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The Role of Equality, Efficiency, and Rawlsian Motives in Social Preferences: A Reply to Engelmann and Strobel

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The Role of Equality, Efficiency, and Rawlsian Motives in Social Preferences: A Reply to Engelmann and Strobel[1]

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Abstract: In a recent paper Engelmann and Strobl claim that a combination of a preference for efficiency and a Rawlsian motive for helping the least well-off is far more important than inequity aversion. Here we show that the relevance of the efficiency motive is largely restricted to students of economics and business administration. Students from other disciplines, adult academics from various disciplines and senior citizens value equality much higher than efficiency. Moreover, there is rather strong evidence that the relevance of the efficiency motive and the Rawlsian motive is largely restricted to non-strategic interactions.

Keywords: Social Preferences, Inequity Aversion, Efficiency preferences, Rawlsian Preferences

JEL No. C7, C91, C92, D63, D64

[1] We would like to thank Susanne Kremhelmer and Michael Näf for their excellent research assistance.

There is now considerable evidence indicating that many people are not only interested in their own material payoff 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 2003). A major puzzle in the literature on social preferences concerns the fact that in some circumstances – e.g. in competitive experimental markets with standardized goods or in the final rounds of public goods experiments – a large majority of subjects behave as if completely self-interested, while in other circumstances – e.g. in competitive markets with incomplete contracts or in public goods experiments with punishment opportunities – a large majority of subjects behave as if motivated by social concerns. 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 (2003), however, question the relevance of inequity aversion. They claim that a combination of a preference for efficiency[2] and a Rawlsian[3] motive for helping the least well-off is far more important than inequity aversion. Very few observed choices in their experiments are consistent with inequity aversion as modeled by Bolton and Ockenfels (2000). The Fehr and Schmidt (1999) version of inequity aversion does better, but only when predicting the same choices as the Rawlsian maximin principle.

Engelmann and Strobel (E&S) designed, in our opinion, an interesting class of experiments and have raised an issue of substantial importance with potentially far-reaching implications. Their claim that a large number of subjects are directly motivated by efficiency concerns is particularly intriguing for economists who have previously thought of "efficiency" exclusively as a normative principle. Likewise, welfare economists and philosophers have thought of the Rawlsian maximin principle mainly in normative terms. However, we believe that efficiency and Rawlsian concerns are substantially less important than suggested by E&S for several reasons:

[2] "Efficiency" in Engelmann and Strobl (2003) 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.

[3] 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.

1. The participants of the E&S experiments were undergraduate students of economics and business administration. The subjects of the experiments self-selected into the study of economics and were taught that efficiency is something desirable from the very beginning of their studies. Thus, non-economists may value efficiency far less and equity far more than do economists. In fact, our own experiments presented below strongly indicate that this is indeed the case.
2. The main purpose for the existing models of inequity aversion has been the modeling of behavior in strategic interactions. However, the experiments conducted by E&S consider situations without a strategic context. Furthermore, the decisions do not affect the decision maker's monetary payoff in most of the experiments. The decision maker is placed in the situation of a neutral arbitrator who may feel that he is supposed to implement the "right" allocation from a social perspective rather than from his own point of view. We believe that the absence of a strategic context may have favored the efficiency motive and we provide evidence for this claim.
3.. It is important to distinguish between the general notion of inequity aversion and the specific (linear) functional form assumed in Fehr and Schmidt (1999) that has been specifically chosen for reasons of tractability and simplicity. While the Bolton and Ockenfels version of inequity aversion is indeed not capable of capturing concerns for the poor, we will argue below that most of the E&S evidence in favor of the maximin principle is compatible with non-linear versions of the Fehr-Schmidt model.[4]

In the following we discuss these concerns in more detail and report the results of new experiments that provide support for claims 1 and 2 above. We conclude with some general remarks about the interpretation of models of social preferences.

I. Economists versus Non-Economists

The most interesting results of Engelmann and Strobel (E&S) concern the 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 treatment Ey, the decision maker (Person 2) can redistribute income from the rich to the poor at a relatively high efficiency cost. Treatment P is particularly important because Rawlsian preferences play no role at all here. Therefore, treatment P constitutes a clean test of the relevance of inequity aversion in

[4] Neilson (2002) provides an axiomatic characterization of non-linear inequity aversion.

the sense of F&S or B&O relative to the efficiency motive. Moreover, a choice of the efficient allocation A in treatment P does not only constitute evidence against the linear version of the Fehr-Schmidt utility function but also against general non-linear (concave) versions of inequity aversion.

We received a first inkling that subject pool effects might have affected the results of E&S when we tried to replicate their results with a group of scientists (aged 30 to 65) who were fellows at the Institute for Advanced Study in Berlin. This institute hosts roughly 50 scientists annually from all over the world and from 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 these people in treatments Ey and P. The anonymity requirement ensured that the experimenter could not identify the subjects' individual choices. The results are presented in Table 1. In sharp contrast to the E&S results, a large majority (70%) 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 cost. Only 21% preferred the efficient yet inequitable allocation A. A similar pattern was obtained in treatment P. Only 20% of the subjects favored the efficient allocation A, whereas 60% choose the allocation predicted by inequity aversion.

We conducted paid experiments using two different subject pools from the University of Munich[5], in order to examine the subject pool hypothesis more rigorously. 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 in the social sciences (henceforth called "non-economists"). Each subject had to make a decision for both of the distribution games discussed above. The results of these experiments, reported in Table 1, are striking. The Munich economics and business administration students corroborate the main result of E&S, confirming that preferences for efficiency do play an important role. In Ey, where efficiency predicts allocation A while inequity aversion and maximin predict allocation C, 66.1% of the economists opted for the efficient allocation. This percentage is even larger than the 40% in the E&S study. In game P, the efficiency advantage of allocation A is somewhat lower and the fraction of economists opting for the efficient allocation A is slightly reduced to 57.8%, very similar to the results of E&S.

[5] A more detailed description of these and several related experiments can be found in Kremhelmer and Schmidt (2003).

These results are completely reversed, however, if we look at the behavior of non-economists from the University of Munich. In games Ey and P, the non-economists chose the inefficient allocation C at the rate of 57.8% and 54.2%, respectively, as predicted by inequity aversion, while only 25-26% opted for the efficient allocation A. The different choices made by economists versus non-economists (both in Munich and Berlin) are statistically highly significant for both games ($p < 0.001$, Chi-Square test).

Table 1: Subject Pool Effects

	Ey			P		
Allocation	**A**	**B**	**C**	**A**	**B**	**C**
Person 1 Payoff	**21**	**17**	**13**	**14**	**11**	**8**
Person 2 Payoff	**9**	**9**	**9**	**4**	**4**	**4**
Person 3 Payoff	**3**	**4**	**5**	**5**	**6**	**7**
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	A			A		
Inequity Aversion (F&S and B&O)			C			C
Rawlsian maximin rule			C	A	B	or C
Engelmann & Strobel results						
Choices (abs. number)	12	7	11	18	2	10
Choices (%)	**40**	**23.3**	**36.7**	**60**	**6.7**	**33.3**
Our results: non-economists Institute for Advanced Study in Berlin						
Choices (abs. number)	9	4	30	9	9	27
Choices (%)	**21**	**9**	**70**	**20**	**20**	**60**
Our results: economists University of Munich						
Choices (abs. number)	72	12	25	63	16	30
Choices (%)	**66.1**	**11**	**22.9**	**57.8**	**14.7**	**27.5**
Our results: non-economists University of Munich						
Choices (abs. number)	22	13	48	21	17	45
Choices (%)	**26.5**	**15.7**	**57.8**	**25.3**	**20.5**	**54.2**
Our results: non-economists Zürich, Switzerland						
Choices (abs. number)				8	8	20
Choices (%)				**22.2**	**22.2**	**55.6**

The robustness of the subject pool effect is further confirmed by an additional paid experiment with non-economists (college students) in Zurich, Switzerland, who only

participated in treatment P.[6] Table 1 shows that these students' choices were almost identical to those of the non-economists from the University of Munich ($p > 0.92$, Chi-square test). Only 22% choose the efficient allocation A while 55.6% choose the allocation predicted by inequity aversion.[7] All of these results strongly indicate that subject pool effects play an important role in the distribution games designed by E&S.[8]

II. Social Preferences in Strategic and Non-Strategic Contexts

The E&S experiments are all one-person-decision problems without strategic interaction. Their result, demonstrating that efficiency seeking is an important motivational force, is in striking contrast to well established experimental results in strategic games. A classical example is the ultimatum game. Efficiency would imply that the responder would accept any positive offer; however, there is overwhelming evidence that low offers are often rejected. This suggests that efficiency seeking is of little importance in the ultimatum game. Similarly, in most linear public good experiments, efficiency would imply that players contribute their entire endowment to the public good. While some subjects contribute significant amounts in the first rounds of these experiments, the level of cooperation typically declines over time. A large majority of subjects often contributes little or free-rides completely in the final round.

Gift exchange and trust games are an interesting class of games in which subjects can take actions that increase efficiency at their own expense. In the gift exchange game, a subject in the role of a "worker" who accepts a wage offered by an "employer" can increase the total surplus by choosing a higher "effort level". In a typical gift exchange game, the worker can increase the employer's payoff by two to five dollars for every dollar that he incurs in terms of "effort costs".[9] Therefore, if workers seek efficiency, they should choose the maximum effort level regardless of the wage the employer offers. However, for most actual wage offers, the maximum effort level would generate a payoff for the employer that is much higher than

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[6] Michael Naef conducted this experiment (2002) for his master's thesis.

[7] The existence of strong subject pool effects is also confirmed by the responses of 25 German senior citizens in treatment Ey and P in an unpaid experiment that was conducted while they attended a public lecture at the University of Munich. In game Ey only 12% of the senior citizens choose the efficient allocation A, while 60% opt for allocation C that is predicted by inequity aversion and maximin. In game P, 12% again chose the efficient allocation A while 56% opted for allocation C as predicted by inequity aversion.

[8] The choices of the non-economists in Munich and Zürich are also significantly different from the choices of the E&S subjects ($p < 0.001$, Chi-square test).

[9] Let $v > 0$ be a constant, let e denote the effort level, w the wage level and c(e) the effort cost. In most gift exchange experiments, the employer's payoff is either given by $\pi^e = (v - w)e$ or by $\pi^e = ve - w$; the worker's payoff is given by $\pi^w = w - c(e)$. The time structure of a bilateral gift exchange game is as follows: the employer offers a wage that can be accepted or rejected by the worker. If accepted, the worker chooses an effort level and payoffs are made.

that of the worker, violating the equity constraint. Inequity averse workers will, therefore, choose lower effort levels that do not violate the equity constraint. In fact, workers choose effort levels that violate the equity constraint in less than 2 percent of the observations.[10] Gneezy (2003) recently confirmed the relevance of the equity constraint by conducting gift exchange games with a high and a low marginal return to effort, where the efficiency gains from an effort increase were much greater in the high return condition than in the low. Therefore, the equity constraint already becomes binding at a lower effort level in the high return condition. Thus, efficiency-seeking workers should provide more effort in the high-return condition whereas inequity averse workers are predicted to provide less effort in this condition. Gneezy's results indeed show that effort is significantly lower in the high-return condition. [11]

The evidence from ultimatum, public good, and gift exchange games suggests that there are circumstances in which efficiency seeking plays no or only a small role. We hypothesize that the diminished role of the efficiency motive might be due to the existence of strategic interaction in these games. In a truly strategic game, each player has a non-empty strategy set and can affect at least some of the other players' payoffs. Thus, it seems plausible that players perceive themselves at least partly as "opponents" or as "competitors", rather than as "neutral arbitrators" whose task is to implement a socially desirable payoff allocation. We conjecture that the perception of the other player as an opponent or competitor renders fairness and equity concerns more salient and efficiency concerns less so. In a sense, the players in a strategic game are more likely to demand fairness for themselves, increasing the importance of the fairness motive. If this conjecture is true, the attempt to generalize social preferences from a non-strategic to a strategic context is problematic.

One possibility for testing this conjecture is to conduct a strategic game prior to the E&S distribution games with the same subjects. If the strategic game indeed provokes perceptions of "opposition" or "competitiveness", one can expect that these perceptions will spill over to the distribution game played subsequently. Therefore, we hypothesize that the relative importance of efficiency seeking decreases in a distribution game that is played after a

[10] Note, in addition, that if the employer's payoff function is given by $\pi^e = (v - w)e$, the profit increase due to an effort increase declines if w is higher. Thus, at higher wages the marginal efficiency gains from an effort increase are smaller, implying a negative relation between effort and wages (if utility is an increasing and strictly concave function of the sum of the employer's and the worker's payoff). However, the stylized fact is that effort varies positively with wages in the gift exchange game.

[11] Kagel, Kim and Moser (1995) conducted ultimatum games in which players bargained about chips. They had treatment conditions in which the chips were three times more valuable, in terms of real money, for the responders. Efficiency would require that the proposer give *all* the chips to the responders in these treatments. However, very few proposals violated the equity constraint in dollar terms.

strategic game when compared to the identical game played in isolation. We conducted additional paid experiments in order to test this hypothesis where subjects participated in the distribution games Ey and P after they played a €10 ultimatum game. This experiment was then compared to the previous versions (reported in Table 1) where the two distribution games were played without a prior ultimatum game. We conducted the additional experiments with two new subject pools from the University of Munich, using 170 economists and 77 non-economists. [12]

Table 2: Strategic versus non-strategic contexts

	Ey			**P**		
Allocation	**A**	**B**	**C**	**A**	**B**	**C**
Person 1 Payoff	**21**	**17**	**13**	**14**	**11**	**8**
Person 2 Payoff	**9**	**9**	**9**	**4**	**4**	**4**
Person 3 Payoff	**3**	**4**	**5**	**5**	**6**	**7**
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	A			A		
Inequity Aversion (F&S and B&O)			C			C
Rawlsian maximin rule			C	A	B	or C
Subject pool 1: economists						
without prior ultimatum game						
choices (abs.)	72	12	25	63	16	30
choices (%)	**66.1**	**11**	**22.9**	**57.8**	**14.7**	**27.5**
with prior ultimatum game						
choices (abs.)	69	28	73	73	36	61
choices (%)	**40.6**	**17**	**42.9**	**42.9**	**21.2**	**35.9**
Subject pool 2: non-economists						
without prior ultimatum game						
choices (abs.)	22	13	48	21	17	45
choices (%)	**26.5**	**15.7**	**57.8**	**25.3**	**20.5**	**54.2**
with prior ultimatum game						
choices (abs.)	16	17	44	18	11	48
choices (%)	**20.8**	**22.1**	**57.1**	**23.4**	**14.3**	**62.3**

The results in Table 2 show that the completion of a prior ultimatum game does have a large and significant effect on the economists' choice of the efficient allocation ($p < 0.001$ in

[12] See Kremhelmer and Schmidt (2003) for a more detailed discussion.

game Ey and $p < 0.051$ in game P according to a Chi-square test). In game Ey, the frequency with which allocation A is chosen is reduced by 25.5 percentage points; the reduction is 14.9 percentage points in game P. Moreover, the relative frequency of allocation C, which is predicted by inequity aversion, increases by values between 8.4 and 20 percentage points. Thus, the economists' behavior unambiguously shifts away from the efficient allocation towards the most egalitarian allocation. Table 2 also shows that despite the already infrequent choice of the efficient allocation by the non-economists, there is a further decrease in their preference for efficieny if they play the ultimatum game first. However, this reduction is not statistically significant.

It is also interesting to note that while the behavior in the distribution games differs strongly between the two subject pools, there is not much difference in behavior in the ultimatum games. The average proposal by the economists is 4.42 as compared to 4.27 by the other students. This difference is statistically insignificant. This suggests that the motivational forces in strategic situtions like the ultimatum game are more robust than in distribution games.

III. The Relative Importance of the Rawlsian Motive

E&S conducted several distribution games in which the Rawlsian prediction is in conflict with the F&S prediction as well as the B&O model. In their game R, for instance, the decision maker (i.e., Person 2) always earned 12; she had to decide between allocations A = (11/12/2), B = (8/12/3) and C = (5/12/4). Here the Rawlsian maximin motive predicts allocation C in which the poorest person is better off than in allocations A or B; B&O predict allocation A because in A the average payoff of the two other players is closest to the payoff of the decision-maker; and F&S predict allocation A because it minimizes the sum of payoff differences between the decision maker and the other two persons. Note, however, that the prediction of the F&S model depends crucially on the linearity assumption whereas the B&O model always predicts allocation A. If one allows for strictly concave inequity aversion in the F&S model, larger payoff differences receive disproportionately more weight than do low payoff differences. This means that the incomes of the poorest group members receive more weight, rendering the choice of the allocation C in game R compatible with inequity aversion. Thus, conceptually, motives placing emphasis on helping the poor can be easily integrated into the F&S model.

We doubt, however, that Rawlsian concerns play an important role in strategic interactions at the empirical level.[13] The results of several strategic games indicate that players show little concern for the payoff of the least well off. A salient example is the three-person experiment of Güth and van Damme (1998) that combines an ultimatum and a dictator game: in 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 get 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), and furthermore, player 2 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 the linear F&S model and the B&O model (see Bolton and Ockenfels 2000; Fehr and Schmidt 2003).

Frechette, Kagel, and Lehrer (2003) provide another striking example of the neglect of the interests of weak players 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, in most cases such proposals received the support of the majority. Thus, Rawlsian preferences seem to play little role in this environment.

IV. Summary and Conclusions

The experiments by E&S raise the important question whether concerns for efficiency and the Rawlsian motive to help the least well off are not only important as normative principles but also guide the actual behavior of real people in social interactions. The experiments by E&S suggest that a combination of efficiency and Rawlsian maximin motives, as modeled by Charness and Rabin (2002), do a better job in explaining observed behavior than do models of inequity aversion. However, our experiments show that there are strong subject pool effects: people who are not economists seem to be much less concerned about efficiency and care much more about inequity than do economists, at least in the simple distribution games

[13] We would like to add that there are important non-strategic interactions like, e.g., charitable giving, for which Rawlsian motives are likely to be important.

considered by E&S. We believe that this is an important insight in itself that deserves further research. For example, it would be important to know whether this difference carries over to other classes of (strategic) games and whether it is mainly due to self-selection effects or whether it is acquired when people study economics.

Furthermore, we have shown that people behave differently in strategic and in non-strategic contexts. Our second experiment places the non-strategic distribution game in a strategic context by playing an (otherwise unrelated) ultimatum game beforehand. This small change has a considerable effect and reduces the frequency of the efficient allocation by up to 25 percentage points. Finally, although it is not difficult to integrate concerns for the poor into the Fehr-Schmidt framework of inequity aversion, we have raised doubts regarding the relevance of the Rawlsian motive in strategic games. The experiments by Güth and van Damme (1998) as well as those by Frechette, Kagel, and Lehrer (2003) suggest that maximin preferences are of little importance in strategic interactions.

The F&S (1999) model of inequity aversion was neither meant to be a definitive description of people's preferences nor was it primarily designed to explain behavior in one-person decision problems such as the E&S distribution games. Rather, we proposed this model as a shortcut for capturing reciprocal *behavior* in strategic games. This shortcut ignores the fact that the motivation driving people's behavior is more complex than simple inequity aversion. It ignores, in particular, that intentions are likely to play an important role.

However, the papers by Rabin (1993), Dufwenberg and Kirchsteiger (2000), Falk and Fischbacher (2000), and Charness and Rabin (2002) demonstrate how difficult it is to model intention based reciprocity directly. Pure reciprocity models generically exhibit a large number of equilibria, rendering their predictions imprecise, and it is very difficult to apply them even to very simple games. The advantage of models of inequity aversion is their tractability: they are very simple and they can be applied to any game in a straightforward manner. Furthermore, it turns out that people behave *as if* they are motivated by inequity aversion in many strategic contexts. Their "true motivation" may be based on the perceived intentions of their opponents, but our simple model of inequity aversion often describes their actual behavior surprisingly well. If the model is not taken too literally but applied with care in situations where fairness and reciprocity play an important role, it will remain a useful tool for better understanding and predicting people's behavior until a superior model has been found.

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