subject motivated by efficiency concerns values the total monetary payoff for the group positively in the subject's utility function. We stick to this use of the term efficiency to prevent confusion.

<sup>3</sup> Rawls (1973) argues that if people had to decide about the allocation of all resources and opportunities in society without any knowledge about what their own role in this society is going to be (i.e. behind a “veil of ignorance”) they would unanimously agree on an allocation scheme that maximizes the well being of the least well off, in particular when it comes to the allocation of “basic goods” such as education, health care, etc. In the following we will call the desire to maximize the payoff of the poorest people “Rawlsian” or “maximin” preferences.

are able to show that the dominance of the efficiency motive over the equity motive is restricted to students of economics and business administration. Students from various other disciplines, adult academics, and a sample of non-academic employees value equality much more highly than efficiency.

This raises the question whether there are other subject characteristics such as gender or the political attitudes that affect the preferences for efficiency versus equality. We find a non-negligible gender effect indicating that women are more egalitarian than men. However, perhaps surprisingly, the dominance of equality over efficiency is unrelated to political attitudes, i.e., subjects who vote for right wing parties and favor right wing political attitudes are as likely to favor the equality motive as are subjects with left wing attitudes.

The strong subject pool effects show that the efficiency motive in non-strategic dictator games is far less important than E&S suggest. The question remains whether efficiency concerns are important in strategic games. In the final part of the paper we mention evidence suggesting that the efficiency motive plays no significant role in strategic games.

### **I. Economists versus Non-Economists**

The most interesting results of E&S concern their treatments Ey and P that are designed to discriminate between preferences for efficiency, the Rawlsian maximin motive, and inequity aversion (see Table 1 below). In both treatments, Person 2 is the decision maker (dictator) who can choose between allocations A, B, and C. Note that own choices never affect Person 2's payoff. Person 2 can redistribute income from the rich (Person 1) to the poor (Person 3) in both treatments by choosing allocations B or C instead of allocation A. However, choices B and C involve a relatively high efficiency loss. In treatment Ey, every additional money unit that is given to the poor person reduces the rich person's income by 4 money units, while the rich person suffers an income reduction of 3 units if the poor person's income is increased by one unit in treatment P. Treatment P is particularly important because the decision maker (Person 2) always earns the lowest income and the various choices cannot change this. Thus, Rawlsian preferences play no role at all here. Therefore, treatment P constitutes a clean test of the relevance of inequity aversion in comparison to the efficiency motive. Moreover, a choice of the efficient allocation A in treatment P not only constitutes evidence against specific functional form assumptions

(like piece-wise linearity or positional asymmetry, meaning that subjects prefer advantageous inequity to disadvantageous inequity) in the Fehr-Schmidt approach, but also against general non-linear versions of inequity aversion as developed by Neilson (2002).<sup>4</sup>

We received a first inkling that subject pool effects might have influenced the E&S results when we tried to replicate them with a group of academics (aged 30 to 65) who were fellows at the Institute for Advanced Study in Berlin. Every year, this institute hosts roughly 50 scientists from all over the world, specialized in many different disciplines including biology, neuroscience, zoology, the social sciences, and the humanities. Only one economist was in this subject pool. We solicited unpaid, anonymous responses from 45 scientists in treatments Ey and P. The anonymity requirement ensured that the experimenter could not identify the subjects' individual choices. In sharp contrast to the E&S results, a large majority (69%) of the scientists were willing to redistribute income from the rich to the poor in the Ey treatment, even though this involved a high efficiency loss. Only 22% preferred the efficient yet inequitable allocation A. Treatment P revealed a similar pattern, where only 20% of the subjects favored the efficient allocation A, whereas 60% chose the allocation predicted by inequity aversion. These results from a sample of scientists from non-economic disciplines led us to examine the subject pool issue in more depth.

We examined the subject pool hypothesis more rigorously by eliciting responses from two different subject pools from the University of Munich<sup>5</sup> in a first wave of paid experiments. The first subject pool consisted of 109 first year undergraduate students in economics and business administration (henceforth called "economists"), while the second subject pool was made up of 83 first and second year undergraduates from other disciplines, mostly the social sciences (henceforth called "non-economists"). The subjects had to make a decision in both of the distribution games discussed above. The results of these experiments are reported in Table 1. For convenience, we also show the results from the E&S experiments in panel (A) of this table.

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<sup>4</sup> The inequity aversion approach by Fehr and Schmidt is fully compatible with the evidence in many of the other games E&S conducted (in particular, in their envy games) if one allows for non-linear forms of inequity aversion and gives up the positional asymmetry assumption.

<sup>5</sup> In all experiments reported in this paper, subjects made their decisions anonymously, they were paid in private, and there was no role uncertainty, i.e., the decision makers knew that they were in the role of person 2.

TABLE 1 – SUBJECT POOL EFFECTS: ECONOMISTS VERSUS NON-ECONOMISTS

Allocation	Treatment Ey			Treatment P		
	A	B	C	A	B	C
Person 1 Payoff	<b>21</b>	<b>17</b>	<b>13</b>	<b>14</b>	<b>11</b>	<b>8</b>
Person 2 Payoff	<b>9</b>	<b>9</b>	<b>9</b>	<b>4</b>	<b>4</b>	<b>4</b>
Person 3 Payoff	<b>3</b>	<b>4</b>	<b>5</b>	<b>5</b>	<b>6</b>	<b>7</b>
Total Payoff	33	30	27	23	21	19
Average Payoff of 1 and 3	12	10.5	9	9.5	8.5	7.5
Efficiency prediction	A			A		
Inequity aversion prediction (BO & FS)			C			C
Rawlsian maximin prediction			C	A	or B	or C
<b>Engelmann &amp; Strobel results</b>						
<b>Economists: Humboldt Univ. Berlin</b>						
(A) Choices (absolut)	12	7	11	18	2	10
Choices (percent)	<b>40</b>	<b>23.3</b>	<b>36.7</b>	<b>60</b>	<b>6.7</b>	<b>33.3</b>
<b>Economists: University of Munich</b>						
(B) Choices (absolut)	72	12	25	63	16	30
Choices (percent)	<b>66.1</b>	<b>11</b>	<b>22.9</b>	<b>57.8</b>	<b>14.7</b>	<b>27.5</b>
<b>Non-Economists: University of Munich</b>						
(C) Choices (absolut)	22	13	48	21	17	45
Choices (percent)	<b>26.5</b>	<b>15.7</b>	<b>57.8</b>	<b>25.3</b>	<b>20.5</b>	<b>54.2</b>
<b>Non-Economists: Zurich, Switzerland</b>						
(D) Choices (absolut)				8	8	20
Choices (percent)				<b>22.2</b>	<b>22.2</b>	<b>55.6</b>
<b>Economists: Zurich, Switzerland</b>						
(E) Choices (absolut)	31	9	18	31	9	18
Choices (percent)	<b>53.5</b>	<b>15.5</b>	<b>31</b>	<b>53.5</b>	<b>15.5</b>	<b>31</b>
<b>Non-Economists: Zurich, Switzerland</b>						
(F) Choices (absolut)	61	23	78	53	25	84
Choices (percent)	<b>37.7</b>	<b>14.2</b>	<b>48.1</b>	<b>32.7</b>	<b>15.4</b>	<b>51.9</b>

The subject pool effects displayed in Table 1 are striking. The Munich economics and business administration students corroborate the main E&S result, confirming that preferences for efficiency play a major role among economists (compare panels A and B of

Table 1). 66.1% of the economists opted for the efficient but most inequalitarian allocation A in treatment Ey, even exceeding the 40% in the E&S study. The efficiency advantage of allocation A is somewhat lower in game P, and the fraction of economists opting for the efficient allocation A decreases slightly to 57.8%, very similar to the E&S results. The behavior of non-economists from the University of Munich contrasts sharply with these results, however (see panel C of Table 1). In games Ey and P, the non-economists chose the inefficient allocation C as predicted by inequity aversion at the rate of 57.8% and 54.2%, respectively, while only 25-27% opted for the efficient allocation A. The differences between the non-economists and the economists from the University of Munich are statistically highly significant, both in treatment Ey and treatment P ( $p < 0.001$  in each treatment, Fisher exact test).

An additional paid experiment with non-economists (college students) in Zurich, Switzerland, who only participated in treatment P, further confirms the robustness of the subject pool effect. A comparison of panels C and D of Table 1 shows that these students' choices were almost identical to those of the non-economists from the University of Munich ( $p > 0.93$ , Fisher exact test). Only 22% choose the efficient allocation A, while 55.6% choose the allocation predicted by inequity aversion. The choices of the non-economists in Munich and Zurich also differ significantly from the choices of the E&S subjects ( $p < 0.001$ , Fisher exact test), further supporting a strong subject pool effect.

Since the available allocations are ordered from “most efficient and least egalitarian” (i.e. allocation A) to “least efficient and most egalitarian” (i.e. allocation C), it is also possible to conduct a statistical analysis on the basis of ordered probit regressions. The dependent variable takes on the value 0 if allocation A is chosen, the value 1 if B is chosen, and the value 2 if allocation C is chosen. We estimated the marginal effect of a dummy variable for economists on the probability of choosing the “least efficient and most egalitarian” allocation C. This dummy is highly significant ( $p < 0.001$ ) and negative in both games, indicating that the probability of an economist choosing C is 0.30 smaller in treatment Ey and 0.33 less in treatment P, when compared with the probabilities for non-economists<sup>6</sup>.

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<sup>6</sup> Among non-economists, the baseline probability for choosing allocation C is 0.57 in treatment Ey and 0.58 in treatment P.

## II. The Impact of Political Attitudes and Gender on Social Preferences

Are subjects' social preferences related to their political opinions and to gender? One might conjecture that subjects with a more right wing political attitude are less in favor of equality and prefer the more efficient allocations. To assess the impact of political attitude on social preferences, we conducted additional experiments where – after subjects had made their choices in treatments Ey and P – we collected information about their political attitudes and how they voted in the last general election. We also collected information about their age, gender, and their membership in organizations (such as sports clubs or local charities). We recruited 68 third semester students of economics or business administration from the University of Zurich and 100 third semester students from other faculties (law and medicine) for these experiments and an additional 62 non-economists from outside the university. These last subjects were non-management employees of banks and other financial institutions. They had no academic education, but all of them had completed an apprenticeship for their current job.

The subjects' political preferences were elicited in two ways. First, subjects ranked themselves on a scale from 0 to 10 where 0 indicates the most extreme left wing position and 10 indicates the most extreme right wing position. This self-report measure of political attitudes is now widely used in representative surveys in Switzerland. In addition, we asked subjects how they voted in the last national election. Both economists and non-economists participated in these elections at a rate of approximately 70%. For these subjects, we computed a Spearman rank correlation between their self-reported political attitudes on the 0-10 scale and their votes for left, center, and right parties.<sup>7</sup> This correlation is 0.78 ( $p < 0.001$ ), indicating that subjects' ranking on the left-right scale and their actual voting behavior are consistent.

The results of our new experiments are displayed in panels E and F of Table 1 and in Table 2. We first tested for differences between students from non-economic disciplines and employees. It turns out that the behavior of these two groups is very similar, and confirmed by statistical tests ( $p = 0.775$  in the Ey treatment,  $p = 0.739$  in the P treatment, Fisher exact test). Therefore, we pooled their data in panel F of Table 1. The table shows that both in treatment Ey and P, 53.5% of the economists prefer the efficient allocation A whereas only 31% preferred the egalitarian allocation C (see panel E of the table).

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<sup>7</sup> In these calculations, we treat the social democrats and the green party as left-wing parties, the liberal party (FDP), the Christian democrats (CVP) and the European people's party (EVP) are center parties, and the Swiss people's party (SVP) is a right wing party. This classification is also used by political scientists.



However, this pattern is reversed among the non-economists (panel F of Table 1). A majority of non-economists (51.9%) prefers the most egalitarian allocation C and only 32.7% choose the efficient allocation A in treatment P. Similarly, a relative majority of the non-economists (48.1%) prefer allocation C in treatment Ey and only 37.7% choose the efficient allocation A.

These differences in social preferences are associated with small but insignificant differences in self-reported political attitudes ( $p = 0.41$ , Mann Whitney test). On average, economists score 5.28 on the left-right scale, whereas the non-economists are somewhat more left wing and score 4.95. These average numbers hide, however, strong individual variation both within the group of economists as well as in the group of non-economists. It is therefore interesting to examine whether individual differences in political attitude can explain the individual variation in social preferences across subjects.

In Table 2, we report the marginal effects of ordered probit regressions where the choice of the most unequal allocation A is represented with 0, allocation B with 1, and the egalitarian allocation C with 2. As explanatory variables, we included a dummy variable for economists (1 for economist), a gender dummy (1 for women), the political attitude on the left-right scale, age, and a dummy for whether the subject is a member in an organization or club.<sup>8</sup> Regression (1) is based on data from the Ey treatment and regression (2) uses the data from the P treatment. We pool the data from both treatments in regression (3) and control for the dependence of subjects' decisions across treatments by clustering on subjects. We also control for a treatment effect in regression (3) by including a dummy for the Ey treatment.

The most important fact stemming from the first three regressions reported in Table 2 is that the marginal effect for the economists' dummy is negative and highly significant even after controlling for political attitudes. In fact, while political attitude has virtually no effect on social preferences, regression (3) shows economists to have an 18 percentage point lower probability of choosing the egalitarian allocation C. Age, membership in organizations, and the Ey-dummy have no significant effects. The gender variable is weakly significant, however, and indicates that women are more egalitarian. If we average over both treatments (i.e. take regression 3), women are roughly 10 percent more likely to choose the egalitarian allocation C.

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<sup>8</sup> We conjectured that subjects who are club members might be more egalitarian. It makes no difference whether we include the dummy or the number of club memberships.

TABLE 2 – IMPACT OF SUBJECT POOL, POLITICAL ATTITUDE AND GENDER

Independent variables	Dependent variable: choices in the distribution game (0=allocation A, 1=allocation B, 2=allocation C)					
	New data			All data		
	(panel E and F in Table 1)			(panels B-F in Table 1)		
	(1)	(2)	(3)	(4)	(5)	(6)
	Ey	P	Ey&P	Ey	P	Ey&P
Dummy for economist (1 = economist)	-0.158** (0.069)	-0.198*** (0.069)	-0.177*** (0.060)	-0.258*** (0.043)	-0.242*** (0.043)	-0.246*** (0.038)
Gender dummy (1 = women)	0.066 (0.066)	0.125* (0.066)	0.095* (0.058)	0.091* (0.048)	0.086* (0.045)	0.101** (0.040)
Political attitude (0=left, 10=right)	-0.015 (0.017)	-0.003 (0.019)	-0.009 (0.015)			
Age	0.007 (0.019)	-0.009 (0.019)	-0.001 (0.017)			
Dummy for membership in organizations	0.073 (0.068)	0.108 (0.069)	0.090 (0.059)			
Dummy for Ey-treatment			-0.035 (0.034)			-0.037 (0.025)
Pr (C) if a non-economist	0.518	0.482	0.500	0.530	0.513	0.518
Number of observations	216	216	432	443	407	850
Cluster per Subjects	no	no	yes	no	no	yes
Prob > chi2	0.0072	0.1035	0.0068	0.0000	0.0000	0.0000
Pseudo R <sup>2</sup>	0.0362	0.0211	0.0278	0.0391	0.0468	0.0442

Note: The table reports the marginal effects of the different variables on choosing the egalitarian allocation C. Numbers in parentheses denote the standard error of the marginal effects. The marginal effects are evaluated at the point where the dummy for economists is set at zero. The estimated baseline probability of choosing allocation C for non-economists is given in the row “Pr(C) if being a non-economist”. \*, \*\* and \*\*\* indicate that the coefficient is statistically different from zero above the 0.1, 0.05 and the 0.01 significance levels, respectively.

We pooled all data from our experiments in regressions 4 – 6 to estimate the overall impact of the economists' dummy and a gender dummy on social preferences<sup>9</sup>. The results of these regressions indicate that economists are approximately 25 percentage points less likely to choose the egalitarian allocation C, while women are more likely to choose C by roughly 10 percentage points. Note also that if we pool the data from both treatments (regression 6) the gender dummy is significant at the 5 percent level.

### III. Social Preferences in Strategic Contexts

The E&S experiments all involve dictator games without strategic interaction. This raises the question whether concerns for efficiency play a role in strategic games. A large amount of evidence suggests that other concerns dominate the efficiency motive in strategic games. The ultimatum game illustrates this phenomenon clearly. Efficiency would imply that the responder should accept any positive offer; however, overwhelming evidence shows that low offers are often rejected, suggesting that efficiency seeking is of little importance in the ultimatum game. Similarly, efficiency in (typical) linear public good experiments would require that players contribute their entire endowments to the public good. While some subjects contribute significant amounts in the first rounds of these experiments, the level of cooperation frequently declines over time. A large majority of subjects contributes very little or free rides completely in the final round. This evidence suggests that negative reciprocity – triggered by unfair offers or by the free riding of other group members – dominates efficiency concerns.<sup>10</sup>

We hypothesize that there is a fundamental discontinuity between social preferences in non-strategic and in strategic games. We define a strategic game as one where at least two players can affect each others' payoffs by their actions and there are (partial) conflicts of interest. Therefore, the players tend to see each other as opponents. Only one player makes a decision in a non-strategic dictator game, however, so there is no rivalry and a more charitable frame of mind is triggered. Self-centered notions of fairness are likely to

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<sup>9</sup> We took all data reported in panels B – F in Table 1. Since we do not have values for age, political attitude and membership in organizations in the experiments reported in panels B – D we cannot use these variables in the regressions 4 – 6.

<sup>10</sup> Positive reciprocity or inequity aversion also dominates the efficiency motive in gift exchange games. In many gift exchange experiments, the employer's payoff is given by  $\pi^e = (v - w)e$  and the worker's payoff is given by  $\pi^w = w - c(e)$ .  $v > 0$  is a constant,  $e$  denotes the effort level,  $w$  the wage level and  $c(e)$  the effort cost. These payoff functions imply that any increase in profit due to increasing effort declines as  $w$  rises. Thus, the marginal efficiency gains from an effort increase are smaller at higher wages, implying a negative relation between effort and wages if workers care for efficiency. However, the stylized fact is that effort varies positively with wages in the gift exchange game.

be more salient if a decision maker views the other player as an opponent, while the notion of helping the group or helping the poor is likely to be more salient if all the other players are at the decision maker's mercy. If this conjecture is true, any attempt to generalize social preferences from a non-strategic to a strategic context is problematic.

Several pieces of evidence support our conjecture. In an earlier version of this paper (Fehr and Schmidt 2003b), we reported the results of an experiment in which economists participated in an ultimatum game prior to playing treatments Ey and P. We conjectured that the saliency of self-centered fairness in the ultimatum game will spill over to the subsequent dictator game, rendering the efficiency motive less important. This is indeed what we observed: the choice of the efficient allocation A in game Ey decreased significantly by 25 percentage points if the subjects played the ultimatum game prior to the dictator game and the choice of allocation A decreased by 15 percentage points in game P.

There is also evidence suggesting that the Rawlsian preference to help the worst off in the group does not play a significant role in strategic games. Güth and van Damme (1998) conducted a three-person experiment combining an ultimatum and a dictator game: at stage 1, player one has to make a proposal  $(x,y,z)$  on how to allocate a given sum of money between himself and players two and three. Player 2 then decides whether to accept or reject the proposal. If he accepts, the proposal is implemented, otherwise all players earn zero. Player 3 remains inactive and cannot affect the final outcome. Güth and van Damme report that the proposer (player 1) allocates only marginal amounts to the dummy (player 3). Player 2 also does not seem to care about player 3. Even though some of the proposals are rejected, not a single rejection can be attributed to an unfair share offered to player 3. These observations contradict maximin preferences, while they are consistent with models of inequity aversion (see Fehr and Schmidt 2003a).<sup>11</sup>

#### IV. Conclusions

Recent evidence by Engelmann and Strobel (2004) seems to suggest that preferences for efficiency and for the welfare of the least well off are quantitatively more important than

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<sup>11</sup> Frechette, Kagel, and Lehrer (2003) provide another striking example of the neglect of weak players' interests in strategic interactions. In their experiments, one player in a group of five can make a proposal of how to allocate a fixed sum of money among the group. Then the players vote on the proposal using majority rule, i.e., the support of 3 players is sufficient for the implementation of the proposal. In 65% of the cases, the proposals offered a zero payoff for two of the five players, completely neglecting the interests of members outside the winning coalition. Moreover, these proposals received the support of the majority in most cases. Thus, Rawlsian preferences seem to play a limited role in this environment.

inequity aversion in dictator games. However, the subject pool in their experiments consists exclusively of economists. Here we have shown that the dominance of the efficiency motive over the equity motive is limited to economists, whereas various groups of non-economists – ranging from academic researchers to students of many other disciplines to non-academic employees of banks and financial institutions – show the opposite pattern. On average, more than 50% of the non-economists prefer the most inefficient and most egalitarian distribution among the available payoff allocations; the probability of an economist choosing this allocation is 25 percentage points lower than that of a non-economist. We have also shown that subjects' political preferences do not affect their social preferences for efficiency and equity. Subjects with a right wing political attitude are as likely to choose the egalitarian allocation as left wing subjects. Women, however, favor the egalitarian allocation more than men do.

Based on our experiments, we conclude that preferences for equity are important in non-strategic dictator games. Furthermore, we argue that concerns for efficiency (and Rawlsian motives) play only a minor role in many strategic games. However, the exact effect of the strategic nature of a game on the subjects' preferences is still an open question that has to be addressed in future research.

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