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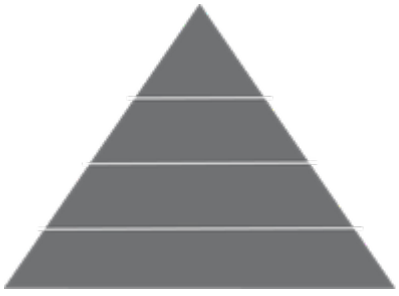

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Efficiency Loss and Support for Income Redistribution in a Laboratory Experiment

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Abstract

Income redistribution with an efficiency loss is expected to have a twofold effect on voters' support for redistribution, as it lowers aggregate egoistic support for redistribution and activates voters' social concerns about actively harming a social group. To test this argument, we present a laboratory experiment in which subjects receive a randomly allocated income, then must communicate to arrive upon a common tax rate. The rate of money "lost" as a part of the redistribution process is manipulated as a treatment (0%, 5%, 20% and 60%). Experimental evidence shows that efficiency loss exerts a unique negative effect on individual and collective support for redistribution. The effect shows a tipping point pattern, outlives group communication, is stronger at the lower end of the income distribution and is not explained by mere efficiency preferences. Skillful politicians might take advantage of voters' avoidance of actively harming through support for redistribution and deliberately over- or understate efficiency loss as a means to manipulate public support for redistribution.

JEL classification: C91, C92, D63, D72

Keywords: redistribution, inefficiency, voting, leaky bucket, avoidance of harming, political attitudes, taxation

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1. Motivation

Although the gap between rich and poor has been widening for more than a decade in many developed democracies (OECD, 2011, 2015), there have been no greater political efforts to increase redistribution. This is puzzling for politico-economic models in the tradition of Meltzer and Richard (1981) (henceforth MR), which theorize that, in a democracy, more inequality leads to more redistribution.[1] Among the many factors that have been proposed to explain why growing inequality in a democracy does not lead to increased redistribution (e.g. see Alesina and Giuliano, 2011; Scheve and Stasavage, 2016, for review), this study tests to which extent social concerns about efficiency loss in the redistributive tax system helps to explain the lack of redistribution.

It is well known that transfers of income can be costly, in that they can involve substantial efficiency loss (see e.g. Browning, 1993; Allgood and Snow, 1998).[2] This idea is central to work of Okun (1975), according to whom society faces an inevitable trade-off between equality and efficiency. Studies in the wake of Okun's (1975) "leaky-bucket" explored the relationship between the size of inefficiency and acceptance of redistribution by the use of survey data. They find that system inefficiency lowers both subjects' tax moral (Barone and Mocetti, 2011) and support for redistribution (Amiel et al., 1999; Pirttila and Uusitalo, 2010; Krawczyk, 2010). These studies focus on how individuals decide on the trade-off between equality and efficiency but ignore the political process of voting on redistribution, which is central to the MR model. Experimental studies using the MR model (Agranov and Palfrey, 2015) and simplifications of it (Krawczyk, 2010; Durante et al., 2014) find tentative evidence that efficiency loss decrease aggregate support for redistribution. Yet, these studies do not differentiate, weather the negative effect of efficiency loss on support for redistribution stems from egoistic preferences, efficiency concerns Balafoutas et al. (2012) or the avoidance to actively harm a social group (Royzman and Baron, 2002).

This study therefore explores the individual and aggregate effect of different magnitudes of efficiency loss on subjects' behavior when voting on a redistributive tax rate that generates a lump sum return.[3] We hypothesize that efficiency loss has a twofold effect on subjects' vote choice: It alters subjects' egoistically preferred tax rate and simultaneously activates their social concerns about group harm, which causes them to favor less taxation. To test these expectations in a group decision context, we collect subjects' preferred tax rate before a phase of numerical communication,

[1] This puzzle has also been referred to as the "Robin Hood" paradox. A term coined by (Lindert, 2004, p.15) saying that redistribution from rich to poor is least present in those countries where it seems to be most needed.

[2] Macro-comparative evidence also suggests that societies in which tax authorities are perceived to be inefficient are also less willing to reduce income inequality (Appendix Figure A.5). The alleged causality implied by this statement, however, cannot be inferred from the cross-country data as inefficient tax authorities can either be a cause or a consequence of rising inequality. In order to identify the causal effect of inefficiency of the redistribution system on voters' preferences for redistribution, we need to manipulate the actual degree of system inefficiency. Since such manipulations are neither possible nor ethically justifiable in real-world settings, this study utilizes an experimental research design.

[3] The MR model focuses on the question of how redistributive taxation alters individuals leisure-labor trade-off (see Agranov and Palfrey (2015) for an experimental test of the original MR model). For the purpose of this study, we simply use the redistribution mechanism suggested by Meltzer and Richard (1981) in combination with numerical communication and majority voting.

and their decisions on it afterwards. Each group votes on a proportional tax rate under majority rule. The treatment variable is the degree of inefficiency represented with 0%, 5%, 20% or 60% of the tax revenues getting lost. This experimental design enables us to test the effect of system inefficiency on both, the individually preferred and the collectively agreed tax rate.

The study proceeds as follows. The next section reviews existing research regarding the "leaky bucket resp. efficiency loss in redistribution. Section 3 presents the theoretical framework and derives our main hypothesis. Section 4 explains the experimental design followed by the presentation of empirical findings in 5. The final section concludes and discusses implications for further research.

2. Literature Review

Justice research shows that efficiency can be used to justify inequality (Scott et al., 2001, p.751). The tension between efficiency and equality is at the center of Okun's (1975, p.55) work, in which societies face an inescapable trade-off between efficiency and equality. According to Okun (1975), there are at least four reasons why redistribution leads to lower aggregate net income, namely administrative cost of the redistribution system, changes in subjects' work effort due to redistribution, changes in savings and investment behavior due to redistribution, and finally, changes in voters attitudes towards redistribution as a result of redistributive programs (also see Gouyette and Pestieau, 1999). This study only refers to the first type of inefficiency, namely efficiency losses inherent in the process of collecting and redistributing taxes. The question arises of how much efficiency loss is tolerated before a redistribution program is rejected as a whole. For Okun (1975, p. 99), it is among the core tasks of a democracy to find an agreement on how much leakage in redistribution is acceptable.

As shown in survey research (e.g. Pirttila and Uusitalo, 2010) and experimental studies (e.g. Charness and Rabin, 2002; Engelmann and Strobel, 2004; Paetzel et al., 2014), a substantive share of subjects prefer an efficient use of resources (also see Scott et al., 2001, p.751).[4] Beckman et al. (2004) conduct a laboratory experiment in the US and China to test the "leaky bucket" argument. They find that the veil of ignorance has a strong effect on accepted efficiency losses. When subjects do not know their income position, leakages of 50% are rejected in three out of four cases. When the individual income is known, however, the acceptance of higher leakage strongly rises. Barone and Mocetti (2011) examine the effect of a "leaky bucket" on subjects' tax morale – measured as attitude towards paying taxes. They find that public spending inefficiency has a strong negative effect on citizens' tax morale. Barone and Mocetti (2011, p. 6) point out that redistribution through a "leaky bucket" represents a *"waste of resources and implies a less favorable ratio between the supply of public goods and the taxes used to finance them"*. Therefore, the tax payers punish the tax state via tax evasion if it fails to redistribute resources efficiently.

[4] A replication study by (Fehr et al., 2006) suggests that Engelmann and Strobel (2004) overstate the relevance of efficiency preference over inequity aversion. The replication study suggests that findings by Engelmann and Strobel (2004) are mainly driven by students of economics in the subject pool. Students of economics learned early in their studies that efficiency is something desirable and therefore value efficiency much more than non-economist students(Engelmann and Strobel, 2004, p.2).

The study by Krawczyk (2010) and Durante et al. (2014) are most closely related to this one. Krawczyk (2010) designed a lab experiment in which he also directly manipulates efficiency of a redistributive system that is based on a linear tax rate returning a lump sum. There is either no inefficiency ($\lambda = 0$) or an efficiency loss of 30% ($\lambda = 0.3$). Using a very different experimental design in which participants chose four tax rates that could affect their own and others payoffs, Durante et al. (2014) distinguish between treatment conditions with no inefficiency ($\lambda = 0$), an efficiency loss of 12.5% or 25%. Krawczyk (2010, p.135-136) finds that transfer choices were significantly lower in the treatment conditions with the 30% efficiency loss. Durante et al. (2014, p.135-136) find that while the average tax rate is similar in sessions with an efficiency loss of 0% and 12.5 subjects chose significantly lower tax rates only in sessions in which redistribution is associated with a 25% loss in tax revenue.

Despite these similarities in the experimental treatment, many of the experimental design choices of this study are subtly different from previous research. While Krawczyk (2010) used only a single measure of efficiency loss (30%) but varies subjects' endowment (random vs. real-effort), this study keeps subjects' endowments exogenous but varies the size of efficiency losses (5%, 20% or 60%). What is more, the voting procedure in this study is very different than the one used by Krawczyk (2010) (random selection of one vote) by Esarey et al. (2012a,b); Barber et al. (2013) (median vote) or Durante et al. (2014). The voting procedure utilized in this study allows for numerical communication which is supposed to stress the group harm induced by voting for redistribution with efficiency loss.

The literature on fairness and redistribution has pointed out that voting behind the veil of ignorance (as implemented in Krawczyk, 2010) elicits decisions which are closer to subjects' fairness preferences than decisions after lifting the veil (Nicklisch and Paetzel, 2018). In contrast to Krawczyk (2010), we elicit preferences for redistribution exclusively after getting the information of their own income and the income distribution in their group. In this study, subjects must communicate to arrive upon a common tax rate.[5] In this respect, our study also tests whether previous experimental results that efficiency loss decreases aggregate support for redistribution is still robust in alternative design choices (e.g. Krawczyk, 2010; Durante et al., 2014), specifically towards numerical communication and different sizes of efficiency loss. What remains particularity puzzling about previous research is that no difference has been made to which extent the negative effect of efficiency loss on support for redistribution results from a rational egoistic choice or social concerns about efficiency. This puzzle is at the center of this study.

3. Theoretical Framework and Hypotheses

3.1. Egoistic Preferences

Before we continue theorizing the effect of efficiency loss on subjects' preferences for redistribution, we present the redistribution mechanism borrowed from the MR model and explain how

[5]The communication tool was also used in Kittel et al. (2015); Lorenz et al. (2017); Paetzel et al. (2018) and will be explained below in some more detail.

an efficiency loss is implemented into this mechanism. The redistribution mechanism consists of a proportional tax rate that is imposed on all incomes. The tax revenue is distributed in equal shares among all group members. Depending on the size of the tax rate, this mechanism redistributes income from those with gross incomes above the mean toward those with gross incomes below the mean. The single-dimensional conflict over the size of the proportional rate is decided through majority rule. Thus, under the premise of fully rational and egoistic agents, the group member with the median gross income is pivotal. The redistribution mechanism for N individuals with *gross incomes* $x_1, \ldots, x_N$ can be defined as:

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

where y_i is the *net income* of individual i under redistributive *tax rate* τ. The average gross income is denoted $\bar{x} = \frac{1}{N} \sum_{j=1}^{n} x_i$. Individuals with gross 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 ($\tau = 0\%$). 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. The efficiency loss resp. "leaky bucket" is implemented by adding an inefficiency factor $\lambda = \{0, .., 1\}$ to the redistribution mechanisms (also see Krawczyk, 2010; Durante et al., 2014). The inefficiency factor λ determines the fraction of the tax revenue which disappears in transit (compare Equation 2).

$$y_i = (1 - \tau)x_i + (1 - \lambda)\tau\bar{x}, \tag{2}$$

Individuals with a gross income above mean income after redistribution through the leaky bucket ($x_i > (1 - \lambda)\bar{x}$) will still aim for no redistribution ($\tau = 0\%$), because these subjects lose more by paying taxes than they gain through the transfer income. In contrast, only individuals with an income below $(1 - \lambda)\bar{x}$ maximize their income through full redistribution ($\tau = 100\%$). Introducing an efficiency loss changes the rational choice under egoistic preferences for those subjects with a gross income that lies between $\bar{x}$ and $(1 - \lambda)\bar{x}$. Without an efficiency loss ($\lambda = 0\%$), individuals with a gross income equal to the average income $\bar{x}$ are indifferent with regards to the level of redistribution. However, with inefficiency ($\lambda > 0$), individuals with an income of $(1 - \lambda)\bar{x}$ are indifferent concerning the level of redistribution. The higher the inefficiency parameter λ, the more individuals have an egoistic preference for no redistribution. That is because by redistribution through a "leaky bucket", a fraction of $\tau\lambda$ of the total income is lost in transit. Thus, the egoistic voter prediction states:

H$_1$ *Subjects with a gross income above* $(1 - \lambda)\bar{x}$ *vote for* $\tau = 0\%$ *and subjects with a gross income below* $(1 - \lambda)\bar{x}$ *vote for* $\tau = 100\%$

3.2. Avoidance of Actively Harming

Human behavior is rarely exclusively guided by rational self-interest. When deciding upon redistributive taxation, subjects' vote choice tends to depend on multiple, even conflicting motives, including fairness (e.g. Kittel et al., 2015; Nicklisch and Paetzel, 2018), group loyalty (Klor and Shayo, 2010), inequality aversion (e.g. Tyran and Sausgruber, 2006) and the framing of the vote choice (e.g. Lorenz et al., 2017; Paetzel et al., 2018). Laboratory research on the MR model (Agranov and Palfrey, 2015) and simplifications of it (e.g. Esarey et al., 2012a,b; Barber et al., 2013), also suggest that subjects' behavior is not fully determined by egoistic preferences. Subjects tend to eschew voting for extreme net income distributions, as $\tau = 0\%$ and $\tau = 100\%$ hardly occur. Instead, subjects with a gross income above $\bar{x}$ tend to support modest levels of redistribution compared to subjects with a gross income below $\bar{x}$. The latter are in support of higher levels of redistribution but rarely agree on equal distribution of net incomes. In a recent literature review on fairness and redistribution, Nicklisch and Paetzel (2018) provide evidence that moderate levels of redistribution are predominantly found as the preferred level of redistribution both in surveys and experimental work.

Avoidance of actively harming a social group may provide another explanation for why support for redistribution falls below egotistically expected levels in the presence of efficiency loss. Introducing an efficiency loss to the redistribution mechanism (represented by λ) is expected to have a twofold effect on subjects' vote choice. First, under the premises of egoistic subjects, efficiency loss involved in the redistribution mechanisms (represented by parameter λ) decreases collective support for redistribution (see 3.1). For each magnitude of efficiency loss, we can determine a corresponding egoistically preferred tax rate. Second, if subjects also adhere to the intuitive judgment principles of "do not harm (through action)" they are predicted to prefer less redistribution when redistribution comes with an efficiency loss (Royzman and Baron, 2002).

In the presence of an efficiency loss, support for redistributive taxation harms the group since taxes reduce aggregate income. The reduction of aggregate income is created only if subjects actively vote in favor of redistribution. Thus, voting in favor of redistribution makes these voters responsible for the loss of group income, no matter why they supported redistribution in the first place (e.g. for egotistic reasons, fairness concerns etc.). Voting on redistributive taxation with an efficiency loss activates subjects' social concern of "not to harm through action" and lets us presume that efficiency loss decreases support for redistribution beyond rational egoistic motives.

This explanation relates to a well-known bias in cognitive psychology, namely the omission bias (Royzman and Baron, 2002, p.165), which occurs when people are unwilling to bring about a preferred outcome through harmful action, when the alternative involves omission that is even more harmful. The omission bias is the preference for harm caused by omissions over equal or lesser harm caused by acts (Baron and Ritov, 2004, p.74). In the context of majority voting on redistributive taxation with inefficiency, this bias works in a slightly different way as there is no binary choice resulting in two different harms. In addition, it is also important to note that the proposed explanation is different from mere efficiency preferences, which are based on the Kaldor-Hicks criterion (Kaldor, 1939; Hicks, 1939). We argue that what prevents subjects from voting in

favor of redistribution is not an efficiency concern, but rather avoidance of actively harming the social group. To test the empirical validity of the avoidance of actively harming argument against mere efficiency preferences, we measure subjects' efficiency preferences using the Balafoutas et al. (2012, 129) distributional-preferences elicitation task.

Contrary to both, the rational-egoistic prediction and the efficiency preference, there is no need to presume a strict proportional relationship between the size of leakage and a consequent reduction in preferred taxation if we presume that subjects voting behavior is affected by their social concern not to harm through action. Avoidance to actively harm the groups total payoff should not have to be necessarily increasing with the leak size because independent of the leak size, redistribution burns a fraction of total income. For that reason, we introduce three different size of leakage into the redistribution mechanism (small, 5%, medium, 20% and large 60% leakage). The values for λ are to some extent arbitrary (also see Krawczyk, 2010; Durante et al., 2014), yet these values are believed to offer enough range to mimic a small, medium and large efficiency loss (cf. Beckman et al., 2004). If the effect of efficiency loss is based on cognitive biases, a tipping-point pattern may occur with increasing levels of inefficiency, as social efficiency concerns outweigh egoistically preferred levels of redistribution only if the efficiency loss is above a certain subjective threshold.

H$_2$ *With increasing inefficiency, subjects' vote for lower levels of redistribution.*

The effect of efficiency loss on support for redistribution is expected to depend on subjects income position. Egoistic subjects with a gross income above $(1-\lambda)\bar{x}$ are predicted to vote for $\tau = 0\%$, regardless of the occurrence and size of efficiency loss. If subjects' egotistic preferences and social efficiency concerns are consistent, both suggest to vote against redistribution. The two types of preferences are in conflict with each other if subjects' gross income is below $(1-\lambda)\bar{x}$. The egoistic preference suggests voting for $\tau = 100\%$, while the social efficiency concern suggest voting against redistribution with higher level inefficiency. If subjects are equipped with social efficiency concerns, inefficiency increases their psychological cost of voting for redistribution. On these grounds, we hypothesize:

H$_3$ *The negative effect of inefficiency on support for redistribution is stronger for subjects with a gross income below* $(1-\lambda)\bar{x}$*, compared to subjects with a gross income above* $(1-\lambda)\bar{x}$*.*

A matter of particular relevance for the assessment of the merits of democracy refers to the question of whether the theorized effect of system inefficiency on subjects vote choice as summarized in H2 and H3 disappears in the political decision process or whether it persists, and thereby also affects the collectively agreed tax rate. Similar to economists who believe that interactions in markets will correct individual irrationality (e.g. Fehr and Tyran, 2005), political scientists tend to show an implicit hope that the irrationality of some voters will be suspended in the process of political deliberation. The "wisdom of crowds" literature, for example, suggests that social groups can be remarkably smarter and knowledgeable when their average decisions are compared with the decisions of individuals (Surowiecki, 2005). However, Lorenz et al. (2011) show that a "social

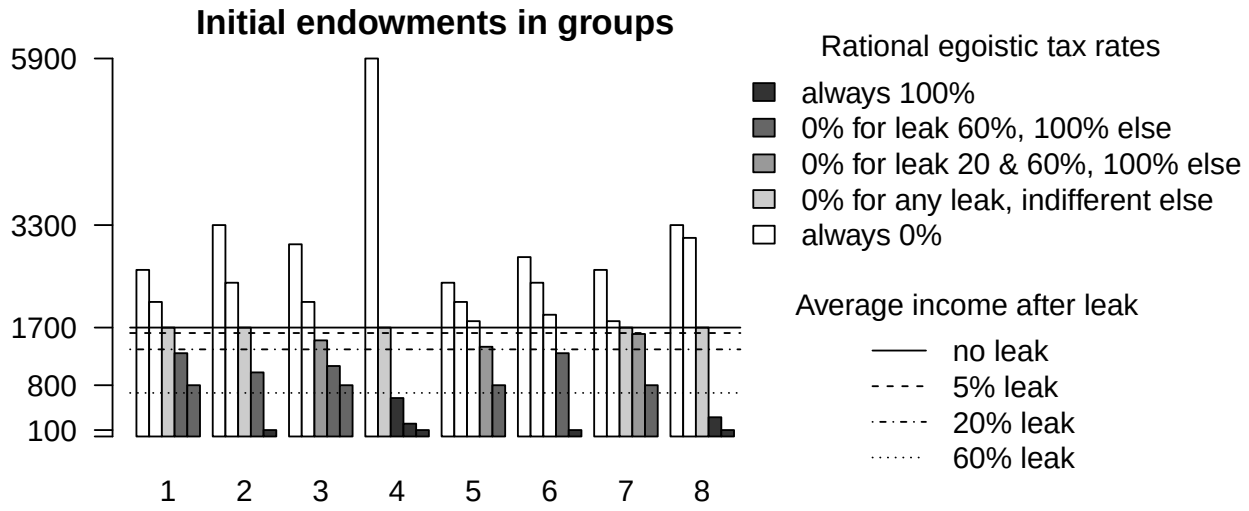
influence effect" diminishes the diversity of the crowd without improvements of its collective error, leading to a state of herd stupidity (also see Bikhchandani et al., 1992). Such a "bandwagon" effect is also known from experimental voting literature in economics (e.g. Tyran, 2004). To this end, it remains an open empirical question whether the psychological effect of system inefficiency on subjects vote choice disappears in the collective group decision process or persists.

4. Experimental Design and Procedures

Building on previous experimental work on the redistribution mechanism outlined above (e.g. Esarey et al., 2012a,b; Barber et al., 2013; Kittel et al., 2015), we use the redistribution mechanism of Equation 2 to test the impact of a "leaky bucket" with different degrees of inefficiency in a laboratory democracy.

4.1. Experimental Vehicle

Figure 1: Distributions of endowments. The horizontal lines show the average income after redistribution with a "leaky bucket".



In each of the eight rounds, subjects were randomly assigned into groups of five. In each round, subjects received endowments from the pre-specified distributions D as displayed in Figure 1 via a random assignment. Each distribution has an average endowment of $\bar{x} = 1700$. Figure 1 also show the rational egoistic preferences for tax rates for the subjects for each endowment with and without the different "leaky buckets". Table 1 reports the mean rational egoistic preferences for all distributions (D1-D8) and leakages. We focus also on the means of predictions to allow for a simple comparison between observations and predictions.

The laboratory experiment was conducted with z-tree Fischbacher (2007) and consisted of the following stages:

Table 1: Mean rational egoistic preferences

Leakage	D1	D2	D3	D4	D5	D6	D7	D8	mean
$\lambda = 0$	0.5	0.5	0.6	0.7	0.4	0.4	0.5	0.5	0.51
$\lambda = 0.05$	0.4	0.4	0.6	0.6	0.4	0.4	0.4	0.4	0.45
$\lambda = 0.20$	0.4	0.4	0.4	0.6	0.2	0.4	0.2	0.4	0.38
$\lambda = 0.60$	0.0	0.2	0.0	0.6	0.0	0.2	0.0	0.4	0.17

1. **Information about endowments and individually preferred decision.** Subjects were informed about their own endowment and the endowment of all other group members. In this stage, subjects were privately asked to enter their ideally preferred tax rate. The upper part of Appendix Figure B.6 presents a sample screen of the communication stage. We decided to also analyze this not monetarily incentivized decision because: (i) no strategic concerns should play a role, (ii) this allows us to compare experimental findings with findings from surveys and (iii), in line with previous research on fairness-principles, we argue that a not monetarily incentivized decision is appropriate to elicit what subjects think is the fair level of redistribution.[6]
2. **Numerical communication stage.** Each subject had to make ten proposals which appeared in a five-column table visible to all group members. The first proposals appeared in the table after the last group member confirmed their proposal. All other proposals appeared in real-time after confirmation by the particular subject. The endowments were displayed throughout the whole communication stage. Subjects could only communicate with numbers to coordinate their final decisions. The lower part of Appendix Figure B.6 presents a sample screen of the communication stage.
3. **Collective decision stage.** After the tenth proposal, a decision box appeared where subjects had to privately enter their final decision. A group decision was achieved when at least three subjects decided on the same number (majority rule). The net income was then computed using the redistributive mechanism explained in Section 2. If the group failed to reach a collective decision, their income was 50% of the endowment or 850 (50% of the average endowment) whichever was lower.
4. **Information payoff.** Subjects were informed on the result of the collective decision and their resulting net income from the eight periods at the end of the eighth period. The payoff in Euro was defined by a subject's average earnings over eight periods. The exchange rate was: 1 experimental token = 0.005 €.

[6] Compare e.g. Gaertner and Schokkaert (2012), Konow (2003), Yaari and Bar-Hillel (1984) and see Bardsley et al. (2010) for a general discussion of monetary incentives in experiments.

4.2. Experimental Procedures

Subjects played eight different gross income distributions (rounds). After the eighth round, subjects completed a questionnaire consisting of questions on their political attitudes, socio-demographic background (age, gender) and field of study. Subjects partisan orientation is measured on a 1 to 10 scale, where 1 represents extreme right-wing orientations and 10 represents an extreme left-wing orientations.

Subjects were recruited from the University of Oldenburg and the University of Hamburg using the software ORSEE (Greiner, 2015) and hroot (Bock et al., 2014). Using a between-subjects design, 100 subjects played the no leakage condition, 75 subjects played the 5% leakage condition, 75 subjects the 20% leakage condition, and another 75 subjects played the 60% leakage condition. With 325 subjects in total and 8 rounds per subject, the dataset contains 2600 individual observations. The written instructions can be found in AppendixC. Table 2 provides an overview of treatments and observations.

Table 2: Overview Treatments

Treatment	Subjects	Rounds	Observations
$\lambda = 0$	100	8	800
$\lambda = 0.05$	75	8	600
$\lambda = 0.20$	75	8	600
$\lambda = 0.60$	75	8	600
Overall	325		2600

4.3. Data Analysis

Fractional logistic regressions are used to estimate the effect of fiscal leakage on the two dependent variables, subjects' ideally preferred tax rate (Table 3) and subjects' final vote on tax rate (Table 4) after group communication. Fractional logistic regressions are particularly suitable for analyzing proportions (Papke and Wooldridge, 1996). Each model includes a set of dummies specifying the size of the leakage (5%, 20% or 60%). The no leakage treatment serves as the reference category. For each of the two dependent variables, we specify three regression models. In order to account for subjects' rational prediction under the presumption of fully egoistic preferences, Model 1 includes two dummy variables accounting for whether subjects should vote for $\tau = 100\%$ or $\tau = 0\%$. The rational prediction "indifferent" serves as the reference category. This categorical operationalization of subjects' egoistic vote, however, makes strong assumptions about their rationality. Model 2, therefore, uses an alternative measure (r) which accounts for the distance between someones own gross income and the group mean gross income. We take the log of this measure to allow for relative comparisons. The continuous operationalization of subjects' egoistic vote is thus defined as $r = ln(\frac{x_i}{(1-\lambda)\bar{x}})$.

Models 1 and 2 are dedicated to test H1 and H2. Model 3 includes a set of multiplicative interaction terms between the three leakage dummies (5%, 20% or 60%) and r to test H3 on whether the leakage effect is conditional on subjects' rational egoistic prediction. Each model controls for age, gender, subjects' field of study and subjects self-reported right-left partisan orientation. Additionally, each model includes a dummy variable accounting for subject pool effects, since the experiments were conducted at two different laboratories.[7]

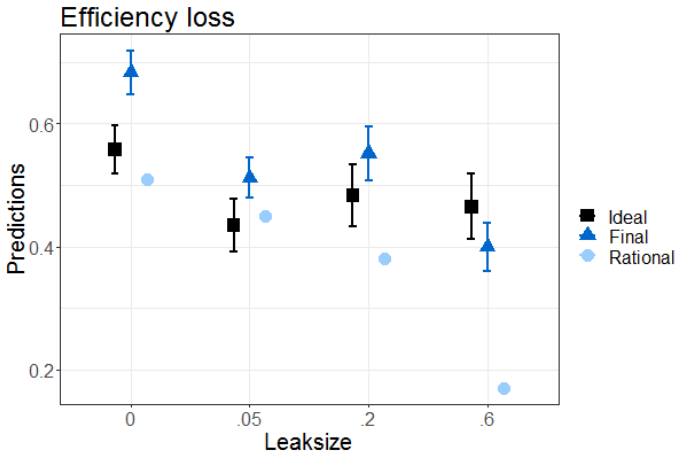
5. Empirical Results

5.1. Basic Results

Predicted effect plots are used to ease the interpretation of regression results from Tables 3 and 4. Using averages from the raw data yields similar results. The predicted effect plots have the advantage of taking into account the effect of control variables, some of which have an effect on support of redistribution. Thus, the predicted effect plots provide a clearer representation of the treatment effect.

Figure 2 provides a visualization of results and compares the median voter prediction (see Table 1) and subjects actual behavior for all treatment conditions ($\lambda = 0\%, 5\%, 20\%$ and 60%). Specifically, Figure 2 shows that over all distributions, we would expect 51% as the average tax rate for no leak, 45% for a leak of 5%, 38% for a leak of 20%, and just 17% for a leak of 60% when all subjects would vote rationally (also see Table 1).

Figure 2: Average tax rate by treatment conditions



Findings from Figure 2 can be summarized in three points: First, in each treatment condition, we see that means of redistribution are above the means of predictions for leaks of $\lambda = 0\%, 20\%$ and 60%. Except for the treatment with a leak of $\lambda = 5\%$, in which the ideally preferred tax rate matches rational prediction.

[7]The inclusion of period fixed effects does not alter any of the substantive findings.

Table 3: Ideally preferred tax rate

	Model 1	Model 2	Model 3
tau = 100	0.587***		
	[0.18]		
tau = 0	-0.966***		
	[0.19]		
Diff. Inc. (ln)		-0.737***	-0.959***
		[0.06]	[0.13]
Leak 5%	-0.482***	-0.561***	-0.528***
	[0.14]	[0.14]	[0.14]
Leak 20%	-0.255*	-0.338**	-0.318**
	[0.15]	[0.15]	[0.15]
Leak 60%	-0.511***	-0.422***	-0.480***
	[0.15]	[0.16]	[0.16]
Right Left (RL)	1.030***	0.991***	1.009***
	[0.37]	[0.37]	[0.37]
Female	0.0432	0.0583	0.0536
	[0.11]	[0.11]	[0.11]
Age	-0.00342	0.00137	0.00126
	[0.01]	[0.01]	[0.01]
Natural sciences	0.272	0.297	0.300
	[0.23]	[0.22]	[0.22]
Social sciences	0.127	0.171	0.176
	[0.18]	[0.18]	[0.18]
Business sciences	0.135	0.201	0.199
	[0.20]	[0.20]	[0.20]
Other	0.0633	0.0970	0.0985
	[0.19]	[0.19]	[0.19]
Subject pool	-0.113	-0.104	-0.105
	[0.12]	[0.12]	[0.12]
Leak 5% x Diff. Inc . (ln)			0.287*
			[0.17]
Leak 20% x Diff. Inc . (ln)			0.169
			[0.19]
Leak 60% x Diff. Inc . (ln)			0.368**
			[0.17]
Constant	-0.0388	-0.564	-0.590
	[0.51]	[0.47]	[0.48]
Observations	2600	2600	2600
Pseudo R-squared	0.108	0.104	0.106
AIC	3243.0	3256.0	3254.3
BIC	3325.0	3332.2	3348.1
LL	-1607.5	-1615.0	-1611.2

Notes. Fractional logistic regression . Dependent variable: Individually preferred tax rate (0-1). Robust standard errors in brackets. *$p \leq 0 > .1$, **$p \leq 0.05$,***$p \leq 0.01$.

Table 4: Finally preferred tax rate

	Model 1	Model 2	Model 3
tau = 100	0.0166		
	[0.20]		
tau = 0	-0.838***		
	[0.20]		
Diff. Inc. (ln)		-0.390***	-0.560***
		[0.04]	[0.10]
Leak 5%	-0.673***	-0.752***	-0.723***
	[0.11]	[0.11]	[0.11]
Leak 20%	-0.505***	-0.583***	-0.561***
	[0.13]	[0.13]	[0.13]
Leak 60%	-1.242***	-1.226***	-1.264***
	[0.12]	[0.12]	[0.12]
Right Left (RL)	0.652**	0.628**	0.643**
	[0.28]	[0.28]	[0.28]
Female	0.0745	0.0792	0.0750
	[0.09]	[0.09]	[0.09]
Age	-0.00537	-0.00274	-0.00294
	[0.01]	[0.01]	[0.01]
Natural sciences	0.179	0.196	0.196
	[0.18]	[0.18]	[0.18]
Social sciences	0.0309	0.0543	0.0556
	[0.16]	[0.15]	[0.15]
Business sciences	0.0642	0.104	0.100
	[0.17]	[0.17]	[0.17]
Other	0.119	0.135	0.134
	[0.17]	[0.16]	[0.16]
Subject pool	-0.113	-0.109	-0.109
	[0.10]	[0.09]	[0.09]
Leak 5% x Diff. Inc . (ln)			0.195*
			[0.11]
Leak 20% x Diff. Inc . (ln)			0.147
			[0.12]
Leak 60% x Diff. Inc . (ln)			0.291**
			[0.12]
Constant	0.918**	0.351	0.328
	[0.45]	[0.39]	[0.39]
Observations	2600	2600	2600
Pseudo R-squared	0.078	0.076	0.078
AIC	3327.7	3333.0	3333.6
BIC	3409.8	3409.2	3427.4
LL	-1649.9	-1653.5	-1650.8

Notes. Fractional logistic regression . Dependent variable: Finally, tax rate voted for (0-1). Robust standard errors in brackets. *$p \leq 0 > .1$, **$p \leq 0.05$,***$p \leq 0.01$.

Second, the existence of a fiscal leakage is associated with a reduction in both, the ideally preferred and finally chosen tax rate. Models 1-3 in both Tables (3 and 4) each have similar results; all treatment dummies are significant and of the expected negative sign. The reduction is the strongest in the 60% leakage condition. A 5% and a 20% leakage both trigger a substantial reduction of the average ideally preferred tax rate, and the tax rate after numerical communication compared to the situation without leakage. Surprisingly, the reduction is slightly stronger for the 5% leakage. However, the difference to the lower reduction under the 20% leakage is not significant, since the 95% error bars are largely overlapping. This implies that subjects respond towards fiscal leakage by voting for a lower tax rate, but a 5% leakage and a 20% leakage have the same effect. Only with a comparatively large leakage of 60% does the reduction in the ideally preferred tax rate and the tax rate after numerical communication significantly increase.

Third, we find no evidence that the process of numerical communication washes out the fiscal leakage effect. On the contrary, in treatment conditions with leaks of $\lambda = 0\%$, 5% and 20%, the average tax rate after numerical communication is higher than the average ideal tax rate before numerical communication. In the treatment with the highest leakage ($\lambda = 60\%$), communication seems to protect the electorate from 'wasting' money.

In total, Figure 2 shows that efficiency loss decreases support for redistribution and the decreasing effect shows a tipping-point pattern with respect to the size of fiscal leakage, which supports H2. However, the overall level of redistribution is still above the egoistic prediction.

Figure 3: Egoistic prediction

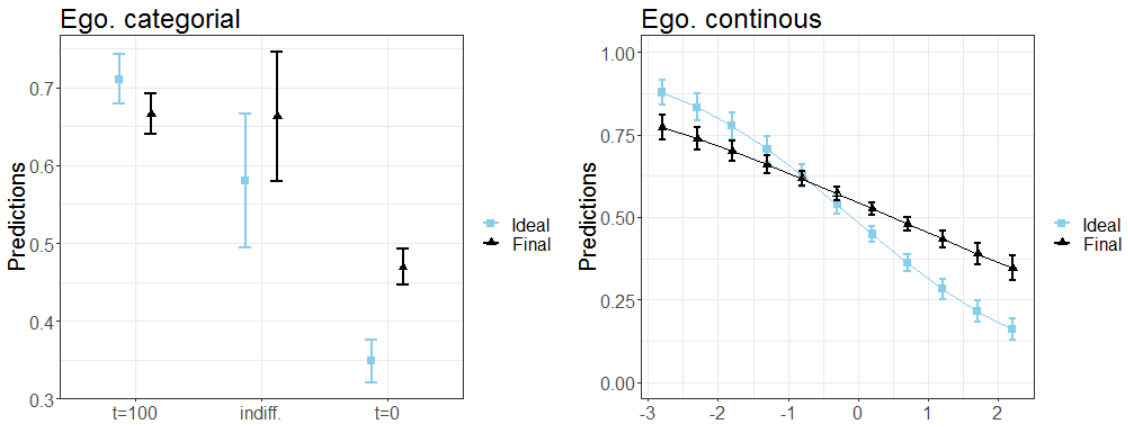


Figure 3 provides more detailed information on whether decisions follow the egoistic prediction. The left panel of Figure 3 shows the predicted effect using the categorical operationalization of egoistic preferences utilized in Model 1 and the right panel shows the predicted effect for the relative gross income measure r utilized in Model 2. For Model 1, we find that the individually preferred redistribution (before communication) is about twice as large for subjects whose rational prediction is to vote for maximum redistribution (about 70%) than for subjects who favor no redistribution according to their rational prediction (about 35%). This means that subjects whose egoistic preference is to vote for $\tau = 0\%$, vote for too much redistribution, while subjects whose

egoistic preference is to vote for $\tau = 100\%$ vote for too little redistribution.

Concerning subjects' final decision (also see Table 4), the dummy variable for subjects having egoistic preferences to vote for $\tau = 100\%$, has no significant effect on their final vote choice, indicating that vote preferences have changed after numerical communication phase. Nevertheless, in line with H1, the egotistic prediction is an important determinant of subjects vote choice. Estimating the effect of the two dummies for the rational vote choice for the ideally preferred tax rate and the finally chosen tax rate without any controls yield an overall R^2 of 22,8 (ideal) and 12,5 (final). On the other hand, Figure 3 shows that a very substantive share of voting behavior deviates from the rational egoistic prediction, as subjects with a gross income below $(1-\lambda)\bar{x}$ favor too little redistribution and subjects with a gross income above $(1-\lambda)\bar{x}$ favor too much redistribution.

This overall pattern for the effect of egoistic preferences on support for redistribution can also be observed using r to account for the egoistic prediction (Model 2). Bearing in mind that r is defined as $ln(\frac{x_i}{(1-\lambda)\bar{x}})$; subjects with a relative income difference of $r = 0$ are indifferent, subjects with $r > 0$ are predicted to support redistribution and subjects with $r < 0$ are predicted to be against redistribution. The right panel of Figure 3 shows that support for redistribution increases when r decreases and support for redistribution decreases if r increases. This pattern holds for the ideal and the final vote decision, however, again after communication the effects of extreme values of r are cushioned.

Figure 4: Egoistic prediction conditioned by efficiency loss

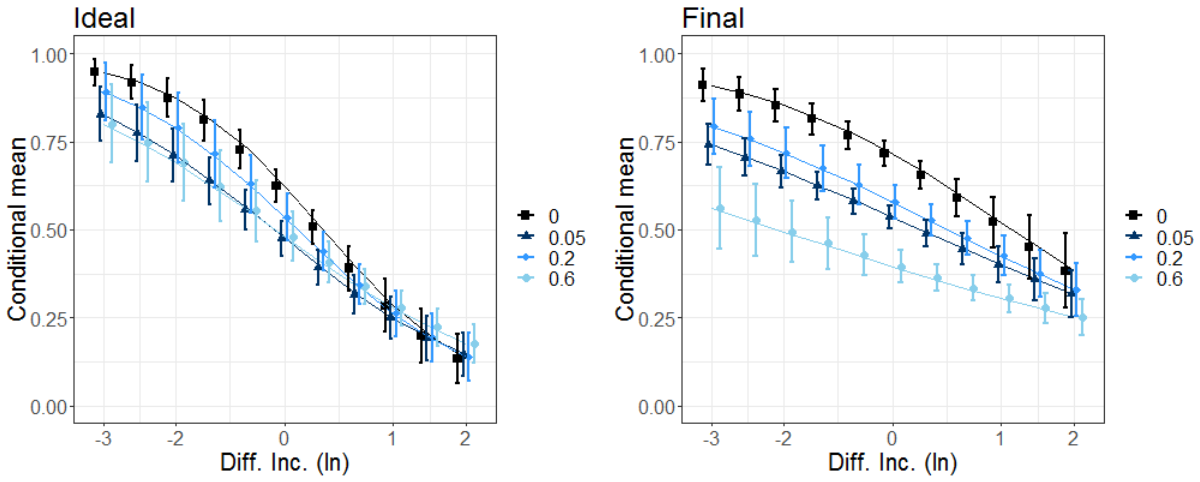


Figure 4 is dedicated to the analysis of H3. Figure 4 shows the ideally preferred tax rate (left panel) and the finally chosen tax rate as a function of the relative income (r) for each inefficiency ($\lambda = 0\%, 5\%, 20\%$ and 60%). In general, we see that the "leaky bucket effect" is stronger for subjects with an income below the mean than for subjects with an income above the mean. The interaction of the leakage with the relative income r in Model 3 in Table 3 and Table 4 show that this effect is significantly stronger for the treatments with a leakage of 5% and 60%.

The negative effect of inefficiency on support for redistribution is stronger with an increasing relative income distance r. With high values of r, leakage has a declining effect on subjects' ideal

vote choice, which means that leakage has no effect on subjects who have a strong incentive to vote for $\tau = 0\%$ based on their distance. The opposite can be observed for subjects who have a strong distance-wise incentive to vote for $\tau = 100\%$. In line with H3, these subjects take into account the inefficiency of the redistributive system and favor less redistribution with a higher efficiency loss.

Among the control variables, only subjects' self-reported right-left orientation helps to explain support for redistribution. There is robust evidence that subjects who consider themselves left-leaning vote for higher redistributive taxation (coefficient RL is always significant in Table 3 and Table 4). The overall pattern suggests that the effects of subjects' partisan orientation on the preferred tax rate gets slightly smaller after the stage of numerical communication. But still, subjects' self-reported ideological orientation exerts a persistent effect on subjects' vote choice. Probing deeper, we find no evidence that the effect of subjects' self-reported partisan orientation on support for redistribution is conditioned by the size of the efficiency loss. This means that even a strong partisan orientation does not immunize subjects against the fiscal leakage effect. This conditional effect of fiscal leakage can be observed for the ideal and final vote choice.

5.2. Probing Deeper

Finally, as part of the robustness analysis, we controlled for subjects' efficiency preferences measured by the Balafoutas et al. (2012, p. 129) distributional-preferences elicitation task. In this task each subject is exposed to a series of ten binary choices between allocations that both involved their own payoff and a payoff for a randomly matched anonymous second subject. According to their choices (see Online Appendix for Instructions), each subject is classified into one of four different and mutually exclusive distributional preference types, namely inequality averts (IAV), efficiency seekers (EFF), inequality lovers (ILO) and spiteful agents (SPI). In addition, we constructed a metric variable measuring subjects' Willingness to Pay (WtP) for efficiency. The auxiliary analysis are summarized in Appendix Table A.6 and Appendix Table A.7. Since there were no ILO- and SPI-types in our sample, the analysis induces only IAV- and EFF-types. First, controlling for strict distributional preference types and subjects' WtP for efficiency does not alter any of the substantive findings reported above. Second, none of the four distributional preference types exerts a statistically significant direct or conditional effect on subjects' ideal and final vote choice. These findings strengthen our confidence that the effect of fiscal leakage on support for redistribution is not simply explained by subjects' efficiency preferences but by avoiding actively harming the group. In the distributional-preferences elicitation task by Balafoutas et al. (2012, p. 129), efficiency preferences are defined as surplus maximization, ignoring the social group context in which redistribution takes place. The judgment principles "do not harm through action" tend to provide better explanations for why efficiency loss reduces support for redistribution, than utilitarian efficiency preferences.

6. Discussion and Conclusions

Contrary to politico-economic models in the tradition of Meltzer and Richard (1981), we see that despite growing income inequality (OECD, 2011, 2015), there have been no greater political

efforts to increase redistributive taxation (Scheve and Stasavage, 2016; Bechtel et al., 2018). This study argues that the efficiency loss of the redistributive tax system helps to understand why more inequality does not necessarily lead to more redistribution in a democracy. In theoretical terms, we draw on Okun's (1975) idea of redistribution with a "leaky-bucket" and test the effect of different sizes of efficiency loss on individual and aggregate support for redistribution.

In order to qualify the effect of fiscal leakage on support for redistribution, it is important to bear in mind that there is only qualitative support for the rational prediction based on egoistic preferences, as we find that subjects with a gross income above $(1-\lambda)\bar{x}$ vote for less and subjects with a gross income below $(1-\lambda)\bar{x}$ vote for more redistribution. Even though this tendency is in line with egoistic preferences and empirically robust, there is also robust evidence that those who should vote for $\tau = 0\%$ support too much and those who should egotistically vote for $\tau = 100\%$ support too little redistribution (H1). Fiscal leakage has a twofold effect, following the egoistic preferences paradigm it reduces support for redistribution since $(1-\lambda)\bar{x}$. This result is also consistent with theoretical predictions that larger efficiency losses lead to smaller governments (Becker, 2003) and with previous experimental research by Krawczyk (2010) and Durante et al. (2014) despite all the design differences.

What is more, fiscal leakage activates subjects social concerns about efficiency loss and suppresses egoistic support for redistribution, particularly at the low end of the gross income distribution. The negative effect of fiscal leakage remains even after controlling for rational egoistic preferences. The tipping point pattern for the effect of different sizes of leakage on lowering individual and collective preferences for redistribution supports this conclusion (H2). The negative effect of small (5%) and medium (20%) sized fiscal leakage on support for redistribution are about the same. Only if efficiency loss is very high (60%) does support for redistribution decrease drastically, even though support for redistribution is still above the rational prediction. This pattern is consistent with previous findings by Durante et al. (2014). What is more, the effect of efficiency loss on support for redistribution outlives the process of numerical communication and is therefore also reflected in the collectively agreed tax rate. The effect is not reduced through group communication. On the contrary, the leakage effects tend to be stronger in the final vote choice.

Finally, the negative effect of efficiency loss on subjects' support for redistribution is conditional on their income position (H3). The effect is stronger for those subjects whose rational egoistic preference would be to vote in favor of redistribution. In this income domain, efficiency loss suppresses egoistic preferences in favor of redistribution.

This study explored the effect of different sizes of efficiency loss on support for redistribution with exogenous endowment. Previous research, however, indicates that support for redistribution is affected by whether endowments are earned or randomly assigned (Krawczyk, 2010; Durante et al., 2014; Kittel et al., 2015). This poses the question of whether the effect of efficiency loss would change with endogenous endowments. With earned endowments, it could be that some participants would see as a greater shame to let some of the joint payoff go to waste and Krawczyk (2010) finds some tentative evidence for this expectation. Endogenously determined endowments are expected to lower the ideally preferred and the implemented level of redistribution but not to

alter the effect of different sizes of efficiency loss on support for redistribution. In order to avoid any contamination, we thus choose to keep the type of endowment allocation constant.

Findings from this study may have important policy implications. Efficiency can be used to justify inequality (Nozick, 1976; Hayek, 1976). The efficiency with which welfare programs transfer income from rich to poor, however, is usually hard to measure. Despite this, as made apparent in our results, voters respond to inefficiency in the context of redistribution. Skillful politicians might take advantage of the difficulties of having valid information on the efficiency of redistribution programs and understate the efficiency of such programs in order to stir voters fear of system inefficiency as a means to make voters that should be egotistically in favor of redistribution, vote against it. Thus, from a policy-making perspective, presenting and reproducing a participial negative image of the efficiency of the redistributive system can be an effective measure to make voters irrationally vote against redistribution.

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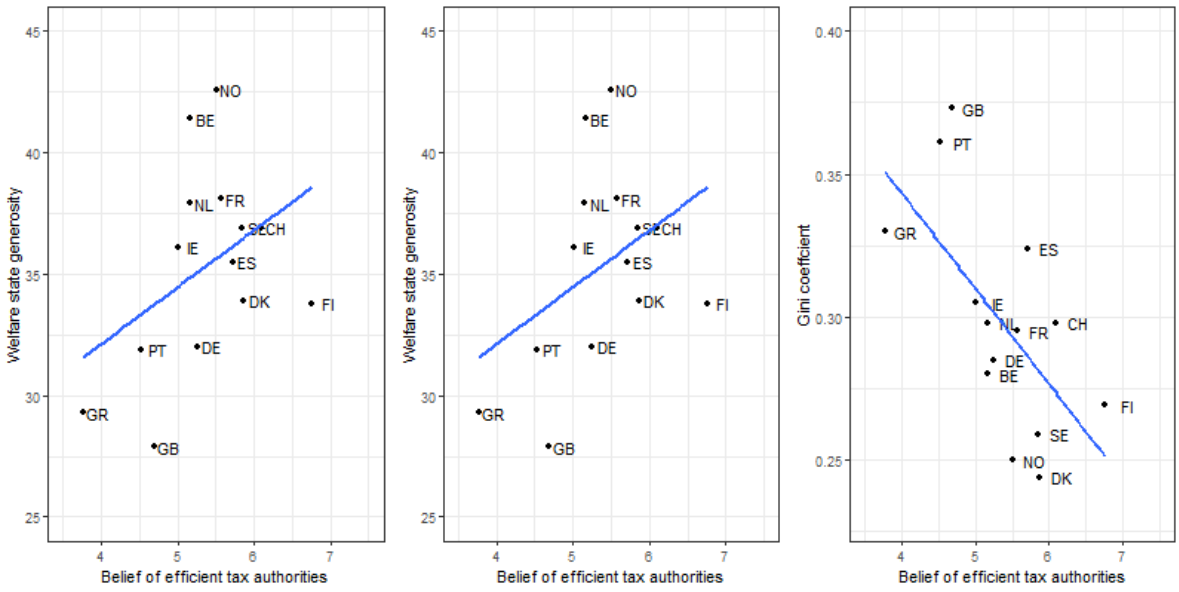
Online Appendix (web supplement)

AppendixA. Additional Figure and Tables

Figure A.5: Perceived efficiency of tax authorities and welfare spending.



*Note:*In the 2008 European Social Survey ESS (2008), respondents were asked how efficient they think their national tax authorities are ("And how efficient do you think the tax authorities are at things like handling queries on time, avoiding mistakes and preventing fraud? Please use this card where 0 means they are extremely inefficient in doing their job and 10 means they are extremely efficient."). Figure A.5 plots the weighted country specific response to this item against social spending (OECD, 2017), welfare generosity (Scruggs and Kuitto, 2014) and income inequality (OECD, 2016) for 14 OECD countries in 2007. The country sample is restricted by the availability of the generosity indicator (not available for Eastern European countries) and the ESS sample. While there is only a moderately positive association between the perceived efficiency of tax authorities and welfare spending (pairwise correlation 0.19; p-value 0.52), the positive association is rather strong with welfare generosity (pairwise correlation 0.41; p-value 0.14), and strongly negative with respect to income inequality (pairwise correlation -0.64; p-value 0.02).

Table A.5: Descriptive

	Obs.	Mean	Std. Dev.	Min	Max
Dependent Vars.					
Ideally preferred (0-1)	2,600	0.49	0.38	0	1
Finally chosen (0-1)	2,600	0.55	0.35	0	1
Egoistic preference					
$\tau = 0\%$ (Rich Dummy)	2,600	0.59	0.49	0	1
$\tau = 100\%$ (Poor Dummy)	2,600	0.37	0.48	0	1
$\tau = 50\%$ (Indifferent Dummy)	2,600	0.04	0.19	0	1
System inefficency					
Leak 5% (Dummy)	2,600	0.23	0.42	0	1
Leak 20% (Dummy)	2,600	0.23	0.42	0	1
Leak 60% (Dummy)	2,600	0.23	0.42	0	1
Controls					
Ideological Right-Left Orientation (0-1)	2,600	0.64	0.17	0.1	1
Female	2,600	0.59	0.49	0	1
Age	2,600	25.08	5.22	17	66
Natural sciences	2,600	0.14	0.34	0	1
Social sciences	2,600	0.25	0.43	0	1
Business sciences	2,600	0.25	0.43	0	1
Other	2,600	0.29	0.45	0	1
Subject pool	2,600	0.51	0.50	0	1

Table A.6: Direct effect of efficiency preferences

	Ideally preferred		Finally preferred	
	Model 1	Model 2	Model 3	Model 4
tau=100	0.589***	0.591***	0.0147	0.0257
	[0.19]	[0.19]	[0.20]	[0.20]
tau=0	-0.963***	-0.961***	-0.840***	-0.828***
	[0.19]	[0.19]	[0.20]	[0.20]
Leak 5%	-0.471***	-0.473***	-0.660***	-0.655***
	[0.14]	[0.14]	[0.11]	[0.11]
Leak 20%	-0.246*	-0.242	-0.495***	-0.478***
	[0.15]	[0.15]	[0.13]	[0.13]
Leak 60%	-0.504***	-0.507***	-1.235***	-1.234***
	[0.15]	[0.15]	[0.12]	[0.12]
EFF	-0.166		0.0152	
	[0.48]		[0.24]	
IAV	0.0817		0.158	
	[0.26]		[0.16]	
WtP efficiency		-0.0820		-0.169
		[0.20]		[0.13]
Right Left (RL)	1.040***	1.031***	0.637**	0.654**
	[0.36]	[0.37]	[0.28]	[0.28]
Female	0.0290	0.0314	0.0702	0.0511
	[0.11]	[0.11]	[0.09]	[0.09]
Age	-0.00336	-0.00354	-0.00551	-0.00564
	[0.01]	[0.01]	[0.01]	[0.01]
Natural sciences	0.276	0.275	0.187	0.185
	[0.23]	[0.23]	[0.18]	[0.18]
Social sciences	0.138	0.128	0.0462	0.0323
	[0.19]	[0.18]	[0.16]	[0.16]
Business sciences	0.150	0.146	0.0791	0.0864
	[0.20]	[0.20]	[0.17]	[0.17]
Other	0.0723	0.0657	0.130	0.123
	[0.19]	[0.19]	[0.17]	[0.16]
Subject pool	-0.104	-0.110	-0.107	-0.106
	[0.12]	[0.12]	[0.10]	[0.09]
Constant	-0.0605	-0.0474	0.903**	0.902**
	[0.50]	[0.51]	[0.45]	[0.45]
Observations	2600	2600	2600	2600
Pseudo R-squared	0.108	0.108	0.079	0.079
AIC	3246.2	3244.6	3330.9	3328.2
BIC	3340.1	3332.6	3424.7	3416.2
ll	-1607.1	-1607.3	-1649.4	-1649.1

Table A.7: Conditional effect of efficiency preferences

	Ideally prefered		Finally prefered	
	Model 1	Model 2	Model 3	Model 4
tau=100	0.587***	0.586***	0.0123	0.0245
	[0.19]	[0.19]	[0.20]	[0.20]
tau=0	-0.965***	-0.966***	-0.843***	-0.832***
	[0.19]	[0.19]	[0.20]	[0.20]
Leak 5%	-0.456***	-0.489***	-0.647***	-0.661***
	[0.14]	[0.14]	[0.12]	[0.11]
Leak 20%	-0.252*	-0.242	-0.490***	-0.465***
	[0.15]	[0.15]	[0.14]	[0.13]
Leak 60%	-0.520***	-0.524***	-1.239***	-1.236***
	[0.15]	[0.15]	[0.13]	[0.12]
Right Left (RL)	1.024***	1.009***	0.639**	0.637**
	[0.35]	[0.37]	[0.28]	[0.28]
EFF	0.0131		0.341**	
	[0.35]		[0.16]	
EFF # Leak 5%	-0.178		-0.492	
	[0.99]		[0.47]	
EFF # Leak 20%	-0.372		-0.469	
	[1.19]		[0.58]	
EFF # Leak 60%	-0.0778		-0.194	
	[1.01]		[0.45]	
IAV	0.0342		0.119	
	[0.41]		[0.28]	
IAV # Leak 5%	-0.640		-0.0462	
	[0.53]		[0.48]	
IAV # Leak 20%	0.261		0.122	
	[0.69]		[0.39]	
IAV # Leak 60%	0.209		0.0837	
	[0.65]		[0.38]	
WtP efficiency		0.0157		-0.0974
		[0.31]		[0.23]
Leak 5% # WtP efficiency		0.218		-0.0471
		[0.53]		[0.33]
Leak 20% # WtP efficiency		-0.223		-0.300
		[0.57]		[0.35]
Leak 60% # WtP efficiency		-0.342		0.0207
		[0.50]		[0.33]
Constant	-0.0225	-0.00820	0.889*	0.930**
	[0.49]	[0.51]	[0.47]	[0.45]
Observations	2600	2600	2600	2600
Pseudo R-squared	0.109	0.109	0.079	0.079
AIC	3256.0	3248.5	3342.1	3333.4
BIC	3385.0	3354.0	3471.1	3438.9
ll	-1606.0	-1606.2	-1649.1	-1648.7

AppendixB. Sreenshots

Figure B.6: Screenshots from Treatment (ztree). Statement for ideally preferred tax rate (top) and communication phase (bottom).

AppendixC. 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 points. These points will be converted to euros at a rate of **1 point = 1 euro.** You will receive your payment without it being revealed to the other participants, and in cash. Additionally, you will receive a show-up fee of 5 euro.

Duration

The entire experiment will take approximately 60 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

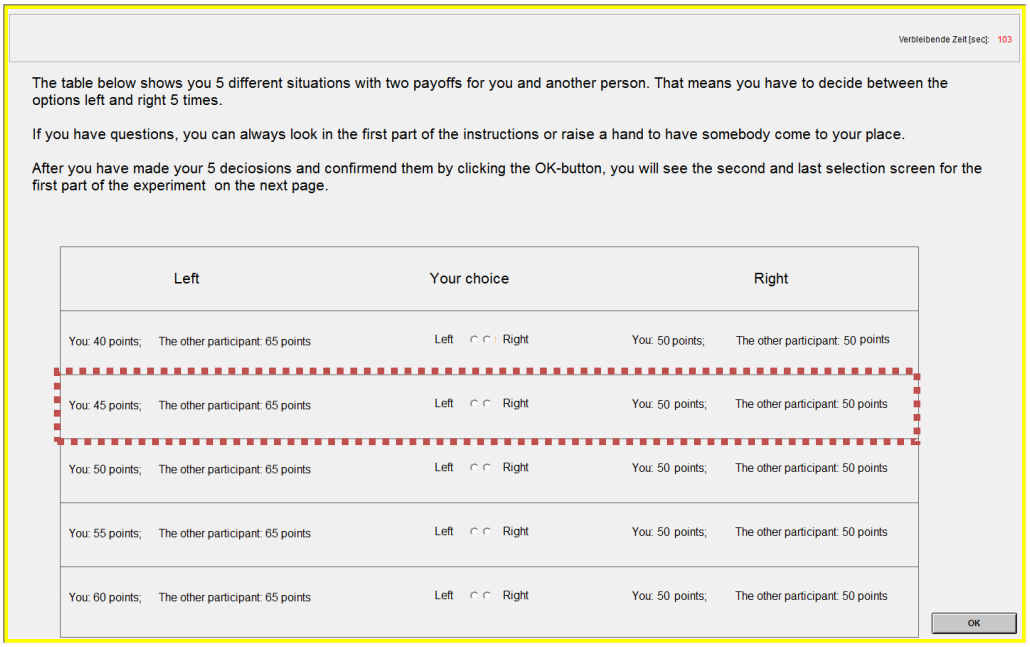
This experiment consists of **two parts**. Every one of these parts will be explained now. In both oft the parts you will be able to earn money. In the first part you will be asked to choose from two options (Left and Right). In the second part you will make a decision about the redistribution of tokens within a random group of five participants.

Part1

In the first part of the experiment we ask you to make 5 decisions two times. In every one of the overall 10 decisions, you will form a group of two with another, randomly chosen, participant. The "other participant" remains, just like you, anonymous. In every one of the 10 decisions, the „other participant" is randomly chosen.

For the first part, you are the active decider and have to choose between left and right, whereas the options left and right are connect to a payment for you and the "other participant". We will now show you an example for the first five decisions (the points in the example differ from those in the experiment).

Figure 1: Decision screen for the selection of different decisions.



Example: The option left in the second row reads: You 45 points, "other participant" 65 Points. This means that if you chose that option and the situation is randomly chosen as relevant for payment you get a payment of 45 points and the "other participant" gets a payment of 65 points.

Following, we ask you to decide for each of the 10 situations between the options left and right, which are presented in two blocks of 5 situations each. Please compare the options row by row and decide for each row by selecting left or right.

Your payment for this part of the experiment results from two partly payments:

Payment as „active decider“: At the end of the first part one of the 10 decision situations will be randomly chosen. Your selection of the left or right option defines your payment as well as the one for the other participant that has been matched with you. In the example of figure 1 you would therefore receive 45 points and the other participant would get 65 points if you chose left.

Payment as „other participant“: Another player decides your payment by making his or her left or right decisions. You are randomly matched and have no influence on the decision. Yet, we assure that there is no decision situation where you and the other participant are mutually “active decider” and “other participant”.

Your overall payment from the first part of the experiment results from additions of the payment as “active decider” and “other participant”.

In case you still have questions, please raise your hand. Somebody will come to your place to answer your question. You can then read the rules for the second part.

Part 2

The second part of the experiment consists of 8 decisions about the redistribution of tokens within a group of five participants.

In each of the 8 rounds the participants will be randomly matched in groups of five.

In each of the 8 rounds you will receive a randomly matched endowment of tokens. You own endowment of tokens as well as the ones of your group members are known to all group members.

Redistribution: Tax rate

The task is for the group members to settle for a redistributing proportional tax rate that redistributes the tokens within the group members including yourself.

After the group members have agreed on tax rate the tokens of each group members are taxed with the agreed rate. The so achieved tax revenue flows to a common pool. [Note that 5% / 20% / 60% of the tokens in the mutual fund get lost.] The [remaining] tokens in the fund will then be redistributed equally among the group members. The agreed tax rate can be all values between 0% (no redistribution) and 100% (every receives the same).

Decision and communication

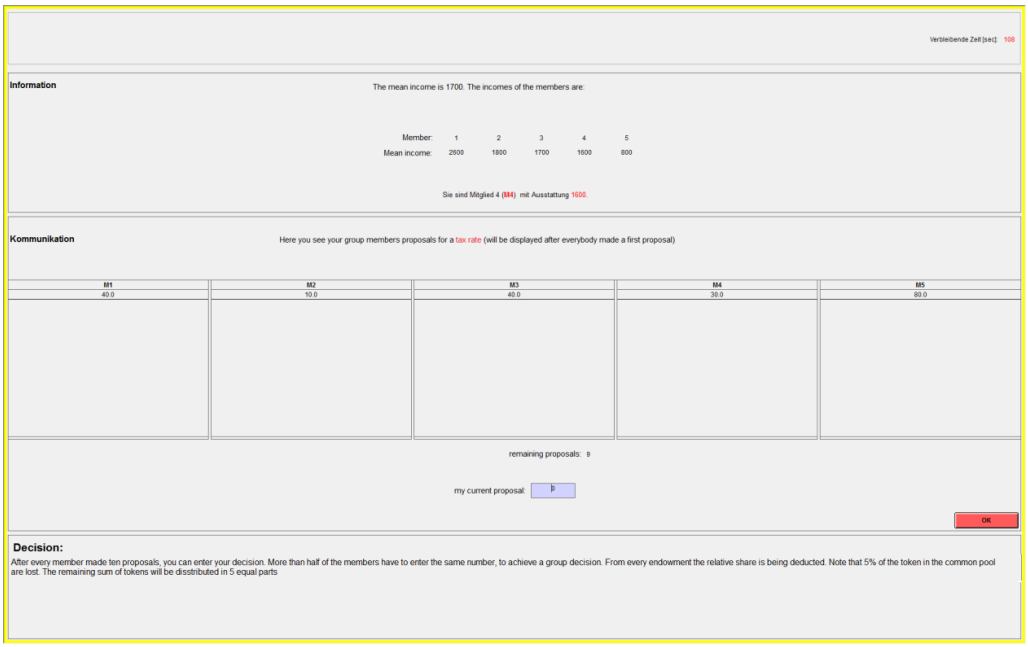
To force a certain tax rate in the group, at least 3 members have to agree on the same tax rate.

Before you make your final entry you have the possibility to chat with your group members. But you can only exchange number proposals. Every participant has to make 10 proposals before the entry field for the final decisions is activated.

Your entry, as well as those of the other members, will be shown to you on the screen so that you get to know which tax rate is desired by the other group members. By exchanging number proposals you can achieve a majority for an agreement. The exchanged proposals are not binding and only proposals. An agreement can only be made when the majority (at least 3 group members) types in the same tax rate as final decision.

If not at least 3 players from the group agree on a common entry and therefore a common rate of redistribution there will be no redistribution and half of the tokens of every participant of that group is deducted. If necessary, the tokens are being limited to half of the mean.

Figure 2: Decision screen for the determination of redistribution
[Here: Inefficiency factor λ=20%, see info box at the bottom of the screen]



Information: In the box above, labeled „information“ you see the distribution of endowment in the respective round for member 1 to 5.

Communication and decision: In der communication box you see five entry fields for players M1-M5. Above these you see (in red) which player you are and what your endowment is. You can type in your current proposal in the entry field. You will also find information about the decision rule. Please note that in each of the 8 rounds the distribution of endowments changes.

After you made a proposal, it appears in the communication window. Like this, all group members enter 10 proposals until they are asked for their final decision after the tenth proposal.

Before the communication- and decision-phase you will first be asked about your ideally preferred tax rate at the beginning of each round. That means, what tax rate would you apply if you could decide alone. This entry is not shown to the other group members.

Calculation of your payment for part 2:

After all 8 rounds and therefore 8 different distributions of endowments have been played out, you get an overview about the decision of your respective group in 8 rounds. From this table you can read, whether a redistribution was made and what endowment you received in the respective round after the redistribution decision.

As payment for the second part you receive the average score from the 8 rounds. Therefore, every round is relevant for your final payment.

Calculation of the final payment from both parts of the experiment.

The final payment results from the additions of the two partial payments from the two parts of the experiment. The exchange rate is: 1000 points = 5 Euros. Anonymous payment takes place directly after the experiment.

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

2018:

Bauer, Alexander Max: Sated but Thirsty. Towards a Multidimensional Measure of Need-Based Justice. Working Paper Nr. 2018-03. http://bedarfsgerechtigkeit.hsu-hh.de/dropbox/wp/2018-03.pdf

Khadjavi, Menusch and Nicklisch, Andreas: Parent's Ambitions and Children's Competitiveness. Working Paper Nr. 2018-02. http://bedarfsgerechtigkeit.hsu-hh.de/dropbox/wp/2018-02.pdf

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2017:

Schramme, Thomas: Mill and Miller: Some thoughts on the methodology of political theory. Working Paper Nr. 2017-25. http://bedarfsgerechtigkeit.hsu-hh.de/dropbox/wp/2017-25.pdf

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Chugunova, Marina, Nicklisch, Andreas and Schnapp, Kai-Uwe Redistribution and Production with the Subsistence Income Constraint: a Real-Effort Experiment. Working Paper Nr. 2017-18. http://bedarfsgerechtigkeit.hsu-hh.de/dropbox/wp/2017-18.pdf

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http://needs-based-justice.hsu-hh.de