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Accountability and the fairness bias in the context of joint production: Effects of bonuses and opportunities[†]

Alice Becker[*]

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Abstract

According to the accountability principle a person's fair allocation takes into account the input-relevant variables she can influence, like effort, but not the variables she cannot influence, like a randomly assigned exogenous factor. This study is based on a real effort-task experiment, where the exogenous influence is twofold: it comes either as a production factor or as a bonus. We confirm that in a base treatment, i.e in absence of exogenous factors, subjects base their allocation decisions largely on effort. When exogenous differences are present behavior changes. Whereas bonuses are largely ignored and subjects still mostly base their decisions on effort, production factors render allocations more selfish. Furthermore, we study whether accountability holds for decisions over opportunities. We apply the so-called lottery-points-method, where a binary lottery in the last experimental stage allocates the whole amount to one of the workers. We find that subjects claim more for themselves when allocating opportunities in all treatments.

Keywords: Distributive justice, real effort task, procedural fairness
JEL classification: C72, C92

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1 Introduction

Monetary incentives are one of the most important factors in the methodology of experimental economics. However, economic experiments usually rely on windfall gains. Contrary to that, the real life-situations involving "a cake that nobody has to bake" (Güth and Kliemt 2003) are rather limited. Distributive behavior changes when the money to be distributed is earned. When allocating their own rather than other's money subjects clearly behave more selfish (Cherry and Shogren 2002, Cherry et al. 2008). However, on the other hand subjects engage in fairness considerations quite strongly when distributing not only their own but jointly earned money. Probably the most prevalent notion of fairness in the context of joint production is the *Accountability Principle* (Konow 1996). It has its origins in equity theory (Homans 1958, 1961) and attribution theory (e.g. Heider 1958, Rotter 1966), which relate input variables to fair allocations. Attribution theory is a social psychology theory that claims to explain behavior based on causal attributions of responsibility. Traditionally equity theory does not discriminate between different classes of input variables. However, for the accountability principle input-relevant factors are distinguished into discretionary variables, i.e., variables that are under agents' influence (e.g. effort), and exogenous variables, i.e., those variables that are not under agents' control (e.g. randomly assigned wage). The accountability principle suggests that the fair allocation of a joint production should depend only on discretionary variables ignoring those that are exogenous.

The aim of this study is to investigate the robustness of the accountability principle as the prevalent fairness ideal in situations involving real effort and joint production. I look at self-serving behavior, or the "fairness bias", and explore specifically under which circumstances subjects are most susceptible to it. To achieve this aim I study distributive behavior and normative beliefs in different conditions. Moreover, I consider both, decisions over outcomes and decisions over opportunities.

The "fairness bias" has been confirmed in a number of experiments involving hypothetical scenarios. Messik and Sentis (1978) perform a study where they ask subjects to distribute payments in hypothetical work situations. They find that subjects choose the egalitarian split more often when it is profitable for themselves. They also judge a higher

payment as fair for themselves than for others in correspondent situations. Loewenstein et al. (1993) study decisions of hypothetical plaintiffs or defendants in case studies, that are based on actual trials. Subjects are identically informed and have to negotiate in the role that was given to them. When asked what they considered fair and whether they agreed with the actual adjudgement both roles were found to engage in self serving estimations. In a follow-up study the authors actually found a causality between engaging in such biased estimations and bargaining impasse since subjects agreed less with the actual adjudgements and took longer for negotiation (Babcock et al.1995). However, Babcock and Loewenstein (1997) report on possible interventions to reduce the fairness bias and resultant impasse. They find that when subjects who already know their roles are informed on the existence of the self-serving bias and list the weaknesses in their own case, differences in their estimates of the judge's award and the occurrence of impasse significantly decrease.

Experimental evidence involving real effort shows similar results. Frohlich et al. (2004) study dictator allocations in a real effort experiment, involving joint production. They find evidence for both behavior according to the accountability principle and egalitarianism. Most subjects behave in an egalitarian manner when an allocation according to the accountability principle would be too costly. Subjects adjust behavior to that fairness ideal that renders them the highest payoff, thus, they engage in a "fairness bias". However, adjusting behavior is not necessarily conscious (Johansson and Konow 2009). One part of behavior involves the conscious and selfishly motivated deviation from what is believed to be fair, the so-called self-centered bias. Another part includes the distortion of beliefs on what is fair in direction towards the subject's material advantage. This so-called self-serving bias involves self-deception, i.e. subjects take more than they believe it's fair but they believe it's fair to do so.

Konow (2000) performs an experiment, involving real effort, where he studies deviations from the accountability principle and the decomposition of the fairness bias in into its conscious and unconscious parts. In several different versions of the dictator game he manipulates either discretionary variables or exogenous variables. He finds that the accountability principle is chosen to be fair by detached benevolent dictators on the one hand but on the other hand that standard dictators don't conform to it. Deviations are

traced back to a self-centered bias in about 40% of the cases and a heavy engagement into self-deception in about 60% of the cases.

In this experiment self-centered and self-deceptive behavior are distinguished by taking into account normative beliefs. I study how they are affected by the treatment manipulations and how behavior conforms to them. Furthermore, in contrast to Konow (2000) here discretionary and exogenous variables are varied at the same time and, moreover, the kind of exogenous differences is manipulated. In addition to a randomly determined production factor I look at how subjects behave when the exogenous difference comes as an additional fixed amount, i.e., a bonus. Finally, subjects decide on allocations over outcomes as well as allocations over opportunities to get the benefits of production as a whole.

The paper is organized as follows. Section 2 elaborates on the experimental design and procedures. In section 3 several different fairness ideals that are applicable in our setting are presented and their behavioral predictions are derived. Section 4 reports the results. Section 5 follows with a discussion and concludes.

2 Experimental Design and Procedures

I study distributive choices based on a real effort experiment. Effort is measured via the number of correct answers in a quiz, that subjects perform in the beginning of the experiment. The quiz is based on a text that registered subjects had received previous to the experiment via e-mail. The e-mail was accompanied by the note that the experiment would start with a quiz based on this text and that earnings in the experiment would depend partly on their performance in the quiz. I chose a rather specific topic to ensure that everybody actually had to prepare the text and nobody could benefit from her respective field of studies. Therefore, the different investments of time in the preparation of the text reflected effort.[1] After performing the quiz subjects were matched in pairs. Each pair's earnings from the quiz went to a joint account. Then subjects made a decision on how to

[1]The text I used was the *Wikipedia* entry for Max Planck: `http://de.wikipedia.org/wiki/Max_Planck`. A similar real effort task, although with a different text, was successfully used in Rauhut and Winter (2010).

allocate the joint account within the pair.

First, I study distributive choices in a base treatment, where all subjects receive the same fixed amount per correct answer in the quiz. Second, I introduce *exogenous differences in earnings* for which subjects cannot be held responsible, i.e., differences in wages that are not effort-linked. In this experiment two kinds of exogenous differences are distinguished. One is a difference in wage, i.e., subjects receive either a low or a high amount per correct answer in the quiz. Another is a difference in an additional amount that subjects receive on top of their (piece-rate) quiz earnings, i.e., either a high or low bonus. Both, production factors and bonuses, were randomly assigned.

Furthermore, I manipulate a second variable in order to check the robustness of the results: the *mode of allocation*. In each treatment each subject makes two decisions, one on the allocation of the amount on the joint account directly (decision over outcomes) and one on the probabilities to get the joint account as a whole (decision over opportunities). Specifically, subjects were told in the outcome treatments that they together with their partner had earned an amount of experimental currency units (ECU) in the quiz, which should be allocated among the two. In the opportunity treatments they were told that they had earned lottery tickets (LOT), which should be allocated among the two. Since the quiz was conducted only once in the beginning of the experiment and no rematching of subjects took place, quiz earnings and thus the size of the joint account, were exactly the same in both versions. The only difference was a binary lottery conducted at the end of the opportunity treatments, which allocated the whole joint amount to one of the two players according to how lottery tickets were allocated.[2] Taking together the first (between subjects) manipulation and the second (within subjects) manipulation the experimental design results in six treatments. For an overview see table 1.

The course of the experiment was as follows. After receiving general instructions subjects performed the knowledge quiz. The quiz consisted of 25 multiple choice questions and subjects had 15 minutes time to answer them.[3] The instructions concerning the two deci-

[2]The procedure that is used is the so-called 'Lottery-points-method' as introduced by Roth and Malouf (1979). Since subjects earn lottery tickets which they then also distribute they are supposed to update their expected value/utility. Thus, this method theoretically induces risk neutrality towards the final lottery.

[3]No subject actually needed the whole amount of time available for answering.

Treatment	**exogenous differences** (bs)	**mode of allocation** (ws)	
	Partners in the quiz have..		
T1	..the same wage.	ECU	LOT
T2	..a different wage.	ECU	LOT
T3	..the same wage,	ECU	LOT
	but get a different bonus.		

Table 1: Treatment manipulations

Note: between subjects (bs), within subjects (ws)

sion stages were shown to the subjects on the screen in front of them before each decision was made[4]. Half of the subjects made their first decision in the outcome version (allocation of ECU), the other half made their first decision for the opportunity version (allocation of LOT). On the decision screens subjects were informed about the total number of correct answers of the pair and the relative and absolute shares. Furthermore, subjects were informed about the amount of ECU/LOT on the joint account, and again their relative and absolute shares. A third information concerned their own and their partners' production factor, respectively bonus. All the information was supported by pie charts to reflect the relative numbers. In the opportunity versions additional information was provided on the size of the winner's prize (the number of jointly earned lottery tickets converted into ECU 1:1). After subjects had entered the number of ECU/LOT they claimed for themselves a subsequent screen displayed the distribution they were about to make in relative terms and asked for final confirmation. Subjects did not receive any feedback on their partners' choice between the two decisions. For final payment one of the two decisions was chosen and one of the two subjects was selected at random as dictator. Subjects received feedback on their earnings, including the actual allocation in ECU or LOT and whether they won or lost the final lottery at the very end of the experiment.

After making their decisions subjects filled out a post-experimental questionnaire, which included questions on gender, age and field of study, as well as empirical and normative beliefs (Bicchieri 2006). Furthermore, their risk attitude was elicited in a non-incentivized way.[5] For filling out this questionnaire subjects received an additional amount of 2.50 €.

[4]The instructions for this experiment are available in the Appendix.

[5]For risk elicitation subjects answered the question: *How willing are you to take risks in general?*

The computerized experiment was conducted at the Friedrich Schiller University in Jena, Germany, using the z-Tree software (Fischbacher 2007) and the E-nstructions software for electronic visualization of the instructions (Schmelz 2010). Participants in the experiment were undergraduate students from different disciplines who were recruited using ORSEE (Greiner 2004). None of the participants was informed about the purpose of the experiment and subjects were allowed to participate only once. After being seated at separate computer terminals, subjects saw general instructions on the computer screen, that informed them about the course of the experiment and which were also read aloud by the experimenter. The experiment included 8 sessions in total, excluding a pilot session that was run in the videolaboratory of the Max Planck Institute in Jena, but was not used for later analysis.[6] The average number of correct answers in the quiz over all sessions was 16.09, with a minimum of 3, a maximum of 24, and a standard deviation of 4.59. Each session lasted on average 45 minutes and involved 32, respectively 30, participants. Subjects earned experimental currency units (ECU), which were transformed into euros at an exchange rate of 100 ECU=10 €. The average earnings per subject amounted to 10.7 € and ranged from a minimum of 5.0 € to a maximum of 22.2 €, including the show-up fee of 2.50 €.

3 Theory and Propositions

In this experiment subjects' effort is measured by the number of correct answers in the quiz q_i, where $i \in \{1, 2\}$ indicates the subject number in the pair. The earnings per correct answer are $a_i = 4$ in T1, $a_i \in \{2, 6\}$ in T2, and $a_i = 2$ in T3. Moreover, subjects receive a bonus, which amounts to $b_i = 0$ in T1 and T2, and $b_i \in \{15, 45\}$ in T3. The individual earnings per subject then add up to

$$X_i = a_i q_i + b_i \tag{1}$$

(Dohmen et al. 2010). Subjects had to indicate their risk attitude on a scale ranging from 'not at all risk taking'(0) to 'very risk taking'(10).

[6] 6 out of this 8 sessions, i.e. 2 sessions per treatment, were conducted with a randomized order of the allocation mode. In the 2 remaining sessions, one for T2 and one for T3, subjects always made their first decision over ECU and their second over LOT. The reason for this was mainly to obtain the necessary number of observations for analysis in connection with figure 2. The data from these 2 additional sessions was used only there.

and the amount on the joint account equals

$$\mathbf{X}(a, q, b) = a_1 q_1 + b_1 + a_2 q_2 + b_2. \tag{2}$$

In this context several fairness notions are conceivable. The first one is the *egalitarian* fairness ideal which is probably the oldest and the simplest notion of justice. It implies the equality of outcomes:

$$f_{egalitarian} = \frac{\mathbf{X}(a, q, b)}{2}. \tag{3}$$

The next two fairness ideals are both originated in equity theory, which relates fair allocations to so-called inputs (Homans 1961). In an economic context this means that input-output relations of the involved parties are equal, where usually inputs are thought of as contributions to an economic exchange (Selten 1978, Güth 1994). If this is taken literally, in this setting everyone gets what she contributes, which is determined by a mixture of effort and luck. What I call the *meritocratic* fairness ideal is then defined as follows:

$$f_{merit} = a_i q_i + b_i. \tag{4}$$

However, predictions depend crucially on what is the *perceived* input. This leads to the third fairness ideal, which relies on the *Accountability Principle* (Konow 1996). Whereas the meritocratic view takes luck into account, this principle is based only on input-relevant factors that are under the control of an agent, ignoring those that are not under her control. Thus, in our setting a fair allocation according to the accountability principle is proportional to the subject's exerted effort:[7]

$$f_{accountability} = \frac{q_i}{\sum q_i} \sum a_i q_i + \frac{\sum b_i}{2}. \tag{5}$$

Moreover, it is possible that subjects succumb to a *fairness bias*. They would then consciously or unconsciously adjust their behavior to that fairness ideal that renders them the highest allocation. Such behavior can be defined as follows:

$$f_{bias} = max(f_{egalitarian}, f_{merit}, f_{accountability}) \tag{6}$$

[7] If $b_i > 0$ (T3) another formal specification of this fairness ideal is possible: $f_{accountability} = \frac{q_i}{\sum q_i}\mathbf{X}(a, q, b)$. This alternative specification would imply that also those parts of the contribution that are totally unrelated to the effort, i.e. the bonuses, are split according to relative effort. Since this seems not in line with the spirit of accountability, I decided for the specification stated in equation (5).

	low effort	**high effort**
low production factor/bonus	condition 1	condition 2
high production factor/bonus	condition 3	condition 4

Table 2: Behavioral conditions

However, subjects act as dictators in this experiment. Since dictators have the possibility to act selfishly, it is rather unlikely that subjects' decisions meet their fairness ideals exactly. This has been shown by other experiments, e.g. Cappelen et al. (2007), which deal with this concern by estimating a selfishness premium for each subject. Instead of taking the point predictions of the previously defined fairness ideals as a theoretical benchmark I will refer to the predictions on relative behavior dependent on different behavioral conditions. According to the experimental design we can define four behavioral conditions. Subjects within one pair differ with respect to their effort and with respect to the exogenous part of their earnings. They exert either more or less effort than the other subject in the pair and they receive either a high or a low production factor/bonus. A combination of those possibilities results in the following behavioral conditions in which subjects make their decisions: low effort and low production factor/bonus, high effort and low production factor/bonus, low effort and high production factor/bonus, and high effort and high production factor/bonus (see table 2).[8] Assuming that each subject takes the same selfishness premium on top of what she thinks is the fair amount, on average relative behavior with respect to the different behavioral conditions should not be influenced. Thus, I state the following three propositions:

Proposition 1 *When behavior follows the egalitarian fairness ideal, subjects claim 50% of the joint account, independent of the condition in which they decide.*

Proposition 2 *When behavior follows the meritocratic fairness ideal, subjects in the conditions with low effort and/or with low production factor/bonus claim on average less than subjects in conditions with high effort and/or high production factor/bonus (condition 1 <*

[8]Since production factors are equal within the pair in T1 we have only two conditions in T1. Observations where both subjects exerted the exact same amount of effort are excluded from the analysis for all treatments.

condition 2 < condition 3 < condition 4).[9]

Proposition 3 *When behavior follows the accountability principle, subjects in conditions with the same effort level claim equally much, and subjects in conditions with low effort claim less than subjects in conditions with high effort ((condition 1 = condition 3) < (condition 2 = condition 4)).*

As can be seen from these propositions the meritocratic fairness ideal and accountability principle make qualitatively opposing predictions for behavior in the 'mixed' conditions (2 and 3). If subjects succumb to a fairness bias they behave according to the fairness ideal that renders them a higher payoff.[10] Thus, I state the following proposition:

Proposition 4 *When behavior is influenced by a fairness bias, subjects in condition 2 behave according to the accountability principle and subjects in condition 3 behave according to the meritocratic fairness ideal.*

The last proposition concerns the robustness check. As pointed out in the experimental design section, the lottery-points method that was used to manipulate opportunities induces risk neutrality. Therefore, we should not find any behavioral difference between decisions in outcomes and decisions in opportunities.

Proposition 5 *Decisions over outcomes and opportunities do not differ.*

[9]The inequality between condition 2 and 3 holds for exerted effort and size of exogenous difference that follow from this experiment (see figure 1 for a graphical representation).

[10] From decisions in conditions 1 and 4 one cannot really see whether behavior is influenced by a fairness bias, since the different fairness ideals don't lead qualitatively to different predictions. Distributive choices in condition 1 would in any case be lower than distributive choices in the other conditions, and in condition 4 they would always be higher.

4 Results

I will start with the analysis of behavior without exogenous differences (T1), followed by the different production factors (T2) and the different bonuses (T3), and test propositions 1 to 4. Then I proceed with analyzing normative beliefs and compare them to actual behavior. Finally, I analyze decisions over opportunities.

4.1 Accountability and exogenous differences

Figure 1 shows mean actual, normative and ideal behavior (predicted by the meritocratic fairness ideal and the accountability principle) for each condition. First of all, it has to be noted that average behavior in all conditions lies above 50 %. Moreover, as we will see in the following there are significant behavioral differences between conditions. This implies that for none of our three treatments the egalitarian fairness ideal seems to be the main behavioral motivation. In T1, where exogenous differences are absent, mean actual behavior in condition 1 (low effort) amounts to 60.27 %. Subjects in condition 2 (high effort) claim on average 74.75 %. Differences between conditions are significant (p=0.002, all pairwise comparisons throughout the paper are based on Mann-Whitney U-tests). Subjects with low effort claim less for themselves than subjects with high effort. Quantitatively actual behavior lies above predictions made by the accountability principle, which amount to 39.72 % for condition 1 and 60.27 % for condition 2.[11] However, since qualitatively behavior is in line with the predictions, I state the first result:

Result 1 In absence of exogenous differences (T1) on average subjects base their decision on effort.

In T2, where exogenous differences are introduced via production factors, behavior in condition 1 is significantly below behavior in condition 3 (p=0.027), and behavior in condition 2 is below behavior in condition 4 (p=0.045). Thus, even though subjects achieve

[11]Note that in T1 due to the absence of exogenous differences the meritocratic fairness ideal and the accountability principle coincide. Since effort is the only variable in this treatment I refer to the accountability principle.

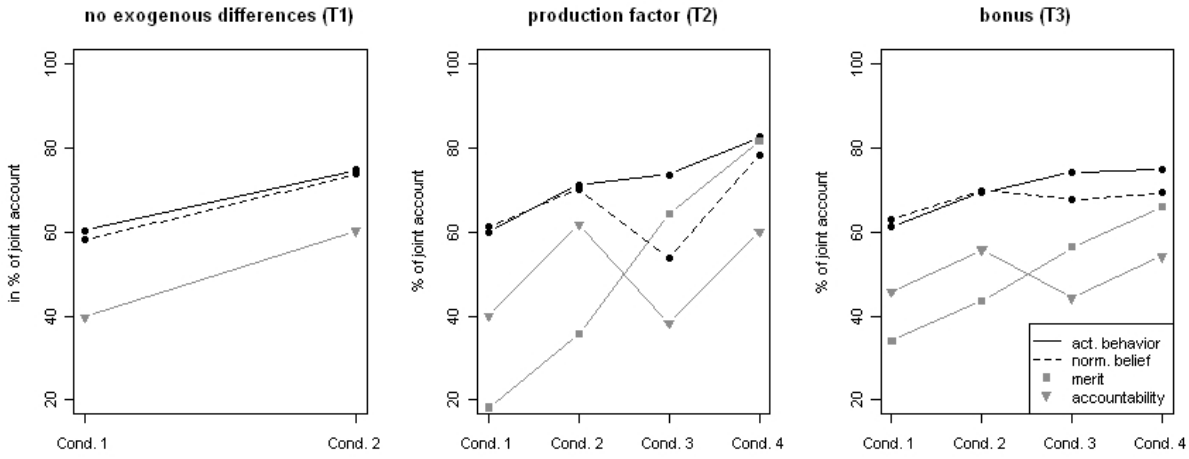

Figure 1: Means of actual, ideal and normative behavior (only outcomes)

Note: Data points represent on average 29 (T1), resp. 12 (T2 and T3) decisions.

the same effort level, they allocate higher shares to themselves when they are assigned a high production factor than when they are assigned a low production factor. Moreover, I find a significant difference between behavior in condition 1 and condition 4 (p=0.004). The results suggest that exogenous factors influence decisions. However, there is no difference in decisions of the mixed conditions (condition 2 and 3).

When exogenous differences come as a bonus (T3), decisions in condition 1 are significantly below decisions in condition 3 (p=0.019) but decisions in condition 2 are not below decisions in condition 4. This suggests that when effort is low subjects distinguish between high and low bonus, but when effort is high they don't. Subjects in condition 1 take significantly less than subjects in condition 4 (p=0.074). However, behavior in condition 2 and condition 3 does not differ.

Due to the robustness check (decision over opportunities) half of the decisions considered so far are made in period one of the experiment and the other half are made in period two. To exclude an effect of the order of decisions, which will be discussed in more detail in section 4.3, we will take a closer look on decisions made only in the first period (see figure 2).[12] The results described above are even more pronounced. Whereas in T2 the graph

[12] 2 additional sessions were conducted, one for T2 and one for T3, with a fixed decision order (first decision over outcomes and second decisions over opportunities).

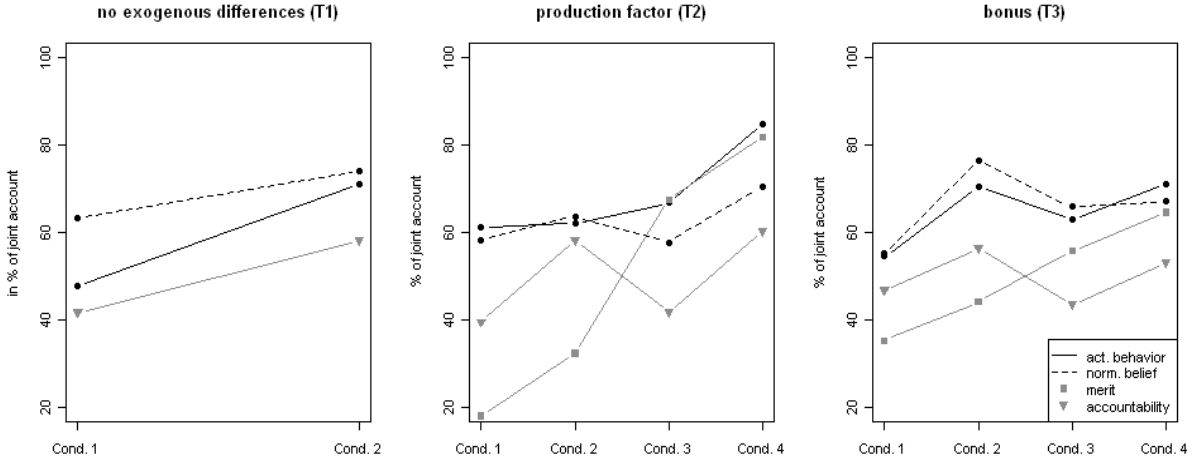

Figure 2: Means of actual, ideal and normative behavior (only first decisions made over outcomes)

Note: Data points represent means over on average 12.5 decisions.

has a rather increasing shape and resembles more the meritocratic fairness ideal, we find in T3 that behavior is strikingly similar to what the accountability principle predicts. In T3 we don't find significant behavioral differences between conditions that involve the same high level of effort (p=0.4289), but a weak difference between conditions with the same low effort level (p=0.0248). In T2 decisions in condition 2 are below decisions in condition 4 (p=0.0003), but there is no significant difference between behavior in condition 1 and 3 (p=0.1131). Under the reservation that it might be necessary to collect even more data in order to test the propositions statistically more profound I state the next results as follows:

Result 2 When exogenous differences are introduced via production factors (T2) subjects' decisions are influenced by those exogenous differences, especially when they exerted a high effort.

Result 3 When exogenous differences are introduced via bonuses (T3) on average subjects base their decisions on effort.

4.2 Normative Beliefs

Figures 1 and 2 show, besides actual behavior, subjects' average normative beliefs. When compared to the three fairness ideals suggested in section 3 we see that there is a striking similarity of all normative beliefs to the accountability principle. It seems that subjects have a clear understanding of which behavior is fair in this situation: subjects with higher effort should get more than subjects with lower effort and external factors should not dominate. Since belief differences between conditions with the same effort level are not significant (considering only decisions in period 1), the next result is:

Result 4 Normative beliefs are qualitatively in line with the accountability principle for all treatments.

When looking at how the beliefs match behavior we see that in T1 normative beliefs reflect behavior almost perfectly in figure 1 and qualitatively in figure 2. In T2, when considering only decisions made in the first period, behavior and normative beliefs match, except behavior in condition 3, which exceeds normative beliefs (p=0.034). In T3 on the other hand normative beliefs and behavior match almost perfectly.

Result 5 When exogenous differences come as a production factor behavior in conditions with low effort and a high production factor (cond. 3) exceeds normative beliefs.

4.3 Outcome vs. Opportunity

Figure 3 shows the mean decisions over outcomes (ECU) and opportunities (LOT) with respect to their order[13]. ECU-decisions are affected by the sequence of decisions whereas LOT-decisions are not. When we compare only the first decisions of both versions in each treatment decisions over opportunities lie significantly above decisions over outcomes in T1 (p=0.050) and T3 (p=0.046). Opportunity decisions made in period 1 don't differ from opportunity decisions made in period 2. Outcome decisions made in period 1 on the other

[13]In each treatment half of the decisions made had the order ECU-LOT and the other half LOT-ECU.

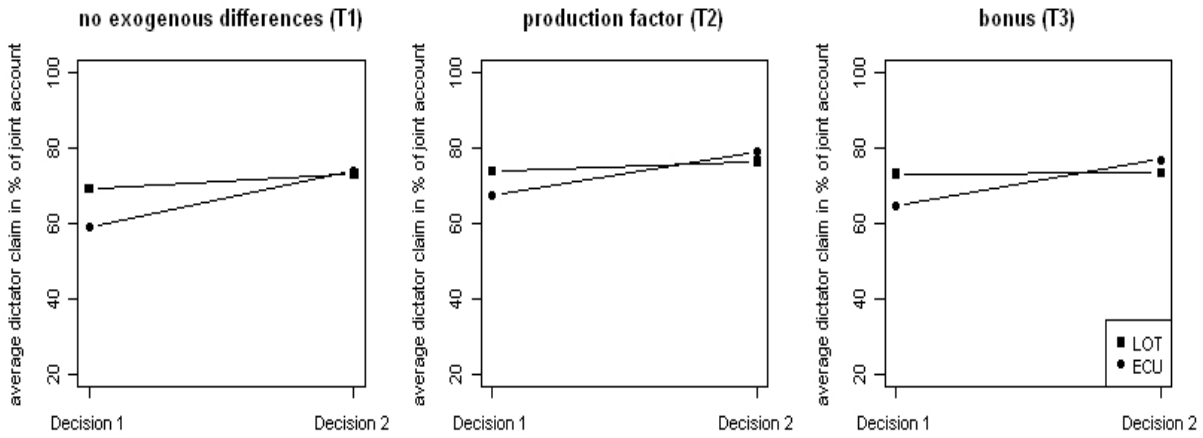

Figure 3: Means of decisions over outcome and opportunities (separated by their order)
Note: Data points represent on average 32 individual decisions.

hand are significantly below outcome decisions made in period 2 (p=0.001 (T1), p=0.006 (T2), p=0.004 (T3)). A within subjects analysis supports this finding. We observe a difference between outcome and opportunity decisions made by the same subjects only in one direction, namely when the first decision is over outcomes and the second over opportunities (opportunity decisions are significantly higher with p=0.008 (T1), p=0.009 (T2), p=0.10 (T3)). When looking at behavior dependent on the different conditions we find average decisions in LOT to lie above decisions in ECU for all conditions (except condition 4 in T3). However, differences in outcome and opportunity decisions cannot be explained by subjects' risk aversion. Several OLS regressions run on the ECU and LOT decisions separately for each treatment show that risk aversion is significant only in T1-LOT where it has negative sign (for the regressions see table 3 in the Appendix.).

Result 6 Opportunity decisions lie above outcome decisions.

In contrast to behavior there is no difference in normative beliefs between outcomes and opportunities (see figure 4). Other than that, conditional behavior in opportunities is similar to those found for outcomes in T1 and T2. In T3-LOT behavior in condition 3 is higher than in T3-ECU (p=0.027 , only first decisions). As a consequence behavior in condition 3 exceeds normative beliefs in T3-LOT (p=0.050) whereas it conforms to

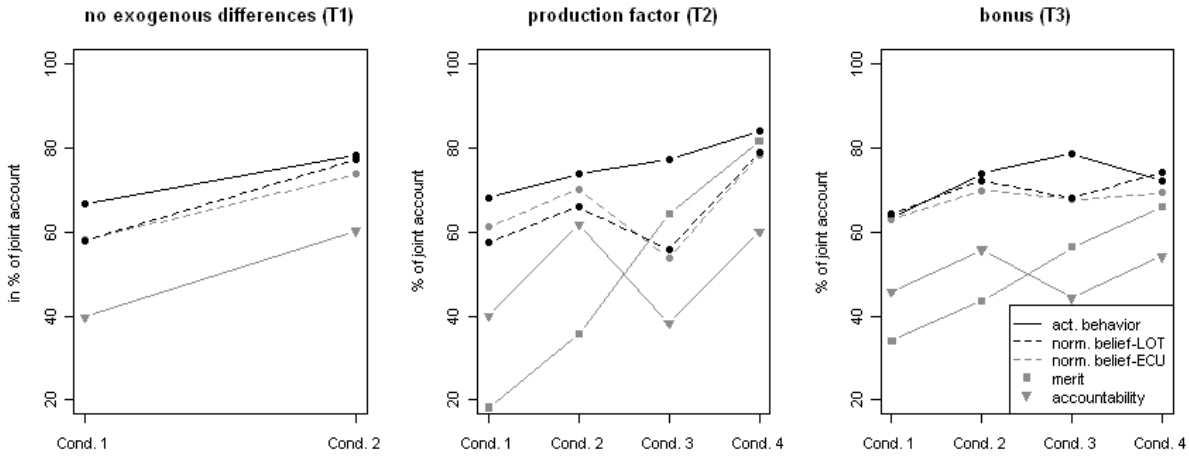

Figure 4: Means of actual, ideal and normative behavior (only opportunities)
Note: Data points represent on average 29 (T1), resp. 12 (T2 and T3), individual decisions.

normative beliefs for T3-ECU.

5 Discussion and Conclusions

I study distributive preferences in a real effort experiment where two subjects contribute their earnings to a joint account which is then allocated among them via random dictatorship. Individual contributions depend on effort and on exogenous factors, that cannot be influenced by the subjects. The link between exerted effort and exogenous factor is either of multiplicative nature, i.e., the exogenous difference comes as a production factor, or of additive nature, i.e, the exogenous difference comes as a bonus. Two versions of the same game are studied, one where subjects decide over the allocation of outcomes directly and one where subjects decide over the opportunity to get the whole amount. I elicit normative beliefs in all treatments and compare it to actual behavior.

Results suggest that normative beliefs are motivated by the accountability principle in all treatments. Behavior on the other hand deviates from this in the production factor treatment. Especially affected by the mismatch between behavior and beliefs are the mixed conditions, where different fairness ideals lead qualitatively to different predictions.

Furthermore, subjects claim significantly more for themselves when they decide over opportunities. Thus, not only is it dependent on the individual situation who engages in a fairness bias, but it also varies with the context.

How can this difference between the production factor and the bonus treatment be explained? When distinguishing between the two different kinds of exogenous differences another aspect comes into play: efficiency. It is to the advantage of the whole pair when someone who exerts a high effort gets the high production factor as compared to someone who exerts a low effort. The former case will increase the pie size compared to the latter case. The bonus on the other hand is completely unrelated to effort and therefore does not entail such efficiency considerations. It is possible that efficiency is the reason why both sources of exogenous difference are treated differently. However, their assignment is completely arbitrary. Therefore, from a fairness perspective allocational differences can hardly be justified.

The second finding, the difference between decisions over outcomes and over opportunities, relates to previous findings. Bolton, Brandts and Ockenfels (2005) for instance perform an experiment where they study proposer and responder behavior in ultimatum games and battle of the sexes games. In the ultimatum game proposers can choose between unfair and fair allocations, and they can choose between unfair and fair procedures in the battle of the sexes games. Whereas responders' acceptance rates are not influenced by whether they are offered an (un)fair allocation or procedure, proposer behavior changes. Unfair procedures are more often proposed than unfair allocations. Similar results are found in another study where subjects face initial inequalities in outcomes or opportunities, which can be compensated for in a later distribution phase (Becker and Miller 2009). Equalizing behavior is more prevalent when a fair allocation ex post (in the case of outcomes) can be achieved as compared to the situation where equalizing behavior leads to an ex ante fair procedure (in the case of opportunities) but to ex post inequality. Other evidence for the influence of outcomes and opportunities is Krawczyk and Le Lec (2008). They compare in probabilistic and deterministic versions of a dictator game how subjects allocate either the chances to win a prize or the prize itself. They find more selfish behavior in the probabilistic version, which increases with the size of the prize. One could be tempted to rationalize those results with subjects' risk aversion. However, none of the

studies finds that risk preferences explain subjects' behavior. Thus, fairness considerations seem to decrease when probabilities come into play.

One possible explanation for this decrease could be the reputation that subjects potentially achieve when decisions are made. In the outcome treatments the share that is given away, respectively kept, is clearly defined. It is therefore obvious whether the dictator behaved fair or not. In the opportunity treatments subjects get either everything or nothing. Therefore, it can never be determined unambiguously whether the dictator behaved unfair or fair in the allocation of lottery tickets. Social behavior is widely regarded as desirable and thus people might want to be perceived as social even though they are not (Andreoni and Bernheim, 2009). Due to the ambiguity in the opportunity setting subjects can take more than in the outcome setting while still not revealing how unfair they are. This 'reputation effect' might be less strong in an anonymous laboratory setting on the one hand, on the other hand it cannot be completely ruled out as a behavioral motivation. However, further research is needed to support this explanation.

The last main finding concerns normative beliefs. Normative beliefs in this experiment are qualitatively in line with the accountability principle, but quantitatively they lie above it. Also, actual behavior does not meet the predictions of any fairness ideal exactly. Thus, in a sense I find support for the approach of Cappelen et al. (2007) who assume, that in addition to the amount that the respective fairness ideal predicts, subjects take what they call a selfishness premium. Based on the comparison between actual behavior and normative beliefs in this experiment I come to the conclusion that some subjects are in addition to this selfishness premium susceptible to a fairness bias. Behavior clearly exceeds normative beliefs in cases, where predictions of different fairness ideals contradict. This suggests that subjects in this conditions engage in a self-centered bias rather than in self-deception. Subjects who exerted low effort but were lucky with their exogenous factor seem to be most susceptible to a self-centered bias. They believe it is fair to take less than subjects which exerted a high effort but were unlucky with their exogenous factor, but they don't do so. Fairness bias can lead to heavy bargaining impasse in real world situations. A reduction of this problem might be possible by educating the respective parties (Babcock and Loewenstein 1997). Thus, I believe it is promising to identify the circumstances under which such a bias occurs to be better able to work against it.

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Appendix

A Regressions

	Dep. variable: Percentage share allocated to self					
	T1		T2		T3	
	ECU	LOT	ECU	LOT	ECU	LOT
const.	75.43***	81.32***	72.32***	72.61***	81.15***	71.74***
	6.33	7.45	8.20	8.48	7.48	7.99
high_eff	14.26***	11.54**	10.24**	7.52	4.95	2.64
	4.79	5.39	4.70	4.96	4.54	5.11
high_cred			11.52**	9.08*	8.62*	6.84
			4.79	5.06	4.56	5.13
decision1	-14.85***	-4.41	-10.31**	-3.21	-11.38**	-0.55
	4.79	5.40	4.70	4.96	4.51	5.08
risk	-1.71	-2.46**	-0.81	0.69	-1.37	0.33
	1.02	1.15	1.07	1.13	1.12	1.26
female	0.62	-1.11	-2.78	-11.95**	-10.12**	-9.80*
	4.92	5.54	4.81	5.07	4.66	5.24
adj. R^2	0.2459	0.09866	0.1674	0.1031	0.1853	0.005182
Obs.	58	58	56	56	56	56

*** $p < 0.01$ ** $p < 0.05$ * $p < 0.1$

Table 3: Results from OLS (Standard errors below each coefficient)

Note: *High_ eff* and *high_ cred* are 1 when the subject exerted high effort, respectively, received the high production factor/bonus. *Decision1* controls for the sequence of decisions over outcomes and opportunities. It is 1 when the decision was made in period 1 and 0 when it was made in period 2. *Risk* controls for risk aversion. It takes values from 0 to 10, where 0 indicates the lowest and 10 the highest degree of risk aversion.

B Instructions

1. General

Welcome and thank you for participating in this experiment! Please read these instructions carefully. They are identical for all participants. For being in time you will receive

a show-up fee of 2.50 €. During the experiment you will have the opportunity to earn additional money. How much depends on your decisions in the experiment, as well as on the decisions of other participants and random moves. All amounts in the experiment will be displayed in ECU (experimental currency units). All earned ECU will be exchanged into Euro at the end of the experiment and disbursed in cash according to the following exchange rate:

10 ECU = 1 €

Please avoid talking to your neighbor from now on. Switch off your mobile phone if necessary and remove all unneeded things from your desk. It is important that you act according to these rules, as otherwise we will have to exclude you from the experiment and therefore from any payment as well. In case of questions please raise you hand and we will answer them individually.

In the beginning of the experiment you will take part in a knowledge quiz based on the text you have received previously via e-mail. The quiz consists of 25 multiple choice questions and you have 15 minutes to answer them. The better you have prepared the more money you can potentially earn in this experiment. You are not allowed to look at the text during the quiz. If we nevertheless mention that you do so you will be excluded from the experiment, and thus any payment, immediately.

After the quiz the experiment continues with two distinct parts where we will ask you to make decisions. In those parts you will be matched with one other person. At no point in the experiment you will learn his/her identity. You will see the instructions for each of these parts on the computer screen at the beginning of each part. Only one of the two parts will be selected randomly for final payment.

At the end of the experiment you will be asked to fill out a questionnaire. Please answer this questionnaire carefully.

If you are done with reading this instructions please click on 'Experiment'. During the experiment you can switch between the experiment and the instructions with the buttons 'Experiment' and 'Instructions'. If you have any questions please raise your hand.

2. Part 1 and 2

In this part of the experiment you get for each correctly answered question in the knowledge quiz an amount of ECU/lottery tickets.
(Only opportunity treatments: The lottery tickets are valid for a lottery that will be conducted in the following. The more lottery tickets you own the higher is your chance to win the lottery.)
You will now be matched with another participant, with whom you share a joint account. The amounts that you and the other have earned in the quiz go to this account.

In the quiz you could earn 4 ECU/lottery tickets per correct answer. (T1)
In the quiz you could earn either 2 or 6 ECU/lottery tickets per correct answer. It was decided at random whether you earned 2 or 6 ECU/lottery tickets. (T2)
In the quiz you could earn 2 ECU/lottery tickets per correct answer. Moreover, you receive an additional amount of either 15 or 45 ECU/lottery tickets, which will also be transferred to the joint account. It is decided at random whether you get 15 or 45 ECU/lottery tickets. (T3)

In the following we will ask you to allocate the amount of ECU/lottery tickets that you and the other person have earned in the quiz together and which is on you joint account. On the next screen you will learn how many questions you have answered correctly, how many ECU/lottery tickets are on the joint account and how much each of have contributed.

After having received all these information you are now requested to decide on the allocation of the amount on the joint account between yourself and the other person. Please enter in the box 'For me' how many ECU/lottery tickets of the account you like for yourself. After that please click on 'Calculate' and you will see what this implies for the other person as well as the percentage shares of your allocation. Both you and the other person will make such a decision. After that one of the two decisions will be chosen at random and implemented.

(Only opportunity treatments: After all lottery tickets have been allocated we will conduct the lottery. The winner receives a prize the loser receives nothing. The prize equals the jointly earned number of lottery tickets in ECU, i.e. in case of 10 jointly earned

lottery tickets the prize is 10 ECU.)

An example:
Possibly you have answered 5 questions correctly and the other participant 8 questions. Thus, together you have answered 5+8=13 questions correctly.

Therefore, there are 5x4+8x4=52 ECU/ lottery tickets on your joint account. Thereof you have contributed 20 ECU/lottery tickets and the other participant 32 ECU/lottery tickets. Assuming that you have allocated 20 % to the other participant and 80 % to yourself, you will receive 42 ECU/lottery tickets and the other participant 10 ECU/lottery tickets (in case luck decides that your decision will be implemented). (T1)
Assumed, luck decided that you receive 6 ECU/lottery tickets per correct answer and the other participant receives 2 ECU/lottery tickets. Therefore, there are 5x6+8x2=46 ECU/lottery tickets on your joint account. Thereof you have contributed 30 ECU/lottery tickets and the other participant 16 ECU/lottery tickets. Assuming that you have allocated 20 % to the other participant and 80 % to yourself, you will receive 37 ECU/lottery tickets and the other participant 9 ECU/lottery tickets (in case luck decides that your decision will be implemented). (T2)
Assumed, luck decided that you receive 45 ECU/lottery tickets in addition and the other participant receives 15 ECU/lottery tickets in addition. Therefore, there are 5x2+45+8x2+15=86 ECU/lottery tickets on your joint account. Thereof you have contributed 55 ECU/lottery tickets and the other participant 31 ECU/lottery tickets. Assuming that you have allocated 20 % to the other participant and 80 % to yourself, you will receive 69 ECU/lottery tickets and the other participant 17 ECU/lottery tickets (in case luck decides that your decision will be implemented). (T3)

(Only opportunity treatment: When the lottery is conducted you will be the winner in 80 of 100 cases and the other participant in 20 of 100 cases. The prize amounts to 52/46/86 ECU. Assumed you are the winner, then you will receive 52/46/86 ECU and the other participant will receive nothing.)

If you are done with reading this instructions please click on 'Experiment'. During the experiment you can switch between the experiment and the instructions with the buttons 'Experiment' and 'Instructions'. If you have any questions please raise your hand.