

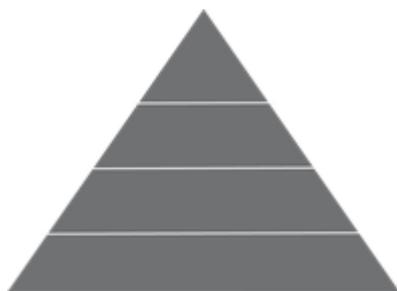
**Compensation via Redistributive Taxation.
Evidence from a Real-Effort Laboratory
Experiment with Endogenous Productivities**

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Compensation via Redistributive Taxation. Evidence from a Real-Effort Laboratory Experiment with Endogenous Productivities

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Abstract

The compensation argument suggests that redistributive taxation is considered to be fair if it equalizes for unjustified privileges of the rich. To test this argument, we design a laboratory experiment in which we manipulate the allocation of subjects' productivity in a real-effort task. We distinguish three treatment conditions: productivity is equal among group members, productivity is unequal (low, medium, high) and randomly distributed among group members and finally, productivity is unequal and distributed among group members based on their performance in a learning & knowledge task. In line with the compensation argument, the experimental data provides robust evidence that redistributive taxation is higher when income inequality is caused by randomly distributed productivities. Moreover, we find evidence in favor of a deservingness effect. Groups in which the low productivity subject shows the highest effort, agree on a higher tax rate while groups in which the low productivity subject shows the lowest effort do not vote on a tax rate in favor of the worst-off.

Keywords: redistribution, real effort task, compensation, laboratory experiment, taxation, productivity

JEL classification: C91, C92, D72

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1 Motivation

When voters decide upon redistribution, do they care about the causal reasons that created income inequality? The [Meltzer and Richard \(1981\)](#) model (henceforth MR) is certainly seen as the working horse model to study redistribution in democracies. Experimental studies using the MR model ([Agranov and Palfrey, 2015](#)), and simplifications of it ([Esarey et al., 2012a,b](#); [Barber and Wibbels, 2013](#)), show that its rational solution appears to be an important, but not an exclusive explanation of subjects' voting behavior. When deciding upon redistributive taxation, subjects' vote choice tends to depend on multiple, often conflicting, motives including fairness (e.g. [Kittel et al., 2015](#)), group loyalty ([Klor and Shayo, 2010](#)), risk preferences (e.g. [Durante and van der Weele, 2014](#)), and inequality aversion (e.g. [Tyran and Sausgruber, 2006](#)). From these studies, it is also well known that preferences for redistribution decrease if subjects have earned endowments in a real-effort task (endogenous) compared to a random assigned endowments (exogenous) (e.g. [Kittel et al., 2015](#)).

What has yet not been addressed systematically, however, is the effect of heterogeneous productivity as a cause of income inequality on subjects' vote choice (also see [Esarey et al., 2012a](#)). The causes of inequality are irrelevant to the rational solution of the MR model. Compensatory and deservingness arguments, on the other hand, suggest that redistributive taxation is considered to be fair if it compensates for unjustified privileges of the rich ([Scheve and Stasavage, 2016](#); [Konow, 2000](#)). If inequality is caused by an unfair allocation of productivity among members of society, redistributive taxation is expected to be considered a legitimate countermeasure. To test this argument, we design a laboratory experiment in which we manipulate the allocation of subjects' productivity in a real-effort task. Subjects earn a token for a correct answer in this real-effort task. The number of tokens is multiplied by an individual productivity factor to determine subjects' gross income. We distinguish three treatment conditions: subjects' productivity is equal among group members, productivity is unequal (low, medium, high) and randomly distributed among group members and finally, productivity is unequal and distributed among group members according to their performance in a previously performed learning & knowledge task. Subjects are matched into groups of three with high, medium and low productivity, play the real-effort task and vote on linear tax rate.

Experimental findings from this study can be summarized in three points: First, in line with the compensation argument, we find that the individually preferred and collectively agreed tax rates are the highest in the random unequal treatment. Second, in the unequal random treatment, we find that the tax rate is higher in groups in which the group member with the lowest productivity shows high effort in the real-effort task despite having the low productivity, compared to groups in which the member with the lowest productivity shows the lowest effort. This pattern indicates that hard work despite low productivity appears to be acknowledged by follow group members in the form of accepting a higher tax rate. Finally, subjects' self-reported partisan orientation is a robust predictor of their voting behavior, as those who report to be more left-leaning vote for higher taxation and those who report to be right-leaning vote for less, regardless of their income position.

The study proceeds as follows. The next section presents the theoretical framework and derives a set of hypotheses from it. Section three describes the experimental design followed by the presentation of empirical findings. The last section concludes and discusses implications for further research.

2 Theoretical Framework

2.1 Literature Review

While from a rational perspective the source of subjects' endowment should not affect their voting behavior, it is well known that it makes a difference whether subjects' endowment is given to them by the experimenter as exogenous windfall gains, or if subjects' endowment has to be earned. [Loewenstein](#)

and Issacharoff (1997), for example, experimentally show that subjects value mugs that are earned in an exercise more than those that are given to a participant by chance. Similar results are reported by Cherry et al. (2005) who made subjects either earn their endowment in a quiz or gave endowments to them by chance ((also see Arkes et al., 1994)). In a 2007 study, Kroll et al. find that the origin of an endowment affects pro-social behavior in asymmetric situations. They show that those who earned their endowments through a quiz instead of receiving it as windfall gains were less inclined to use a high income positions to make high contributions to a public good. Spraggon and Oxoby (2009) find that subjects that earned their endowment offer more in a two-player public goods game than a matched partner with an exogenous endowment. Wit et al. (1992) explored heterogeneous endowments in the light of fairness preferences. In their study, contributions to a public good differ less if income positions were a result of individual effort compared to endowment distribution based on chance. This pattern is confirmed by Tan (2008), who implement heterogeneous productivities and include punishment in a public goods game. Tan (2008) show that high-productivity subjects are expected to be more responsible. Fellner et al. (2011) find that asymmetric productivities can activate norms of efficiency and equality, depending on the information structure, whereas less information activates preferences for equality, information about conductivities fosters preferences for efficiency.

Only a few studies tested the effect of endogenous vs. exogenous endowment in the context of the MR model. Kittel et al. (2015) and others (e.g. Cabrales and Rodriguez Mora, 2012) find that subjects are more egalitarian when endowments are given to them by chance compared to a real-effort task. Esarey et al. (2012a) vary the relationship between effort and pay by manipulating subjects' productivity. In their study, subjects' decisions on redistribution were driven by rational self-interest only. Esarey et al. (2012a) did not find that the allocation of subjects' productivity affects the level of redistribution. The experimental design by Esarey et al. (2012a), however, used within-subjects design and the same real-effort task to allocate subjects' productivity and to generate subjects' income. These design choices are expected to undermine the effect of the allocation of subjects' productivity on the level of redistribution. In methodological terms, the experimental set-up utilized in this study is designed to overcome these limitations.

In theoretical terms, the idea that redistribution from rich to poor can be justified by compensation for unjustified privileges of the rich is a common theme in public debates on the pros and cons of the welfare state (Scheve and Stasavage, 2016; Bossert and Fleurbaey, 1996). The compensation argument connects to the theory of justice by Rawls (1971). In Rawlsian terms "equality of fair opportunity" (p. 57) is given when success is derived from effort and skills, rather than luck. The "fairness-legitimacy" linkage states that "support for redistribution is greater when success or failure is determined by factors perceived as justified, such as skill and effort" (Krawczyk, 2010, 132). This linkage is also used to understand why the size of the welfare state varies between countries. Alesina and La Ferrara (2005) find that those who believe in success through effort and talent are more opposed to redistribution than those who see luck and other uncontrollable factors as the main reasons for economic success (for similiar results see Fong, 2001; Krawczyk, 2010). The "fairness-legitimacy" linkage can be reformulated in terms of entitlement and deservingness (Konow, 2000, 2003). These largely overlapping conceptual terms (Feather, 2003) concern the extent to which individuals are perceived as accountable for differences in economic performance. Under the premises of entitlement and deservingness norms, subjects acknowledge earned entitlements, that is, they agree that high-performing individuals who put in more effort deserve greater rewards (Gill and Stone, 2010, 2015; Paetzl and Sausgruber, 2016). In social psychology and sociology, the concept of entitlements and deservingness is discussed under the notion of "equity theory" (Adams, 1965).

2.2 Voting on Redistribution

Before we continue theorizing the effect of heterogeneous productivity on the collectively agreed tax rate, we present the simplified version of the MR model and explain how heterogeneous productivity is

implemented into this model. The MR model's redistribution mechanism consists of a proportional tax rate that is imposed on all incomes. The tax revenues are distributed in equal shares among all group members. Depending on the size of the tax rate, this mechanism redistributes income from those with net incomes above the mean toward those with net incomes below the mean. The single-dimensional conflict over the size of the proportional rate is decided through majority rule. Therefore, under the premises of fully rational and egoistic agents, the group member with the median net income is pivotal. The redistribution mechanism for N individuals with *gross incomes* x_1, \dots, x_N can be defined as:

$$y_i = (1 - \tau)x_i + \tau \bar{x}, \quad (1)$$

where y_i is the *gross income* of individual i under redistributive *tax rate* τ . The average net income is denoted $\bar{x} = \frac{1}{N} \sum_{j=1}^n x_j$. Individuals with net income below the average ($x_i < \bar{x}$) maximize their income through full redistribution ($\tau = 100\%$), which is their rational choice under egoistic preferences. Analogously, endowments above average ($x_i > \bar{x}$) lead to a preference for no redistribution. Individuals with endowments being exactly \bar{x} are indifferent in the standard model because their net and gross income remains the same regardless of the collectively agreed tax rate. The distributional conflict in the group is thus polarized except for indifferent individuals. Thus, the median voter prediction states

H₁. *Subjects with a gross income above \bar{x} vote for $\tau = 0\%$ and subjects with a gross income below \bar{x} vote for $\tau = 100\%$.*

2.3 Compensation and Deservingness

Individuals' gross income is defined as $x_i = p_i * c_i$, where c_i is the subject's number of correct answers in the real-effort task and p_i is a subject's productivity. Heterogeneous productivity is induced by altering p_i . The productivity factor p_i is either low (p_l), medium (p_m) or high (p_h). In each group, consisting of three subjects, there is one subject with p_l , one with p_m and one with p_h . Thus, even if all group members put the same effort into the real-effort task, the productivity factors p_i will cause inequality in the distribution of gross incomes x_i .

Under the premise of fully egoistic preferences, the subjects' vote choice will be based solely on whether their gross income is above or below \bar{x} . Subjects' productivity factor p_i , subjects' effort c_i and the mechanisms through which the productivity factor p_i is allocated is irrelevant for rational and fully egoistic voters. The compensation argument, in contrast, predicts that voters take into account the cause of inequality in the distribution of gross incomes x_i .

If inequality stems from unfairness in the gross income generating process, redistributive taxation provides a means to compensate for unfairness. In order to test the compensation argument, we therefore manipulate the allocation of p_i . The productivity factor p_i is either allocated based on subjects' performance in a learning & knowledge task or allocated randomly. The random allocation of p_i created unfairness in the gross income generating process. In this case, it is a matter of luck which p_i a group member receives. Allocating p_i on the basis of subjects' performance in a learning & knowledge task makes differences in the income generating process justifiable. If the different productivity factors that cause inequality are distributed based on performance in a learning & knowledge task (earned), there is no violation of the fairness norm in the income generating process and therefore no need for compensation through redistribution. If the different productivity factors, however, are randomly distributed, redistribution is considered to be a mechanism with which to compensate for a low gross income due to a low productivity.

H₂. *The tax rate τ is lower if the allocation of p_i is based on subjects' performance compared to a random allocation of p_i .*

If the mechanism through which productivity is allocated to subjects is considered unfair, the overall level of redistribution within a group should be affected. However, there is a second aspect of fairness

that refers to the question of what subjects make out of their given productivity. Subjects with a lp_l may work hard in the real effort task and generate a high c_i , even though they end up with a low gross income x_i . The other group members may solidarize with the low productivity group member and take their effort into account when voting for a tax rate. The hardworking poor may earn credit for not giving up despite their bad initial situation. Their effort is reflected in the other group members' willingness to accept higher redistribution.

While the other group members may appreciate the effort of the low productivity group member and accept higher levels of redistribution, there could be moral disapproval of subjects with a high productivity and low effort. Subjects with p_h may end up with a high gross income x_i even though they were rather lazy and generated a low c_i . The idea is that being fortunate in the productivity lottery comes with the social obligation of not acting lazy. Therefore, there are two ways in which the norm of deserving can be violated; hardworking poor and lazy rich. In the random allocation of subjects' productivity treatment, the link between effort and income is manipulated through productivity. Therefore, H3a and H3b should only apply to the treatment in which p_i is allocated randomly.

H₃. *The tax rate τ increases if a) the group member with p_l shows the highest effort c_{\max} and b) the group member with p_h shows the lowest effort c_{\min} .*

3 Experimental Design and Analysis

3.1 Experimental Procedures

The experimental sessions were conducted at the Universities of Oldenburg and Hamburg. A total of 357 subjects participated in the study. The experiments took place in the computer laboratory using the experimental software *zTree* (Fischbacher, 2007). Subjects were recruited using the online registration platform *hroot* (Bock et al., 2014). All sessions were conducted by the same experimenter following exactly the same procedures for every session: At the beginning of each session, after randomly handing out place cards, the experimenter read out the instructions¹ and answered questions. Subjects also answered comprehension questions to ensure understanding of the following procedure. The questions were implemented in the experimental software.

At the end of each session, subjects were individually paid in private and in cash. Subjects earned approximately 21 € (22.8 \$) on average and sessions lasted approximately 90 minutes.

The experimental design consists of three treatments as summarized in Table 1: Heterogeneous productivity from quiz, heterogeneous productivity from lottery and equal productivity. See Figure 1 for graphical presentation:

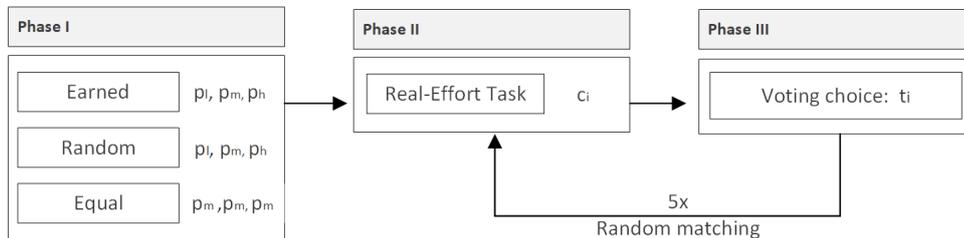


Figure 1: Stylized experimental Design

In each treatment, subjects earned their endowment for a decision game following a real effort task that required them to count numbers in random sequences of numbers and letters. Correct answers were rewarded with a token. Before the first period of real effort, participants were assigned a productivity

¹See appendix A for a translated version.

factor that determined the monetary exchange rate for correct answers. In the *equal* treatment, the productivity factor was constant (6 eurocents for each correct answer). In the two experimental treatments, the exchange rates were heterogeneously distributed. In the *unequal earned* treatment participants had to take a quiz on the White House. The focus of the quiz was chosen to be as general as possible to avoid advantages for individual students. Productivity factors were then assigned according to each subject’s performance on the quiz: The third with the most correct answers in the session was assigned the high productivity factor (9 eurocent per correct answer). The medium productivity factor was assigned to the second best third of the session, and the participants who ranked lowest received the low productivity (3 cent for each correct answer). In the *unequal random* treatment productivity factors were assigned using a lottery that split the session in three parts instead of the White House quiz.

In the second stage of the experiment, the endowment earned in the real effort task is subject to a vote on the linear tax rate. In groups of three, consisting of a high, medium and low productivity member (with the exception of the *equal* treatment of course), subjects had to decide on a redistributive tax rate. As predicted by the MR model, the median decision was implemented. In a one-shot vote for a tax rate between 0 and 100, the median vote instantly won and was used as the group decision. The group’s endowments were then redistributed according to the lump sum tax rate. To ensure perfect information about consequences of a possible tax rate, subjects were equipped with a calculator that displayed the profit of each group member before and after redistribution.

To avoid learning and sequence effects, subjects were not informed on the implemented tax rates until after the last period was played. After being informed on the profits from each period, subjects completed a questionnaire about redistributive preferences.

Treatment	Subjects	Rounds	Observations
Equal productivity	39	5	195
Unequal earned productivity	93	5	465
Unequal random productivity	93	5	465
Unequal earned productivity without information	63	5	315
Unequal random productivity without information	69	5	345
Overall	357		1785

Table 1: Overview of Treatments

3.2 Data and Analysis

Linear regression with robust standard errors is used to estimate the effect of the treatment conditions on the group-specific average tax vote. In order to test H3a and H3b, the statistical analysis focuses on the group level. Therefore, we test the effect of the treatment conditions on the average tax vote within a group.² The dependent variable is defined as the tax rate chosen by an individual group member divided by three (the number of group members).

In order to account for subjects’ rational prediction under the presumption of fully egoistic preferences, the regression models include a dummy variable accounting for the predicted average tax vote (H1). The rational and egoistic prediction on the group level is either 33.3% ($\frac{0+0+1}{3}$) or 66.6.% ($\frac{0+1+1}{3}$). The average tax vote increases from about 39% to 58% if the egoistic group level prediction changes from 33.3% to 66.6%. The main treatment conditions are measured with a set of dummies, indicating whether the allocation of p_i has been equal or random, while the earned-condition serves as the reference category.

²Conducting the analysis on the individual level does not alter any of the substantive findings on H1 and H2.

The deservingness hypothesis is measured with two categorical variables that account for subjects' effort rank within their group and their p_i . Subjects with the highest c_i get the third rank, those with the lowest p_i the first rank position. This effort rank variable has been created for subjects with p_h and p_l , while the effort position of subjects with p_m serve as the reference category.

The model specification controls for the average age and gender of the group. Subjects' partisan orientation is measured on a 1 to 10 scale, where 1 represents extreme right-wing orientation and 10 represents an extreme left-wing orientation. Subjects' partisan orientation is then averaged per group. In addition, each model includes a dummy variable accounting for subject pool effects as the experiments were conducted at two different laboratories and a set of dummies for the five rounds the real effort task was repeated.

4 Empirical Results

4.1 Descriptive Statistics

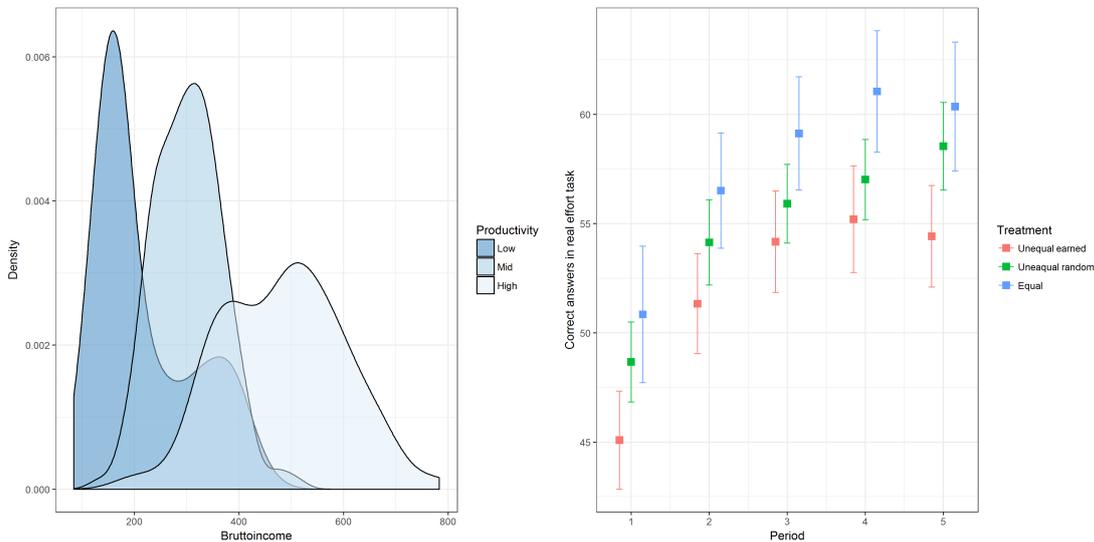


Figure 2: Graphical description of real effort task

Figure 2 show how different productivities effect subjects gross income. While subjects with a high productivity factor (p_h) were able to earn high and low endowment, subjects with low (p_l) and medium (p_m) productivity factors were limited to smaller endowments. This shows that heterogeneous productivities are an effective instrument to create inequality in x_i . The graph on the right side shows that subjects effort in the real effort task increased over the periods mostly likely due to training, regardless of the treatment condition. It is interesting to see that effort, independent of productivity factor, was highest in the equal productivity factor condition.

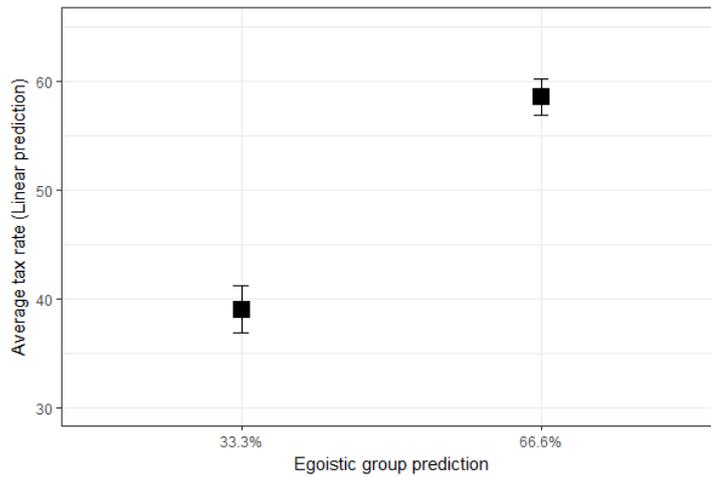


Figure 3: Egoistic prediction on average tax decision

Figure 3 shows that in line with H1, egoistic preferences are an important predictor of the average tax vote. In the case of the 33.3% point prediction, empirical levels of redistribution are slightly above 33.3%, while in the case of 66.6% point prediction, empirical levels of redistribution are below the predicted level. This pattern is largely consistent with previous experimental findings on the MR model indicating that subjects choose tax rates from which they benefit but subjects are reluctant to choose the pure rational solutions, 0% or 100%

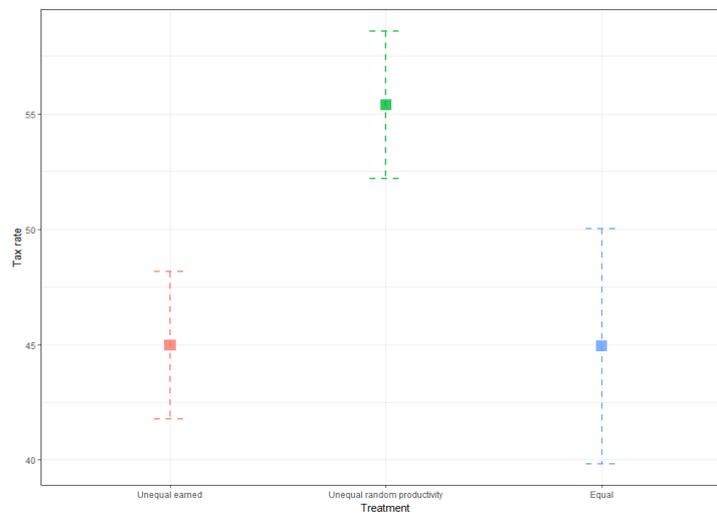


Figure 4: Treatment effect on average tax decision

Figure 4 compares the average group tax rate over the three productivity allocation treatment conditions. In line with H2, the average tax rate is highest in the unequal random treatment with 55%. The unequal earned and equal treatment show significantly lower tax rates of about 45%.

4.2 Regression Analysis

Table 2 presents a set of five regression models. Model 1 uses a simple dummy measure of the predicted group average in order to test H1. The 33.3% point prediction serves as the reference category. Model 2 includes a set of dummies specifying the treatment condition in order to test H2. The unequal earned productivities treatment serves as the reference category. Model 3 includes the full set of control measures.

Model 4-6 serve to test H3a and H3b on whether high effort despite a low productivity or low effort despite a high productivity cause more redistribution.

Table 2: Determinants of average tax rate

	Model 1 Av. tax rate	Model 2 Av. tax rate	Model 3 Av. tax rate	Model 4 Av. tax rate	Model 5 Av. tax rate	Model 6 Av. tax rate
Ego. vote 66%	18.41*** [1.83]	17.16*** [1.85]	17.19*** [1.82]	17.14*** [3.96]	21.28*** [5.88]	13.67** [6.02]
Random		7.859*** [1.94]	7.799*** [1.95]	8.542*** [2.02]		
Equal		-0.110 [2.69]	-0.00878 [2.53]			
Right Left			14.39* [7.57]	14.03* [7.89]	8.180 [10.94]	24.89** [12.38]
Age			0.270 [0.27]	0.0472 [0.29]	-0.287 [0.44]	0.445 [0.43]
Female			-6.337** [3.07]	-6.316** [3.16]	-9.742** [4.77]	0.144 [4.54]
Subject pool			-4.286** [1.73]	-2.784 [1.87]	-3.477 [2.84]	-2.010 [2.67]
Period 2			4.117 [2.52]	4.317 [2.85]	4.074 [3.90]	4.729 [4.25]
Period 3			3.861 [2.69]	1.164 [2.82]	2.073 [3.88]	1.197 [4.14]
Period 4			6.483** [2.93]	4.707 [3.17]	6.527 [4.61]	2.581 [4.50]
Period 5			7.098*** [2.74]	5.997** [3.03]	6.091 [4.02]	5.707 [4.62]
p_l / Effort med.				6.620** [2.59]	3.370 [4.44]	9.678*** [3.26]
p_l / Effort high				7.525* [4.10]	5.925 [5.82]	7.890 [6.90]
p_h / Effort low				-1.838 [5.45]	1.476 [8.09]	-2.468 [8.40]
p_h / Effort med.				0.441 [3.80]	2.246 [5.80]	-0.535 [6.00]
Constant	38.81*** [1.44]	36.32*** [1.64]	21.81** [8.90]	23.15** [10.27]	34.36** [14.18]	12.48 [17.15]
Observations	345	345	345	285	144	141
Sample				rand. & earned	earned	rand.
Adjusted R-squared	0.230	0.267	0.307	0.348	0.335	0.217
BIC	2930.0	2922.9	2942.1	2437.6	1259.5	1222.2

Notes. Random effects model with robust standard errors. Dependent variable: Average tax rate (Model 1-6). Robust standard errors in brackets. * $p \leq 0 > .1$, ** $p \leq 0.05$, *** $p \leq 0.01$.

To begin with, in line with H1, the egoistic prediction 66.6% causes a strong increase in the average tax vote. A look at the adj. R2 shows that the egoistic prediction is the single most important determinant of the average tax vote (23%). The treatment variables (H2) contribute another 3.7% and the fully specified Model 3 has a adj. R2 of 30.7%. In substantive terms, changing the egoistic prediction from 33.3% to 66.6% causes an increase in the average tax vote by about 18%. In line with H2, the average tax vote is significantly lower (-7.8%) under random allocation of productivity factors (see Model 2 and 3). The average tax vote in the earned allocation of productivity factors is not different from the treatment in which all group members have the same medium productivity factor (p_m). Concerning the fully specified Model 3, groups with a larger share of females tend to redistribute less. Beyond that, there is a consistent effect of the groups partisan orientation as more left leaning groups show higher levels of redistribution.

Model 4 includes a set of dummy variables reporting the effort rank of the group members with respect to their productivity factor p_i . Model 4 is estimated on both treatments (earned and random). Controlling for the treatment condition (random). Groups in which the subject with p_l is hardworking

and reaches the effort position 2 or 3 show a higher average tax vote. Thus, in line with H3a, this pattern supports the notion that other group members appreciate if subjects work hard despite a low productivity factor by accepting higher levels of redistribution. Contrary to H3b, however, being lazy despite having a high productivity factor does not affect the average tax vote (H3b). This pattern is confirmed in Figure 5, showing the effect of the effort rank for p_l and p_h group members.

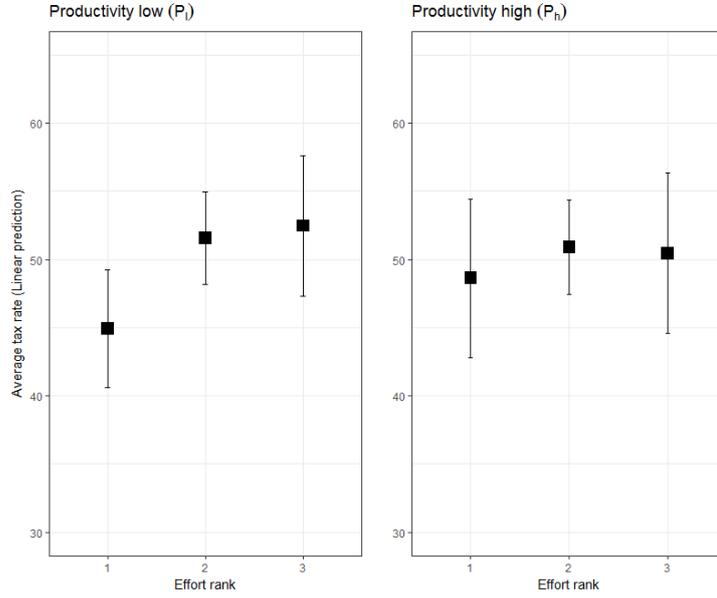


Figure 5: Average tax rate by productivity factor and effort rank

Models 5 and 6 re-estimate the specification of Model 4 on separate samples. Model 5 is based only on the earned allocation of p_i treatment, and Model 6 is based only on the random allocation of p_i treatment. As theorized, the deservingness effect should only appear in the random allocation of p_i sample because only in this treatment is the subjects' low p_i a matter of bad luck. Only in this treatment condition is hard work a signal for deservingness. In the earned allocation of p_i treatment, hard work does not matter because p_l is justified by a poor performance in the learning & knowledge task.

4.3 Robustness Analysis

The compensation argument is based on the presumption that subjects are fully aware of who got p_l , p_m and p_h . The mechanism through which heterogeneous productivity creates unequal distribution of gross income x_i should disappear if voters only see their gross income x_i , and the gross income of their fellow group members but do not know the allocation of p_i , nor the number of correct answers c_i . As part of the robustness analysis, we conducted the random and earned treatment again only without giving subjects the information on p_i and c_i .³

Without p_i and c_i , subjects only know that income inequality is either based on a random or earned allocation of productivity factors but they do not know who has which productivity and who was lazy or hard working in the real effort task. Under these circumstances, the average tax vote should be higher compared to the earned treatment with full information.

This expectation is confirmed by Model 1 in Table 3 and Figure 6. The average tax rate is the lowest in the earned allocation of p_i treatment and the highest in the random allocation of p_i treatment. In the earned and random treatments without information on p_i and c_i , the average tax vote is slightly lower than in the random treatment, but significantly higher compared to the earned treatment.

³We cannot disguise p_i and c_i separately because subject always need to know x_i in order to vote and with one piece of additional information (p_i or c_i) they can infer the third missing parameter.

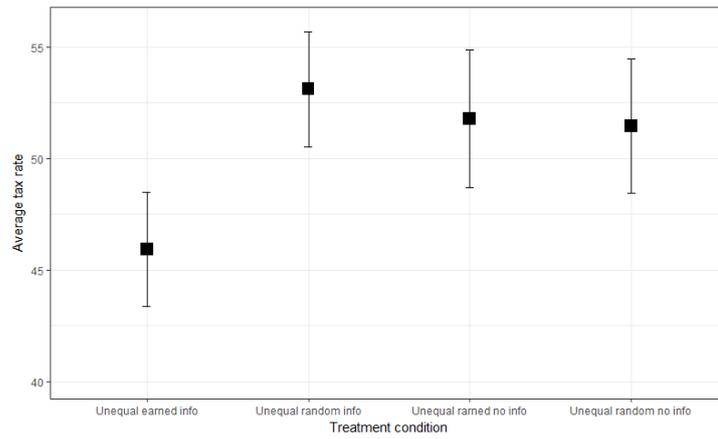


Figure 6: Info treatment

Finally, we tested the earned allocation of p_i treatment separately against all other treatment conditions. Models 2 to 5 fully confirm previous results. The average tax rate is significantly lower in the earned treatment condition compared to the random and the two no info treatment and statistically indifferent from the treatment in which all group member have the same p_m productivity factor.

Table 3: Determinants of average tax rate

	Model 1	Model 2	Model 3	Model 4	Model 5
	Av. Tax rate	Av. Tax rate	Av. Tax rate	Av. Tax rate	Av. Tax rate
Ego. vote 66%	19.14*** [1.36]	18.82*** [2.05]	21.74*** [1.95]	20.75*** [1.98]	17.77*** [2.24]
Random info	7.294*** [1.91]	7.785*** [1.97]			
Earned no info	6.309*** [2.00]		6.340*** [2.08]		
Random no info	5.392*** [2.03]			4.733** [2.13]	
Equal	0.508 [2.50]				0.0907 [2.52]
Right Left	17.54*** [6.29]	17.28** [7.90]	18.92** [8.69]	7.555 [9.36]	7.399 [9.98]
Age	0.331* [0.20]	0.0792 [0.28]	-0.240 [0.31]	0.268 [0.27]	0.255 [0.37]
Female	-3.282 [2.35]	-6.256** [3.17]	-8.022** [3.65]	-1.981 [3.18]	-8.459* [4.30]
Subject pool	-5.831*** [1.57]	-2.818 [1.89]	-3.708 [2.71]	-7.991*** [2.29]	-6.600*** [2.40]
Period 2	3.535* [2.07]	4.226 [2.81]	3.901 [2.94]	2.770 [3.10]	3.682 [3.16]
Period 3	6.019*** [2.10]	1.235 [2.88]	5.323* [3.01]	4.989* [2.94]	6.346* [3.39]
Period 4	7.279*** [2.18]	4.816 [3.21]	7.657** [3.24]	7.356** [3.25]	9.263** [3.89]
Period 5	7.408*** [2.13]	6.112** [3.05]	6.708** [3.16]	6.819** [3.02]	7.872** [3.44]
Constant	16.08** [7.09]	24.21*** [9.23]	29.56*** [10.01]	23.88** [10.15]	27.36** [11.89]
Observations	549	285	239	253	204
Adjusted R-squared	0.344	0.335	0.403	0.371	0.285
BIC	4623.9	2424.6	2013.2	2154.6	1759.2

Notes. Random effects model with robust standard errors. Dependent variable: Average tax rate (Model 1-5). Robust standard errors in brackets. * $p \leq 0 > .1$, ** $p \leq 0.05$, *** $p \leq 0.01$.

5 Conclusions and Discussion

Previous experimental studies on the simplified MR model have shown that endogenous endowments decreases subjects' willingness to redistribute (Kittel et al., 2015). This study also relies on endogenous endowment but alters the allocation of subjects' productivity to test whether the cause of income inequality affects subjects' willingness to redistribute. Drawing on compensatory and deservingness arguments, we expect that redistributive taxation is perceived to be fair if it equalizes for unjustified privileges of the rich (Scheve and Stasavage, 2016; Konow, 2000). Therefore, redistributive taxation is predicted to increase with a random allocation of subject productivity. Or in other words, redistribution is perceived

legitimate if it compensates for inequality caused by bad luck. To test this argument, we design a laboratory experiment in which we manipulate subjects' productivity in a real-effort task. Experimental findings from this study can be summarized in three points:

First, in line with the compensation argument and contrary to previous research by [Esarey et al. \(2012a\)](#), we find that the individually preferred and collectively agreed tax rate is the highest in the random unequal treatment. The average tax rate is about 10% higher in the unequal random treatment when compared to the equal and unequal earned treatment. This finding is confirmed by our additional robustness checks.

Second, in the unequal random treatment, we find evidence for a deservingness effect. Groups in which the group member with the lowest productivity shows high effort in the real-effort task despite having the low productivity vote for a higher tax rate when compared to groups in which the member with the lowest productivity also shows the lowest effort. This pattern indicates that hard work despite low productivity appears to be acknowledged by follow group members in terms of them accepting a higher tax rate. The effort level of high gross income group members does not affect the group's average tax rate. In this respect, our finding is contrary to prior research that expects punishment for subjects waste their privileges (e.g. [Schokkaert and Devooght, 2003](#)).

Third, contrary to [Esarey et al. \(2012a\)](#) we find that subjects' self-reported partisan orientation is a robust predictor of voting behavior, as those who report to be more left-leaning do vote for higher taxation and those who report to be right-leaning vote for less, regardless of their income position. Although our experimental data supports the conclusion that egoistic preferences are the single most important determinant of subjects' voting behavior in the simplified MR model, the data also shows that deviations from the rational prediction can at least partially be attributed to subjects self-reported political ideology.

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	Obs.	Mean	Std. Dev.	Min	Max
Dependent Vars.					
Decision for tax rate	1785	49.9	42.5	0	100
Treatment indicators					
Unequal earned [0,1]	1785	0.26	0.44	0	1
Unequal random [0,1]	1785	0.26	0.44	0	1
Unequal earned no info [0,1]		0.18	0.38	0	1
Unequal random no info [0,1]	1785	0.39	0.46	0	1
Random [0,1]	1785	0.31	0.31	0	1
Controls					
Right-left orientation	1785	3.9	1.75	0	10
Age	1785	25.48	5.72	17	64
Female	1785	0.54	0.49	0	1
Subject pool	1785	1.55	0.49	1	2

Table 4: Descriptive

A Instructions

Welcome and thank you for your participation in this experiment!

Briefing/Instructions

The goal of this experiment is the study of decision making. You and your fellow participants will be tasked with making decisions over the course of this experiment. Your decisions, and those of the other participants, will influence your accumulated payment according to the rules explained on the following pages. The briefing is to serve as an explanation and introduction into the structure of the experiment and the consequences your decisions will have. The experimenter is not withholding or altering any information.

Payment

Over the course of the experiment you will earn your payment. You will receive your payment without it being revealed to the other participants, and in cash.

Duration

The entire experiment will take approximately 75 minutes. After you have completed the tasks, a questionnaire will appear on your screen. Following your completion of this questionnaire, you will have to wait until your seat number is called. You will then receive your payment in Euro.

Please take enough time to read the instructions and to come to your decision. You cannot speed up the process of the experiment by completing your tasks faster, as the completion by all participants is required to proceed.

Anonymity

All participants will not know the identity of the others participating, neither during, nor after the experiment. The other participants will also not be informed of how much you have earned, neither during, nor after the experiment.

Ban on communication

Throughout the entire experiment you are not allowed to communicate with other participants. Please also shut off any mobile devices. Furthermore, we would like to indicate that you are only allowed to use those functions on the computer that are required for the experiment. Violation of these rules will lead to expulsion from the experiment.

If you have any questions regarding the experiment after reading this briefing, please raise your hand. One of the experimenters will come to you and answer your question in private.

Content and procedure

The experiment consists of **2 stages** which will be explained on the following pages. In every stage of the experiment, you will be faced with decisions and situations relevant to your payment. In the first stage, you will complete a quiz on the subject you were able to prepare for beforehand. In the second stage, you will then be tasked with completing counting tasks, which will decide how high your endowment for the following decision game will be. In the decision game, you will be tasked with deciding on the redistribution of the earned endowment in a randomly created 3-person group. The second stage will be repeated 5 times.

Stage 1

At the beginning of the experiment, you will be tasked with completing a quiz on the White House. The information on which the quiz is based was taken from the German Wikipedia page. You will be able to see whether your answers are correct or not right after answering. After answering the final question, you will be presented with an overview of your results and a ranking of all participants. You will also be shown your rank.

Based on your rank, you will be assigned a different productivity factor. Your productivity factor dictates how much you earn for each correct answer in the next stage. There are three different productivity factors: high, middle, and low. Each comes with their corresponding pay for a correct answer:

High: 9 cents for each correct answer

Middle: 6 cents for each correct answer

Low: 3 cents for each correct answer

Which of these categories you will be assigned depends on which third of the participants you are in. The upper third is assigned the high productivity factor, the middle third the middle productivity factor and the third with the least correct answers the low productivity factor. If participants have the same amount of correct answers, the one with the faster time will receive the higher rank. Your assigned productivity factor remains the same over the course of the experiment – the quiz will not be repeated.

Stage two:

In the second stage of the experiment, you are first tasked with counting the amount of numbers hidden in a row containing capital letters and numbers (see figure 1). For this stage of the experiment, you have 5 minutes (300 seconds) at your disposal. In this time, you can complete as many of the letter and number rows as you are able.

Figure 1: Counting tasks

The amount of correct inputs after 5 minutes will be converted into Euros based on your productivity factor (either 9, 6, or 3 cents).

Redistribution: Tax rate

Following the counting tasks, you will be tasked with redistributing your earned income among the group (including yourself). The redistribution will be done using a percental tax rate. Each group member enters their preferred tax rate into the input window.

Figure 2: decision game

After the group members input their preferred preference, their income endowment will be taxed using the percental tax rate. The resulting tax will be put into a communal pot. The money in the pot will then be distributed evenly among the group members.

The agreed upon tax rate can be any value between 0% (meaning no redistribution takes place) and 100% (meaning everyone receives the same).

Election decision and communication

The tax rate can be chosen by means of a popular vote. If there are three different tax rates being suggested, the middle suggestion will be used.

***Example:** If 10%, 30% and 70% are suggested, 30% will be chosen, as it represents the middle value between 10% and 70%. If two group members suggest 10%, 10% will be chosen.*

In each of the 5 rounds, the groups are shuffled randomly. Each group member's endowment is known to the entire group. This also applies to the productivity factor.

After the second stage is completed, another counting task will commence. There you may earn another income endowment. Your income after the second stage will remain constant over the course of the experiment. A decision task will take place after the counting task. This will be repeated 5 times.

Before the experiment will begin, you will be asked several questions to test your understanding of the experiment. These questions have no influence on your payment and are only asked to ensure your understanding of the experiment.

Calculation of your payment:

After all 5 rounds have been played, you will be presented with an overview of the decisions made in each of your 5 groups. This overview shows you how much you earned after the redistribution took place.

Your payment for this experiment will be your income from all 5 rounds summed up. Each round is therefore relevant for your payment.

The payment will take place right after the experiment and will be anonymous.

The experiment will begin shortly!

If you have any questions, please raise your hand until someone comes to speak to you.

Thank you and have fun.

Welcome and thank you for your participation in this experiment!

Briefing/Instructions

The goal of this experiment is the study of decision making. You and your fellow participants will be tasked with making decisions over the course of this experiment. Your decisions, and those of the other participants, will influence your accumulated payment according to the rules explained on the following pages. The briefing is to serve as an explanation and introduction into the structure of the experiment and the consequences your decisions will have. The experimenter is not withholding or altering any information.

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Over the course of the experiment you will earn your payment. You will receive your payment without it being revealed to the other participants, and in cash.

Duration

The entire experiment will take approximately 75 minutes. After you have completed the tasks, a questionnaire will appear on your screen. Following your completion of this questionnaire, you will have to wait until your seat number is called. You will then receive your payment in Euro.

Please take enough time to read the instructions and to come to your decision. You cannot speed up the process of the experiment by completing your tasks faster, as the completion by all participants is required to proceed.

Anonymity

All participants will not know the identity of the others participating, neither during, nor after the experiment. The other participants will also not be informed of how much you have earned, neither during, nor after the experiment.

Ban on communication

Throughout the entire experiment you are not allowed to communicate with other participants. Please also shut off any mobile devices. Furthermore, we would like to indicate that you are only allowed to use those functions on the computer that are required for the experiment. Violation of these rules will lead to expulsion from the experiment.

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Content and procedure

The experiment consists of **2 stages** which will be explained on the following pages. In every stage of the experiment, you will be faced with decisions and situations relevant to your payment. In the first stage, you will be assigned a random productivity factor. In the second stage, you will then be tasked with completing counting tasks, which will decide how high your endowment for the following decision game will be. In the decision game, you will be tasked with deciding on the redistribution of the earned endowment in a randomly created 3-person group. The second stage will be repeated 5 times.

Stage 1

At the beginning of the experiment, you will be assigned a random productivity factor which decides your pay in the following part of the experiment. There are three different productivity factors: high, middle, and low. Each comes with their corresponding pay for a correct answer:

High: 9 cents for each correct answer

Middle: 6 cents for each correct answer

Low: 3 cents for each correct answer

The assignment of your productivity factor takes place via a lottery. You will be presented with the result instantly. Your assigned productivity factor remains the same over the course of the experiment.

Stage 2:

In the second stage of the experiment, you are first tasked with counting the amount of numbers hidden in a row containing capital letters and numbers (see figure 1). For this stage of the experiment, you have 5 minutes (300 seconds) at your disposal. In this time, you can complete as many of the letter and number rows as you are able.

Figure 1: Counting tasks

The amount of correct inputs after 5 minutes will be converted into Euros based on your productivity factor (either 9, 6, or 3 cents).

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Figure 2: decision game

After the group members input their preferred preference, their income endowment will be taxed using the percental tax rate. The resulting tax will be put into a communal pot. The money in the pot will then be distributed evenly among the group members.

The agreed upon tax rate can be any value between 0% (meaning no redistribution takes place) and 100% (meaning everyone receives the same).

You have a calculator you can use to assist you in your decision and see what your payout in eurocent will look like using a certain tax rate. You can input as many tax rates as you like into the calculator before making your final decision in the input box.

Election decision and communication

The tax rate can be chosen by means of a popular vote. If there are three different tax rates being suggested, the middle suggestion will be used.

***Example:** If 10%, 30% and 70% are suggested, 30% will be chosen, as it represents the middle value between 10% and 70%. If two group members suggest 10%, 10% will be chosen.*

In each of the 5 rounds, the groups are shuffled randomly. Each group member's endowment is known to the entire group. This also applies to the productivity factor.

After the second stage is completed, another counting task will commence. There you may earn another income endowment. Your income after the second stage will remain constant over the course of the experiment. A decision task will take place after the counting task. This will be repeated 5 times.

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After all 5 rounds have been played, you will be presented with an overview of the decisions made in each of your 5 groups. This overview shows you how much you earned after the redistribution took place.

Your payment for this experiment will be your income from all 5 rounds summed up. Each round is therefore relevant for your payment.

The payment will take place right after the experiment and will be anonymous.

The experiment will begin shortly!

If you have any questions, please raise your hand until someone comes to speak to you.

Thank you and have fun.

DFG Research Group 2104

– Latest Contributions

2017:

Neuhofer, Sabine, Paetzel, Fabian, Schwaninger, Manuel and Traub, Stefan: Recognition of needs in a dictator game: Experimental evidence on information-sensitive giving behavior. Working Paper Nr. 2017-10. <http://bedarfsgerechtigkeit.hsu-hh.de/dropbox/wp/2017-10.pdf>

Chugunova, Marina, Luhan, Wolfgang and Nicklisch, Andreas: When to Leave the Carrots for the Sticks: On the Evolution of Sanctioning Institutions in Open Communities. Working Paper Nr. 2017-09. <http://bedarfsgerechtigkeit.hsu-hh.de/dropbox/wp/2017-09.pdf>

Tepe, Markus, Lutz, Maximilian, Paetzel, Fabian and Lorenz, Jan: Leaky bucket in the lab. The effect of system inefficiency on voting on redistribution. Working Paper Nr. 2017-08. <http://bedarfsgerechtigkeit.hsu-hh.de/dropbox/wp/2017-08.pdf>

Pritzlaff-Scheele, Tanja and Zauchner, Patricia: Meeting Needs. An Experimental Study on Need-Based Justice and Inequality. Working Paper Nr. 2017-07. <http://bedarfsgerechtigkeit.hsu-hh.de/dropbox/wp/2017-07.pdf>

Paetzel, Fabian, Lorenz, Jan and Tepe, Markus: Transparency diminishes framing-effects in voting on redistribution: Some experimental evidence. Working Paper Nr. 2017-06. <http://bedarfsgerechtigkeit.hsu-hh.de/dropbox/wp/2017-06.pdf>

Schwaninger, Manuel, Neuhofer, Sabine and Kittel, Bernhard: Offers Beyond the Negotiating Dyad: Including the Excluded in a Network Exchange Experiment. Working Paper Nr. 2017-05. <http://bedarfsgerechtigkeit.hsu-hh.de/dropbox/wp/2017-05.pdf>

Kittel, Bernhard, Neuhofer, Sabine and Schwaninger, Manuel: Need-based Justice in Social Exchange Networks. Working Paper Nr. 2017-04. <http://bedarfsgerechtigkeit.hsu-hh.de/dropbox/wp/2017-04.pdf>

Diederich, Adele and Wyszynski, Marc: Need, framing, and time constraints in risky decision making. Working Paper Nr. 2017-03. <http://bedarfsgerechtigkeit.hsu-hh.de/dropbox/wp/2017-03.pdf>

Kittel, Bernhard, Kanitsar, Georg and Traub, Stefan: Knowledge, Power, and Self-interest. Working Paper Nr. 2017-02. <http://bedarfsgerechtigkeit.hsu-hh.de/dropbox/wp/2017-02.pdf>

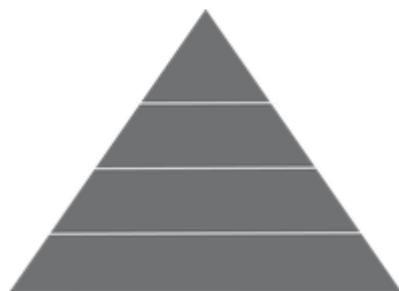
Traub, Stefan and Krügel, Jan Philipp: Risk Taking and the Welfare State: Some Experimental Evidence. Working Paper Nr. 2017-01. <http://bedarfsgerechtigkeit.hsu-hh.de/dropbox/wp/2017-01.pdf>

2016:

Guo, Lisa, Trueblood, Jennifer S. and Diederich, Adele: Thinking Fast Increases Framing Effects in Risky Decision-making. Working Paper Nr. 2016-04. <http://bedarfsgerechtigkeit.hsu-hh.de/dropbox/wp/2016-04.pdf>

Paetzel, Fabian and Sausgruber, Rupert: Entitlements and loyalty in groups: An experimental study. Working Paper Nr. 2016-03. <http://bedarfsgerechtigkeit.hsu-hh.de/dropbox/wp/2016-03.pdf>

Nicklisch, Andreas, Grechenig, Kristoffel and Thöni, Christian: Information-sensitive Leviathans. Working Paper Nr. 2016-02. <http://bedarfsgerechtigkeit.hsu-hh.de/dropbox/wp/2016-02.pdf>



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