

Seebauer, Michael

Working Paper

Does direct democracy foster efficient policies? An experimental investigation of costly initiatives

IWQW Discussion Papers, No. 01/2015

Provided in Cooperation with:

Friedrich-Alexander University Erlangen-Nuremberg, Institute for Economics

Suggested Citation: Seebauer, Michael (2015) : Does direct democracy foster efficient policies? An experimental investigation of costly initiatives, IWQW Discussion Papers, No. 01/2015, Friedrich-Alexander-Universität Erlangen-Nürnberg, Institut für Wirtschaftspolitik und Quantitative Wirtschaftsforschung (IWQW), Nürnberg

This Version is available at:

<https://hdl.handle.net/10419/107760>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

IWQW

Institut für Wirtschaftspolitik und Quantitative
Wirtschaftsforschung

Diskussionspapier
Discussion Papers

No. 01/2015

**Does Direct Democracy Foster Efficient Policies?
An Experimental Investigation of Costly Initiatives**

Michael Seebauer
University of Erlangen-Nürnberg

ISSN 1867-6707

Does Direct Democracy Foster Efficient Policies?

An Experimental Investigation of Costly Initiatives

Michael Seebauer^{*}

February 2015

Abstract

This study investigates the effects of the provision of costly initiatives on policy efficiency in a laboratory experiment where a policy setter implements a status quo affecting the utility of the constituency. I vary treatments regarding the political institution (either purely representative or direct democracy where the status quo may be contested by the costly proposal of an alternative) and the appointment of the policy setter (either random or by election). In accordance to theoretical predictions, the experimental data reveal a substantial indirect effect of direct democracy inducing higher efficiency levels by serving as a credible threat towards the policy setter without actually being used. Moreover, the initiative impedes excessive candidate competition during elections reducing campaign costs and thus increasing overall efficiency. In contrast to theoretical predictions, the initiative is actually employed frequently, so there is also a sizeable direct effect of the initiative. However, this effect is generally overcompensated by the costs induced by the process.

JEL-classification: D72, D61, C92

Keywords: Direct Democracy, Policy Decision, Efficiency, Laboratory Experiment

^{*} University of Erlangen-Nuremberg (FAU), Chair for Economic Theory, Lange Gasse 20, D-90403 Nürnberg, michael.seebauer@fau.de

The author would like to thank the *German Israeli Foundation (GIF)* and the *Emerging Field Initiative (EFI)* of the University of Erlangen-Nuremberg for their financial support in conducting the experiments. Furthermore, he would like to thank Veronika Grimm, Maren Tonn, Stefan Voigt, Janina Satzer, Sang-Min Park, and many other discussants for helpful remarks.

1 Introduction

In the last decades, direct democratic institutions have spread throughout the world. While they are traditional political institutions in Switzerland and the USA, they were only recently introduced in the new democracies of Eastern Europe, mostly former members of the Soviet Union. The benefits and drawbacks of direct democratic institutions have been discussed by theoretical and empirical literature alike. Proponents of direct democracy argue that its presence serves as a means to control inefficient governments as politicians act as political entrepreneurs who maximize their own utility by high expenditures or excessive bureaucracy (see Niskanen, 1975). In general, policy decisions in direct democratic systems more closely reflect the median voter's preferences than in purely representative democracies (e.g. Gerber 1996) and improve economic performance (e.g. Matsusaka, 2005a). The resulting outcomes as well as the procedural utility the citizens derive from actively participating in the political decision-making process make them happier in general. On the other hand, the process of direct democracy is criticized because it generates high transaction costs, in particular information and organization costs, which can be reduced by delegating political decisions to a representative who specializes in political decision-making. To this effect, representative democracy constitutes the classical division of labor. Under direct democracy, citizens may not make an informed decision because they have no incentive to become informed about the political issue at hand. Additionally, the political process is prolonged by direct democratic procedures, and well-organized interest groups may use initiatives to achieve their goals on the expense of the general public.¹ While there has been a lot of theoretical as well as empirical work on the subject there are only very few papers investigating direct democratic institutions experimentally.

This paper aims at analyzing the net efficiency effects of direct democratic institutions in a series of laboratory experiments that explicitly take into account the costs of the political process and also allows for endogenous appointment of the policy setter. Laboratory experiments constitute an excellent complementary method to the existing empirical literature. They allow to control aspects that cannot be observed in the field. Specifically, laboratory experiments enable me to induce individual preferences and explicitly model the costs of direct democracy in order to measure outcome efficiencies. In the experimental design of this study each member of a group of three individuals has an ideal policy point which is common knowledge to the entire group. One group member is assigned the role of the group leader who sets a status quo which determines each group member's payoff. I vary treatments in two dimensions. In the first dimension I vary the political institution which is either purely representative

¹ Butler and Ranney (1994, pp. 17-18) summarize the pitfalls of direct democracy.

democracy where the group leader's status quo is final, or direct democracy where any other group member may contest the status quo policy by proposing a costly alternative subject to a simple majority vote. The second dimension is the process of group leader appointment which can be either exogenous by random assignment or endogenous by candidate election (while running for election is costly).

The experimental data show that there exists a strong indirect effect of direct democracy on outcome efficiencies under exogenous leadership, i.e. the group leader sets a moderate status quo to avert an impending alternative proposal. When the group leader is appointed endogenously, adding the direct democratic institution does not increase the group leader's status quo efficiency. This is due to the fact that without the counterbalancing direct democratic institution in place less extreme group members are elected as group leader. Both endogenous leadership and the availability of direct democracy lead to the same status quo efficiency levels on their own. The combination of both does not enhance status quo efficiency any further. Taking into account the election costs in the endogenous treatments reveals that direct democracy reduces election costs substantially by decreasing candidate competition, thus increasing net efficiency again. A direct effect of direct democracy caused by the actual use of the direct democratic institution can always be observed. However, on average this effect is overcompensated by the costs generated by the process, i.e. the actual use of the initiative causes inefficiencies. While alternatives are not as often proposed as would be beneficial for the group, on average the proposed alternatives are not efficiency enhancing when the costs are taken into account.

The remainder of this chapter is structured as follows. In the next section a short literature overview is given. In Section 3 I present the theoretical model and the experimental design. Section 4 summarizes the experimental results and Section 5 concludes.

2 The Effects of Direct Democratic Institutions: Theoretical and Empirical Background

Direct democratic institutions are political institutions which aim at including the general public in the political decision making process by allowing them to cast a vote on specific political issues. The definition of the Initiative & Referendum Institute (IRI) Guidebook to Direct Democracy states that “[m]odern direct democracy gives citizens the right to exercise popular sovereignty also between elections by voting on substantive issues” (Kaufman et al., 2010, p. 196). Two major types of direct

democratic institutions can be distinguished: the referendum and the initiative.² The referendum is a vote on a government policy change. A referendum is required if the government e.g. wants to implement a constitutional change. But there are also non-required referendums which may be initiated by either the government (plebiscite) or the citizens.³ The initiative is a vote on a piece of legislation proposed by the citizens. However, this process involves high organizational costs because it demands the proposing party to collect a certain amount of signatures from the citizens to support the initiative proposal as well as to eventually bring it to the vote. In this study I focus on the initiative, the costs this process involves, and the effects it has on policy making and its outcomes.

Frey (1994) argues on the basis of the empirical analysis of Swiss data that direct democracy keeps the agenda-setting power with the citizens and enables them to regain control over politicians. Voters' preferences are better served by more developed direct political participation rights. Gerber (1996) theoretically investigates the effect on legislative behavior. She presents a model with three agents who make decisions on policies on a one-dimensional policy space: the legislature who passes a law, a proposer who can propose a challenging initiative, and a voter who chooses between the law and the initiative. The theoretical results show that the possibility of the initiative may constrain legislators leading them to implement policies that more closely reflect the median voter's preferences. In a more general model where the policy setter is imperfectly informed about the voters' preferences Hug (2004) covers different types of direct democratic institution. Comparing the effects of the different institutions, the theoretical results show that the availability of the initiative makes the occurrence of a popular vote most likely. More importantly, institutional provision of the initiative also leads to policy outcomes that most closely reflect the median voter's preferences, independent of whether they actually take place or not. In his reviews of the available evidence Matsusaka (2005a, 2005b) confirms that direct democratic institutions serve as a means to control for inefficient governments and help to improve economic performance. Matsusaka (2004) conducts an empirical analysis on US data to investigate the effects of initiatives. His findings show that government expenditures dropped on the state level and rose on the local level where the initiative was available. The budget being concentrated on the local level can be interpreted as a sign for policies closer to the citizens' preferences which differ from region to region. Furthermore,

² See e.g. Hug (2004, pp. 323-325) or Schiller (2002, p. 20) for an overview of the different types of procedures.

³ The government-triggered plebiscite is often non-binding. Thus, it is easily manipulated strategically "from above" which is why it is disputed whether it should be subsumed as a direct democratic institution.

states allowing the use of the initiative more often relied on fees instead of taxes. Feld et al. (2010) investigate direct democratic institutions in Switzerland and find lower income and property tax when more direct democracy is available. Pommerehne (1983) shows that waste disposal in Swiss communities is more efficient when citizens decided on it directly. Using data on Swiss municipalities Feld and Kirchgässner (2001a) find that direct democracy reduces public debt, and in addition to that Feld and Kirchgässner (2001b) show that fiscal referendums reduce expenditures. Blume et al. (2009) conduct an empirical analysis on cross-country data on a global scale. They can only partly confirm the results of the national studies. Direct democratic institutions have an impact on fiscal policy variables and government efficiency, but there is no significant effect on productivity. Importantly, while mandatory referendums reduce government spending it is increased by the initiative. Furthermore, the direct effect of direct democracy is stronger than its indirect effect. In a follow-up study with a broader data set Blume et al. (2012) mostly confirm their previous results.

There are several aspects indirectly affecting economic performance that are positively influenced by direct democratic institutions. Besley and Coate (2000) show in a theoretical model that adding the initiative to a representative systems serves as a mechanism to unbundle political issues, as putting specific issues on the ballot yields a closer relationship between policy outcomes and voter preferences. Benz and Stutzer (2004) find in an empirical study with EU and Swiss data that citizens are better politically informed under direct democratic institutions because they are involved in the political process and participate in the public discussion of political issues. Frey and Stutzer (2004) present empirical evidence for procedural utility Swiss citizens gain from participating in the decision making process. People in direct democratic systems are in general happier than in other systems. Torgler (2005) shows in an empirical analysis of Swiss data that direct democracy raises tax morale.

But there are also contra arguments against the use of direct democratic institutions. Representative democracy serves as classical division of labor, i.e. the government specializes on political decision making. This results in efficiency gains and a reduction of costs, especially decision costs and information costs (Feld and Kirchgässner, 2004). In particular, the initiative involves the costs of signature collection. If e.g. the signature requirements of the initiative are too high, the direct democratic institution will only induce costs without having any correctional impact (ibid.). Grillo (1997) provides a cost argument stating that decision costs, information costs, and organizational costs cancel out the benefits from direct democratic institutions when the electorate has a considerable size. Matsusaka and McCarty (2001) show in a theoretical model with preference uncertainty and costly initiatives that special interest groups can abuse

asymmetric information to use the initiative to their advantage which generates inefficient outcomes far away from the median voter's preferences. Additionally, the political process is unnecessarily prolonged by direct democratic procedures resulting in the government's disability to react to economic or societal changes in a timely manner, resulting in a status quo bias (Kirchgässner et al., 1999, p. 20). Another critique already acknowledged by Downs (1957) is that voters have no incentives to become informed about the political issues in direct democracies. The costs of gathering information are higher than the benefit of making a well-informed decision.

Direct democratic institutions have rarely been investigated experimentally in the laboratory. The existing studies focus on different aspects of direct democracy. Lupia (1994) investigates the effect that different degrees of information have on voting behavior and policy outcomes under the direct democratic institution of initiative. Participants have individual ideal points on a one-dimensional policy space which are private information. Each period, one participant was randomly assigned the role of the setter who has complete knowledge of all ideal points and who can contest an exogenous status quo on this policy space and propose an alternative. All other participants then vote on whether to accept the alternative. Four treatments were conducted which differed in the degree of voters' information. In one treatment voters were completely informed about the proposed alternative, in the other three treatments they did not learn about but the setter had to incur different levels of entry costs to contest the status quo. The experimental results show that voters are able to use (positive) entry costs as information cues to make correct inferences about the proposed alternative increasing the likelihood that the "incomplete information" outcome would be the same as the "complete information" outcome.

Feld and Tyran (2002) experimentally study tax compliance when fines on tax evasion are subject to a referendum. To this end, they conduct a one-shot public good experiment with group size of three where not contributing the complete endowment is punished with a fine. However, the fine is small enough so that non-compliance is the dominant strategy. In one treatment the fine is imposed exogenously, in another treatment all group members vote on whether to impose the fine or not before contributions are made. A public good game without fine serves as a baseline treatment. The authors find that compliance is higher on average when the fine is endogenously imposed by referendum even for individuals who initially voted against the fine.⁴ The authors attribute this observation to a higher degree of legitimacy caused by a referendum.

⁴ In another study with a very similar experimental design Tyran and Feld (2006) find that this result specifically applies to mild sanctions.

Fischer and Nicklisch (2007) experimentally investigate the effect of referendums on the voluntary provision of public goods by comparing different voting mechanisms in ex interim voting. Particularly, after learning about the individual contribution within a group its members vote on whether the public good should be provided or the contribution should be reimbursed after being reduced by a transaction fee, using either unanimity or majority voting. Additionally, a baseline treatment was conducted where participants could only state their satisfaction with the contributions without any effect on the provision. They find that contributions are highest under unanimity. The results regarding efficiency are mixed. If the public good is provided efficiency is higher under unanimity than in any other treatment. However, overall efficiency is lower under unanimity than in any other treatment.

Most closely related to my study are Güth et al. (2004) who conduct an experiment to investigate the efficiency of direct and indirect democracy. Randomly matched groups of three repeatedly interact to determine the implementation of (political) measures. Implementation of measures can either be determined by direct democracy, i.e. a simple majority vote on measures by the whole group, or by indirect democracy, i.e. a randomly determined delegate just chooses the measures to be implemented. The complexity of direct democracy is varied by letting individuals vote on all measures at once or on each measure sequentially. Furthermore, in order to give the delegate under indirect democracy an incentive to implement the efficient outcome there is an additional treatment where the dictator can tax the incomes of all other group members. The main findings of this experiment are that delegates often exploit their position at the expense of the other group members, and that under direct democracy the welfare-maximizing mix of measures is implemented more often than under indirect democracy. The costs of the political process are not considered in this experiment. Furthermore, the authors themselves acknowledge that modeling representative democracy by random dictatorship instead of using candidate election may be a drawback of their design. My study differs from this approach by introducing endogenous choice of the group representative as a treatment variation as well as incorporating the costs of the direct democratic process.

My study contributes to the existing literature by investigating the effects of the initiative on policy efficiency in a laboratory experiment that explicitly takes into account the costs of the direct democratic institution. The true organizational costs of an initiative in the field are unknown and can at best only be estimated. Despite the availability of data on initiative campaign spending,⁵ it has never been integrated into

⁵ E.g. Matsusaka (2004) presents some numbers for the United States of America.

empirical analysis to check for the net benefits of the initiative process.⁶ Furthermore, individual preferences about specific political issues are hard (if not impossible) to measure precisely in the field. By inducing both preferences of the political agents and the costs of the political process the laboratory experiment I conduct enables me to evaluate the net efficiency of the initiative. Additionally, I incorporate endogenous appointment of the policy setter. This allows for the comparison of direct democracy's effect on the behavior of legislators who have been elected by the constituency or who have discretionary power (by random dictatorship). The interplay between direct democracy and candidate election can also be analyzed this way. The previous experimental literature lacks integrating candidate election into their design. And lastly, my design enables me to identify if there exists an indirect effect of direct democracy because the status quo is endogenously chosen by the representative. As yet, the status quo in experimental studies on direct democracy has been exogenous.

3 Theoretical Framework

In this section I present and analyze the game underlying my experiment. Building on the theoretical approaches employed by e.g. Gerber (1996), Besley and Coate (1997), and Feld and Matsusaka (2003), I design a game with two main treatment variables which I deal with in turn: (i) political institution, i.e. pure representative democracy vs. a mix of representative and direct democracy, and (ii) leadership, i.e. exogenous vs. endogenous politicians. I describe the game exactly as it will be implemented in my experiment.⁷ A society is modeled as a group of three members, each representing a political camp (rather than individuals) within this society. Group members make decisions regarding a specific political issue which affects each group member's utility, and hence, the group's welfare. The ideological positions of the group members are implemented by randomly assigning them ideal policy points in order to catch all sorts of relative positions of ideologies when confronted with a political issue.

3.1 The Model

Within a group of three members labeled $i = 1,2,3$ each i has an individual ideal policy point x_i on the one-dimensional policy space $P = \{0,1,2, \dots,100\}$. The ideal policy

⁶ Matsusaka and McCarty (2001) use proxies for organizational costs in their empirical analysis on the occurrence of the initiative but not on political outcomes.

⁷ The approach of citizen-candidacy is based on e.g. Osborne and Slivinski (1996) and Besley and Coate (1997).

points are independently drawn from a uniform distribution over the policy space. Furthermore, all ideal points are common knowledge to each group member.⁸

Leadership

One of the three group members takes on the role of the group leader and is either appointed exogenously or endogenously. When leadership is *exogenous* (EX) one of the three group members is randomly selected as the group leader by nature. This way, each group member may become the group leader with equal probability. With *endogenous* leadership (EN) the group leader is determined by an election. Group members independently and simultaneously choose to run for election and be a candidate at cost $c_e > 0$. If there is more than one candidate each group member votes for one of the candidates and the group leader is determined by simple majority rule. If there is no candidate or there is a tie between candidates (which can only occur in case of three candidates and each getting one vote) the group leader is determined randomly among group members. As with exogenous leadership the probability of becoming group leader is equal for each group member. In case of only one candidate the respective group member is directly appointed group leader.

Political Institution

The group leader chooses a status quo $s \in P$. I consider two different political institutions. In the *purely representative democratic institution* (RD) the status quo chosen by the group leader is ultimate and automatically becomes the final policy z which determines each group member's utility.⁹ In the *direct democratic institution* (DD), after observing the status quo chosen by the group leader, all group members, apart from the group leader, may independently and simultaneously propose an alternative $a_i \in P$ to the status quo at cost $c_a = 2c_e > 0$.¹⁰ Then, a costless vote will simultaneously be held on each proposed alternative, separately. For each alternative every group member (including the group leader) has to state whether to accept or reject it. If two alternatives are proposed each group member also has to state which

⁸ This complete information assumption is in line with the theoretical approach of Gerber (1996).

⁹ Thus, exogenous leadership can be viewed as random dictatorship. As Güth et al. (2004) also point out, this design feature captures the fact that representatives with temporary dictatorial power have more or less discretionary power.

¹⁰ Proposing an alternative is more expensive than running for election which makes sure that there is at least some incentive to run for election when the direct democratic institution is available. This is a reasonable assumption as in reality elections are organized on a regular basis using existing organizational structures while initiatives have to be organized "from scratch" as each time e.g. new signatures have to be collected. Particularly, I set $c_a = 2c_e$ in order to simplify equilibrium calculations and because I set my experimental parameters accordingly.

alternative she favors in case both are accepted by a majority.¹¹ If an alternative is accepted by the simple majority of the group it overrides the group leader's status quo decision and becomes the final policy z . Otherwise, the group leader's status quo becomes the final policy z .

Each group member's utility depends on the policy z which decreases in the policy's distance to the respective ideal policy point: $U_i(x_i, z) = -|z - x_i|$. In other words, the closer the final policy is to a group member's ideal policy point the higher is her utility.

		Political Institution	
		Representative Democracy	Direct Democracy
Leadership	Exogenous	EXRD	EXDD
	Endogenous	ENRD	ENDD

Table 1: Treatments

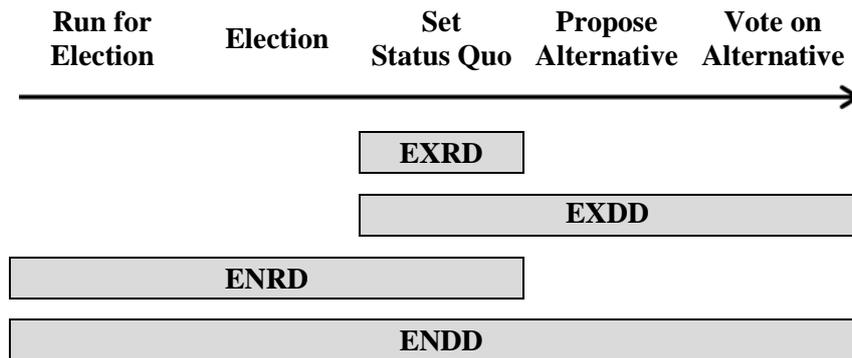


Figure 1: Sequence of the games for the different combinations of leadership types and political institutions

The variation of leadership types and political institutions result in four different games serving as treatment variations in my experiment. The resulting 2x2 design is summarized in Table 1. Depending on the combination of leadership type and political institution the game has up to six stages as depicted in Figure 1.

¹¹ This mechanism serves as a tie breaker to guarantee a unique voting result by determining which of the two accepted alternatives is implemented as the final policy.

3.2 Theoretical Behavior

I analyze these games using backward induction. In all of the following analyses, for simplicity and without loss of generality, I order the individual ideal policy points so that $x_1 \leq x_2 \leq x_3$ and normalize the resulting set of ideal policy points by setting $x_1 = 0$. Furthermore, I assume that all group members are rational and selfish utility maximizers.

Voting on Alternatives

In the voting stage each group member only accepts an alternative that makes her better off than (or indifferent to) the status quo. Hence, the majority only accepts (and favors) those alternatives that are closer (or equidistant) to the median member's ideal point x_2 than the status quo.¹²

Proposing an Alternative

In this stage a group member (other than the group leader) only proposes an alternative that maximizes her own utility satisfying two conditions: (i) its net benefit makes her strictly better off than the status quo, and (ii) it does not decrease at least one other group member's utility (i.e. it is acceptable for a majority of the group).¹³ Formally,

$$\begin{aligned} & \max_{a_i} U(x_i, a_i) - c_a \\ & \text{s.t. } U(x_i, a_i) - c_a > U(x_i, s) \quad \wedge \quad \exists j \neq i: U(x_j, a_i) \geq U(x_j, s) \end{aligned}$$

To solve this maximization problem I assume for simplicity that $x_2 \leq s \leq x_3$, i.e. the status quo is located to the right of (or equal to) the median member's ideal point.¹⁴ This implies that group member 3 has no incentive to propose an alternative because she cannot increase her own utility without making everyone else worse off, i.e. there would be no majority vote for her alternative. Group member 2, the median group member, proposes an alternative if her benefit is larger than the cost of doing so, i.e. $c_a < s - x_2$. In that case her utility maximizing alternative is $a_2 = x_2$, making group member 1 better off as well. Group member 1 only proposes an alternative if both her net benefit of doing so is positive ($c_a < s$) and the alternative makes the median group member at least indifferent to the status quo. Group member 1's utility maximizing alternative then

¹² If an alternative is closer to the median member's ideal policy point it is also closer to one other group member's ideal point yielding a higher utility for both of them. In turn, this results in a majority preferring the alternative to the status quo.

¹³ I assume that in case of indifference between the status quo and an alternative in terms of utility, an individual accepts the alternative.

¹⁴ For $s \leq x_2$ the solution of the maximization problem is analogous. Furthermore, by the restriction $s \leq x_3$ I do not consider "perverse" settings of the status quo, i.e. a status quo which would make every individual worse off than necessary.

depends on the distances between ideal policy points and status quo:
 $a_1 = x_2 - \min\{s - x_2; x_2\}$.¹⁵

Taking into account both group members' utility maximizing alternatives and the costs of proposing an alternative, I consider the stage's payoff matrix depicted in Table 2 which, depending on the constellation of ideal policy point (the ideal policy set), has different equilibria.

		Group member 2	
		Propose	Not Propose
Group member 1	Propose	$(-x_2 - c_a; -c_a)$	$(-(x_2 - \min\{s - x_2, x_2\}) - c_a; -\min\{s - x_2, x_2\})$
	Not Propose	$(-x_2; -c_a)$	$(-s; -s + x_2)$

Table 2: Payoff matrix of the stage "Propose Alternative"; within each cell the first payoff belongs to group member 1 and the second to group member 2

To analyze the behavior in this stage two cases regarding the relative location to the other group members' policy points have to be considered.

Case 1: The median member's ideal policy point is closer to the status quo than to the other constituent's ideal policy point ($s \leq 2x_2$). Let k and l be the probabilities of group member 1 proposing alternative $a_1 = 2x_2 - s$ and group member 2 proposing alternative $a_2 = x_2$, respectively. Both group members propose an alternative if their respective expected payoff from proposing is positive:

- (1) $l(-x_2) + (1 - l)(-2x_2 + s) - c_a > l(-x_2) + (1 - l)(-s)$
for group member 1, and
- (2) $-c_a > k(-s + x_2) + (1 - k)(-s + x_2)$
for group member 2

Solving for k and l , respectively, leads to

- (1') $l < 1 - \frac{c_a}{2(s - x_2)}$ for group member 1, and
- (2') $c_a < s - x_2$ for group member 2.

If condition (2') is met group member 2 proposes an alternative ($l = 1$), but condition (1') can not be true at the same time, resulting in the Nash equilibrium $(k^*; l^*) = (0; 1)$. However, if condition (2') is not met condition (1') is only true if $s > x_2 + \frac{c_a}{2}$, resulting

¹⁵ If the median group member's ideal policy point is closer to the status quo than to individual 1's ideal policy point ($s \leq 2x_2$), the alternative "mirrors" the status quo towards individual 1 to make the median group member indifferent between alternative and status quo. Otherwise, the chosen alternative is individual 1's ideal policy point itself as it makes the median group member better off.

in the Nash equilibrium $(k^*; l^*) = (1; 0)$, i.e. only group member 1 proposes an alternative. Otherwise, implying that the status quo is too close to group member 2's ideal policy point even for group member 1 to beneficially propose an alternative, no one proposes an alternative, resulting in the Nash equilibrium $(k^*; l^*) = (0; 0)$.

Case 2: The median group member's ideal policy point is closer to the other constituent's ideal policy point than to the status quo ($s > 2x_2$). Now, let k and l be the probabilities of group member 1 proposing alternative $a_1 = x_1 = 0$ and individual 2 proposing alternative $a_2 = x_2$, respectively. Again, both group members propose an alternative if their respective expected payoff from proposing is positive:

$$(3) \quad l(-x_2) - c_a > l(-x_2) + (1 - l)(-s) \quad \text{for group member 1, and}$$

$$(4) \quad -c_a > k(-x_2) + (1 - k)(-s + x_2) \quad \text{for group member 2.}$$

Solving for k and l , respectively, leads to

$$(3') \quad l < 1 - \frac{c_a}{s} \quad \text{for group member 1, and}$$

$$(4') \quad k < \frac{s - x_2 - c_a}{s - 2x_2} \quad \text{for group member 2.}$$

For $s \leq c_a$, i.e. the status quo is too close to group member 1's ideal policy point, both conditions (3') and (4') are not met, making it unbeneficial for both group members to propose an alternative and leading to the Nash equilibrium $(k^*; l^*) = (0; 0)$. Otherwise, if $c_a < s$ but $c_a \geq s - x_2$, i.e. the status quo is only too close to group member 2's ideal policy point, the Nash equilibrium is $(k^*; l^*) = (1; 0)$. Condition (4') is always true when $c_a < x_2$, i.e. the group members' ideal policy points are located far enough from each other, rendering condition (3') false at the same time and resulting in the Nash equilibrium is $(k^*; l^*) = (0; 1)$. Additionally, for $c_a < s - x_2$ and $c_a \geq x_2$ where the two group members' ideal policy points are close but the status quo is far away, there is a Nash equilibrium in mixed strategies $(k^*; l^*) = \left(\frac{s - x_2 - c_a}{s - 2x_2}; 1 - \frac{c_a}{s} \right)$. Figure 2 graphically summarizes the multiple conditions and the resulting Nash equilibria.¹⁶

¹⁶ It is noteworthy that the size of the costs also influences the group members' behavior. An increase in costs c_a would decrease the number of occasions proposing an alternative would be beneficial in for either group member. This can either be readily seen from conditions (1') through (4') or Figure 2 where the area for the pure strategy equilibrium (0;0) would increase with an increase of c_a .

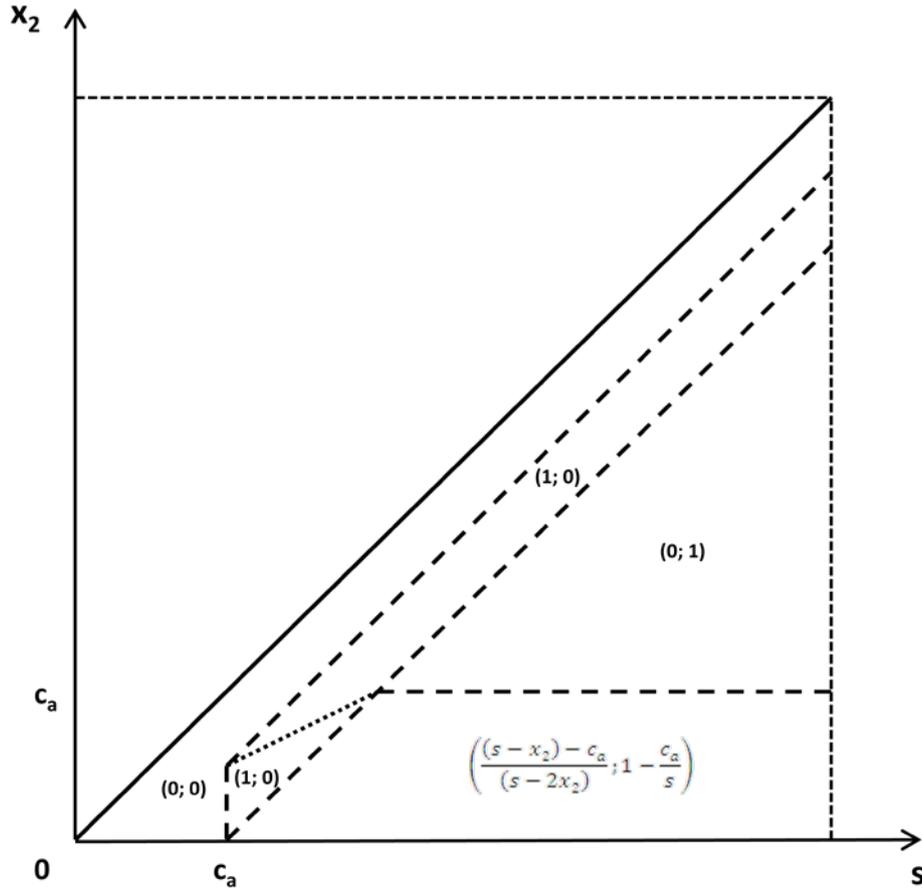


Figure 2: Graphical representation of Nash equilibria in the Proposition Stage for different combinations of median group member's ideal policy point x_2 and status quo s set by the group leader. The tuples $(k; l)$ in the different sections are the probabilities of group members 1 and 2 proposing an alternative, respectively.

The analysis of the behavior during the direct democratic process leads to the following proposition.

Proposition 1

- (a) If group members 1 and 2's ideal policy points are not too close to each other, either only group member 1 proposes alternative $a_1 = x_2 - \min\{s - x_2; x_2\}$ or only group member 2 proposes alternative $a_2 = x_2$ when the net benefit of doing so is positive for the respective proposer and the alternative is acceptable for the majority of the group.
- (b) If group members 1 and 2's ideal policy points are too close to each other they mix between proposing an alternative and not when the net benefit of doing so is positive for both group members and the alternative is acceptable for the majority of the group.

Setting the Status Quo

The group leader chooses a status quo that maximizes his utility. Since in the purely *representative* institution the choice of the status quo is final its choice is straightforward. Any group leader i chooses his own ideal policy point as the status quo: $s^* = x_i$. In the *direct democratic* institution he must select a status quo without risking any other group member to propose an alternative, i.e. the net benefit of any other group member's proposition must be non-positive. Formally,

$$\begin{aligned} & \max_s U(x_i, s) \\ & \text{s.t. } \forall j \neq i: \nexists a_j: [U(x_j, a_j) - c_a > U(x_j, s) \wedge \exists n \neq j: U(x_n, a_j) \geq U(x_n, s)] \end{aligned}$$

If the median group member is the group leader the solution to this maximization problem is straightforward, again. Choosing his own ideal policy point as the status quo makes him immune to the others proposing alternatives since any alternative will make two group members worse off. In the following I solve this maximization problem for the case that group member 3 is the group leader.¹⁷ The solution for group member 1 is analogous. The group leader has to consider the conditions for the pure strategies Nash equilibrium $(k^*; l^*) = (0; 0)$ from the “Propose Alternative” Stage. The crucial conditions are $s \leq x_2 + \frac{c_a}{2}$ and $s \leq c_a$. Taking into account every possible degree of closeness of the other group members' ideal policy points the group leader chooses the respective maximum value of these upper bounds for s . Additionally, the group leader's own ideal policy point might be lower than those bounds, hence choosing it as the status quo instead would maximize his utility without risking the proposition of any alternative.¹⁸ The resulting optimal status quo is $s^* = \min \left\{ \max \left\{ c_a, x_2 + \frac{c_a}{2} \right\}, x_3 \right\}$.¹⁹

Proposition 2

- (a) In the purely *representative* institution the group leader always chooses his own ideal policy point as the status quo.
- (b) In the *direct democratic* institution the group leader always chooses a status quo close enough to the median group member's ideal policy point to prevent any other group member from proposing an alternative. There is only an indirect effect of direct democracy as the institution is actually never used.

¹⁷ In analyzing the case of individual 3 being the group leader the assumption regarding the status quo $x_2 \leq s \leq x_3$ from the previous stages proves very useful.

¹⁸ Even in the case of the other group members mixing between proposing and not proposing an alternative any other than the opposition-free status quo decreases the group leader's expected utility.

¹⁹ It can readily be seen from this expression that an increase in costs c_a would allow the group leader to set a status quo closer to his own ideal policy point without fearing the proposition of an alternative.

Election

If there is a vote on the candidates, i.e. there are two or more group members running for being elected as group leader, each group member votes for the group member whose ideal policy point is closest to her own.

Running for Election

A group member only runs for election if the net benefit of doing so is not negative. In the analysis of this stage I further restrict the ordering of the individual ideal policy points I applied at the beginning of my analysis by assuming $x_3 \geq 2x_2$, i.e. the distance between group member 2 and 3's ideal policy points is at least as large as the distance between group member 1 and 2's ideal policy points.²⁰ Payoffs in this stage's three-player game are determined by the outcome of the vote, the status quo the respective group leader would choose, and the cost of running for election. Payoffs matrices differ under the different institutions because the status quo choice differs. I first analyze this stage under the purely *representative* institution where status quo choice is always identical to the ideal policy point of the respective group leader. The payoff matrix for $x_3 > 2x_2$ is given in Table 3.²¹

²⁰ This condition results from simplifying $x_3 - x_2 \geq x_2 - x_1$. Remember that I normalized the set of ideal policy points by setting $x_1 = 0$. Any constellation of ideal policy points can be transformed in such a way that this condition is met. Keep also in mind that in the analysis of this stage only the distances between ideal policy points, not the actual ideal policy points themselves, are important.

²¹ For $x_3 = 2x_2$, i.e. the distance between the median group member's ideal policy point and any other group member's ideal policy point is equal, the payoff matrix can be simplified further. Additionally, in case both individual 1 and 2 run for election, the median member is indifferent between voting for either of them, thus randomizing her vote. This results in different entries in the respective cell of the matrix. The payoff matrix for this special case is shown Table A.1 in the appendix.

Group member 3 Run		Group member 2	
		Run	Do Not Run
Group member 1	Run	$\left(\begin{array}{l} \frac{1}{3}(-x_2 - x_3) - c_e; \frac{1}{3}(-x_3) - c_e; \\ \frac{1}{3}(-2x_3 + x_2) - c_e \end{array} \right)$	$(-c_e; -x_2; -x_3 - c_e)$
	Do Not Run	$(-x_2; -c_e; -(x_3 - x_2) - c_e)$	$(-x_3; -(x_3 - x_2); -c_e)$
Group member 3 Do Not Run		Group member 2	
		Run	Do Not Run
Group member 1	Run	$(-x_2 - c_e; -c_e; -(x_3 - x_2))$	$(-c_e; -x_2; -x_3)$
	Do Not Run	$(-x_2; -c_e; -(x_3 - x_2))$	$\left(\begin{array}{l} \frac{1}{3}(-x_2 - x_3); \frac{1}{3}(-x_3); \\ \frac{1}{3}(-2x_3 + x_2) \end{array} \right)$

Table 3: Payoff matrix of the stage “Run for Election” under the purely representative institution; within each cell the first payoff belongs to group member 1, the second to group member 2, and the third to group member 3.

Let p , q , and r be the probability of group members 1, 2, and 3, respectively, to run for election. Each group member chooses to run for election if the expected payoff from doing so is not smaller than the expected payoff of not running, yielding the following three conditions:²²

$$-(x_3 - x_2)qr - \frac{1}{3}(x_2 + x_3)q + \frac{1}{3}(2x_3 - x_2)r + \frac{1}{3}(x_2 + x_3) - c_e \geq 0$$

for group member 1,

$$-(x_3 - x_2)pr - \left(\frac{1}{3}x_3 - x_2\right)p + \left(\frac{2}{3}x_3 - x_2\right)r + \frac{1}{3}x_3 - c_e \geq 0$$

for group member 2, and

$$(x_3 - x_2)pq - \frac{1}{3}(2x_3 - x_2)p - \frac{1}{3}(2x_3 - x_2)q + \frac{1}{3}(2x_3 - x_2) - c_e \geq 0$$

for group member 3.

This stage has multiple equilibria in pure strategies, in totally mixed strategies, i.e. every group member mixes between running and not running for election, and partially mixed strategies, i.e. one group member has a pure strategy while the other two mix between running and not running for election. The number and types of equilibria differ substantially across different ideal policy sets. Across all ideal policy sets specific “areas” containing the same combination of equilibria can be identified, although the

²² For pure strategies these conditions have to be strictly met, for mixed strategies indifference between strategies, i.e. equality of the respective condition, suffices.

probabilities of mixed strategies also differ within those areas. So rather than presenting a general theoretical derivation for all the equilibria in this stage I calculated all equilibria explicitly by using the parameters I apply in my experiment: $c_a = 20$ and $c_e = 10$. The identified “equilibrium areas” of this stage under the purely representative institution are summarized in Figure A.1 in the appendix. The main result of these calculations is that, unless the group members’ ideal policy points are very close to each other ($x_3 \leq \frac{3}{2}c_a + \frac{1}{2}x_2$), at least one group member runs for election (with positive probability).

I now turn to analyzing this stage under the *direct democratic* institution. Immediately following from the optimal choice of the status quo in the “Set Status Quo” Stage under this institution, for $x_2 < \frac{1}{2}c_a$ and $x_3 \leq c_a$ the payoff matrix, and thus the analysis, of this stage is identical to the one under the purely representative institution. Because the group members’ ideal policy points are close enough to each other, setting the status quo to their respective ideal policy point as the group leader would not provoke any other group member to propose an alternative later in the game. For ideal policy sets with $x_2 \geq \frac{1}{2}c_a$ and $x_3 > c_a$ the elected group leader has to choose a status quo which is close enough to the median group member’s ideal policy point for anybody to propose a beneficial alternative later in the game. For the remaining ideal policy sets with $x_2 < \frac{1}{2}c_a$ and $x_3 > c_a$ this restriction only applies to group member 3 while group member 1 chooses her own ideal policy point as status quo. The resulting payoff matrices for $x_3 > 2x_2$ is shown in Tables 4 and 5, respectively.

Group member 3 Run		Group member 2	
		Run	Do Not Run
Group member 1	Run	$\begin{pmatrix} -x_2 - c_e; -\frac{1}{3}c_a - c_e; \\ -(x_3 - x_2) - c_e \end{pmatrix}$	$\begin{pmatrix} -x_2 - c_e; -\frac{1}{2}c_a; -(x_3 - x_2) - c_e \end{pmatrix}$
	Do Not Run	$(-x_2; -c_e; -(x_3 - x_2) - c_e)$	$\begin{pmatrix} -(x_2 + \frac{1}{2}c_a); -\frac{1}{2}c_a; \\ -(x_3 - (x_2 + \frac{1}{2}c_a)) - c_e \end{pmatrix}$
Group member 3 Do Not Run		Group member 2	
		Run	Do Not Run
Group member 1	Run	$(-x_2 - c_e; -c_e; -(x_3 - x_2))$	$\begin{pmatrix} -(x_2 - \frac{1}{2}c_a) - c_e; -\frac{1}{2}c_a; \\ -(x_3 - (x_2 - \frac{1}{2}c_a)) \end{pmatrix}$
	Do Not Run	$(-x_2; -c_e; -(x_3 - x_2))$	$\begin{pmatrix} -x_2; -\frac{1}{3}c_a; -(x_3 - x_2) \end{pmatrix}$

Table 4: Payoff matrix of the stage “Run for Election” under the direct democratic institution for $x_2 \geq \frac{1}{2}c_a$ and $x_3 > c_a$; within each cell the first payoff belongs to group member 1, the second to group member 2, and the third to group member 3.

Group member 3 Run		Group member 2	
		Run	Do Not Run
Group member 1	Run	$\begin{pmatrix} -\frac{1}{3}(2x_2 + \frac{1}{2}c_a) - c_e; -\frac{1}{3}(2x_2 + \frac{1}{2}c_a) - c_e; \\ -x_3 + \frac{1}{3}(2x_2 + \frac{1}{2}c_a) - c_e \end{pmatrix}$	$(-c_e; -x_2; -x_3 - c_e)$
	Do Not Run	$(-x_2; -c_e; -(x_3 - x_2) - c_e)$	$\begin{pmatrix} -(x_2 + \frac{1}{2}c_a); -\frac{1}{2}c_a; \\ -(x_3 - (x_2 + \frac{1}{2}c_a)) - c_e \end{pmatrix}$
Group member 3 Do Not Run		Group member 2	
		Run	Do Not Run
Group member 1	Run	$(-x_2 - c_e; -c_e; -(x_3 - x_2))$	$(-c_e; -x_2; -x_3)$
	Do Not Run	$(-x_2; -c_e; -(x_3 - x_2))$	$\begin{pmatrix} -\frac{1}{3}(2x_2 + \frac{1}{2}c_a); -\frac{1}{3}(2x_2 + \frac{1}{2}c_a); \\ -x_3 + \frac{1}{3}(2x_2 + \frac{1}{2}c_a) \end{pmatrix}$

Table 5: Payoff matrix of the stage “Run for Election” under the direct democratic institution for $x_2 < \frac{1}{2}c_a$ and $x_3 > c_a$; within each cell the first payoff belongs to group member 1, the second to group member 2, and the third to group member 3.

Again, let p , q , and r be the probability of group members 1, 2, and 3, respectively, to run for election. Each group member chooses to run for election if the expected payoff

from doing so is not smaller than the expected payoff of not running. For $x_2 \geq \frac{1}{2}c_a$ and $x_3 > c_a$ (cf. Table 4) this leads to the conditions $-\frac{1}{2}c_a q + \frac{1}{2}c_a - c_e \geq 0$ and $-c_a q + \frac{1}{2}c_a - c_e \geq 0$ for group members 1 and 3, respectively. Using my assumption regarding the costs substituting $c_e = \frac{1}{2}c_a$ then leads to the simplified conditions $-\frac{1}{2}c_a q \geq 0$ and $-c_a q \geq 0$. Because these conditions can never be true both group member 1 and 3 will not run for election, i.e. $p = r = 0$. Applying this result and the cost assumption to group member 2's condition $\frac{1}{6}c_a(-3pr + p + r + 2) - c_e \geq 0$ leads to $-\frac{1}{3}c_a \geq 0$ which can never be satisfied, either. Thus, there is one unique Nash equilibrium in pure strategies where no group member runs for election when group members 1 and 2's ideal policy points are not too close to each other ($x_2 \geq \frac{1}{2}c_a$).

For $x_2 < \frac{1}{2}c_a$ and $x_3 > c_a$ (cf. Table 5) group members run for election if the following conditions are met:

$$-\frac{1}{2}c_a q r - \frac{1}{3}\left(2x_2 + \frac{1}{2}c_a\right)q + \frac{1}{3}(x_2 + c_a)r + \frac{1}{3}\left(2x_2 + \frac{1}{2}c_a\right) - c_e \geq 0$$

for group member 1,

$$-\frac{1}{2}c_a p r + \frac{1}{3}\left(x_2 - \frac{1}{2}c_a\right)p - \frac{1}{3}(2x_2 - c_a)r + \frac{1}{3}\left(2x_2 + \frac{1}{2}c_a\right) - c_e \geq 0$$

for group member 2, and

$$\frac{1}{2}c_a p q - \frac{1}{3}(x_2 + c_a)p - \frac{1}{3}(x_2 + c_a)q + \frac{1}{3}(x_2 + c_a) - c_e \geq 0$$

for group member 3.

The number of different “equilibrium areas” is much smaller here than under the purely representative institution. They are summarized in Figure A.2 in the appendix. At least one group member runs for election (with positive probability) only when one group member's ideal policy point is relatively far off ($x_3 > \frac{3}{2}c_a + \frac{1}{2}x_2$) while the other members' ideal policy points are close to each other ($x_2 < \frac{1}{2}c_a$).

Proposition 3

- (a) When leadership is endogenous in the purely *representative* institution group members run for election more often than under the *direct democratic* institution.
- (b) For all ideal policy sets where any group member runs for election in either political institution, in the purely *representative* institution it is more likely that the median group member is among the candidates.

To summarize the analysis of the complete model, I briefly describe theoretical behavior for the four treatments, separately:

- **EXRD**: The group leader chooses his own ideal policy point as the status quo.
- **ENRD**: At least one group member runs for election with positive probability unless the ideal policy points are too close to each other. The appointed group leader then chooses his own ideal policy point as the status quo.
- **EXDD**: The group leader chooses a status quo just close enough to the median member's ideal policy point not to provoke any other group member to propose an alternative. Hence, no alternative is proposed and the status quo is final.
- **ENDD**: Only if there is one relatively extreme group member and the other group members' ideal policy points are close to each other at least one group member runs for election with positive probability. The appointed group leader then chooses a status quo just close enough to the median member's ideal policy point not to provoke any other group member to propose an alternative. Hence, no alternative is proposed and the status quo is final.

It is noteworthy that theoretically in my model the direct democratic institution is never actually used, hence never incurring any costs to the group. Thus, there is only an indirect effect of direct democracy forcing the group leader to apply a moderate policy in order to prevent any opposition through the successful proposition of an alternative policy. However, the group incurs costs when group leadership is endogenous. These costs are on average higher in the purely representative institution as there are more possible occasions which group members run for election in.

As the efficiency of political outcomes is the main interest of this paper, on the basis of the previous theoretical analysis I can now make statements in this regard for each of the four treatments. Efficiency is measured as the relation of the achieved group utility determined by the final policy z to the maximally possible group utility which is achieved by setting the policy to the median group member's ideal policy point. Additionally, both values are adjusted by the minimal group utility in the respective ideal policy set which results from either of the corner solutions for the final policy (0 or 100). Formally, this is

$$EFF = \frac{\sum_{i=1}^3 U_i(x_i, z) - \min\{\sum_{i=1}^3 U_i(x_i, 0); \sum_{i=1}^3 U_i(x_i, 100)\}}{\sum_{i=1}^3 U_i(x_i, x_2) - \min\{\sum_{i=1}^3 U_i(x_i, 0); \sum_{i=1}^3 U_i(x_i, 100)\}}$$

In order to make my statements comparable to the experimental results later, in my calculations I apply the utility function $U_i(x_i, z) = 100 - |z - x_i|$ which is the payoff

function used in the experiment. For the exogenous treatments I calculate for every ideal policy set the average efficiency on the basis of every group member being the group leader with equal probability. Furthermore, in the endogenous treatments where multiple Nash equilibria in the first stage of the game are possible I calculate the average efficiency considering all of the respective equilibria with equal weights, as well as a minimum (maximum) efficiency resulting from the equilibrium that would generate the lowest (highest) group payoff. The efficiencies are listed in Table 6. The gross policy efficiency is the efficiency of the final policy alone while the net policy efficiency also considers the costs of running for election in the endogenous treatments.

	gross policy efficiency				net policy efficiency	
	EXRD	EXDD	ENRD	ENDD	ENRD	ENDD
Minimum			95.92%	94.49%	84.05%	93.51%
Average	85.18%	94.87%	96.95%	94.59%	88.55%	93.72%
Maximum			99.30%	94.67%	92.09%	93.91%

Table 6: Theoretical efficiencies in the different treatments

Considering gross policy efficiency EXRD performs worst as randomly appointed group leaders choose their own ideal points as the status quo. Introducing only the direct democratic institution (EXDD) to this game increases policy efficiency by almost 10 percentage points due to the indirect effect of direct democracy, i.e. the sole provision of the direct democratic institution increases the policy efficiency although it is actually never used. An even larger increase in efficiency can be observed when only the election of the group leader is introduced in ENRD as on average more moderate group leaders are appointed.²³ When both mechanisms are in place (ENDD) the increase in efficiency is just not as high as in ENRD or ENDD. The interaction of endogenous leadership and direct democratic institution causes no group member to run for election in most ideal policy sets, and if a group member runs for election the median group member is rarely one of them.

Once I take into account the costs for running for election the picture changes dramatically. The net policy efficiency in ENRD now is only slightly higher than in EXRD because group members run for election in almost any possible ideal policy set incurring costs to the group. Due to the fact that group members rarely run for election in ENDD the costs only slightly decrease net policy efficiency in this treatment. As a result, the indirect effect of direct democracy reappears as ENDD now outperforms

²³ As Figure A.1 in the appendix shows, there is a large area of ideal policy sets where in equilibrium only the median group member runs for election which leads to maximum policy efficiency.

ENRD in terms of efficiency. Thus, the indirect effect of direct democracy is now two-fold: it restricts group leaders in their status quo choice and thereby it reduces candidate competition beforehand. However, the policy efficiency in ENRD is still only slightly short of the policy efficiency in EXDD.

4 Experimental Design and Procedure

I employ a 2x2 treatment design, varying the type of leadership (exogenous and endogenous) between-subjects, and the political institution (purely representative and direct democratic) within-subjects. As already described in Section 3.3, treatments are labeled *EXRD*, *EXDD*, *ENRD*, and *ENDD*. Every session consists of two parts with 20 decision periods where in each part participants interact under a different institution (keeping the type of leadership constant) and the order is changed across sessions. Using partners matching, participants are divided in groups of three which stay fixed during the entire session. This way, I obtain 20 independent observations for each type of leadership, half of them for each order of political institutions.²⁴

The experiment was conducted at the Cologne Laboratory for Experimental Economics. It was computerized using z-Tree (Fischbacher, 1999) and participants were recruited with ORSEE (Greiner, 2004). In total, 120 students of different fields of study of the University of Cologne attended 4 sessions of 30 participants each that lasted approximately 90 minutes. Earnings were expressed in points which were exchanged for cash at the end of the session for €1 per 300 points. Participants earned an average of €12.84.²⁵

5 Experimental Results

This section reports the experimental results. In turn, I focus on the effects of different institutional settings on policy efficiency, on candidates for election and leader types in the endogenous treatments as well as their effect on efficiency levels, and finally on the proposition of alternatives.

5.1 The Institutional Effects on Efficiency

In this section I report the experimental results on the efficiency of group outcomes in my four treatments. In particular, I analyze the efficiency levels of both the status quo

²⁴ In the treatment ENRD efficiency levels of group outcomes are significantly higher in the second part than in the first part (89% vs. 93%). However, this level effect does not affect the main results of my analysis. In general, I arrive at the same qualitative conclusions if I only consider the first parts of each session in my analysis.

²⁵ The instructions for the experiment can be found in the appendix.

which is initially set by the group leader and the final policy which results from any successful alternative proposition (in the DD treatments). I assess efficiency with the same measure I applied in the theoretical analysis in Section 3.2. The average efficiency levels in the different treatments (and different stages of the respective game) are shown in Figure 3.

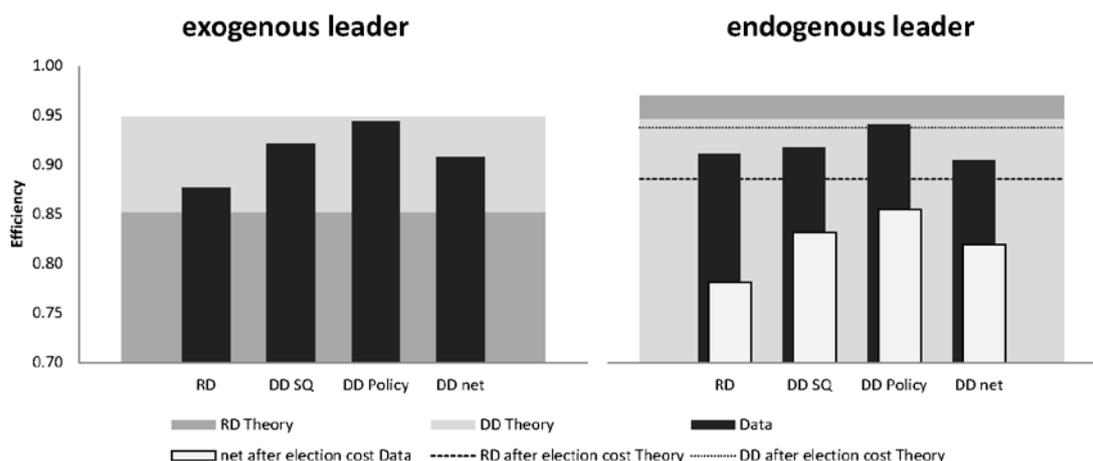


Figure 3: Average efficiency levels of status quo and final policy in the different treatments

The left (right) part of Figure 3 shows the average efficiency levels in the treatments EXRD and EXDD (ENRD and ENDD) where the group leader is exogenous (endogenous). The areas in the background of the bar diagrams represent the theoretically predicted average efficiency levels of the final policy as derived in Section 3.2; the dark (light) grey area shows the theoretical efficiency in the respective RD (DD) treatment. Additionally, for the endogenous treatments the dashed (dotted) line illustrates the resulting efficiency levels in ENRD (ENDD) when also the costs of running for election are considered. The dark bars show, in turn, the efficiency levels of the status quo (and final policy) in the respective *RD* treatment,²⁶ the status quo in the respective DD treatment (*DD SQ*), the final policy accepted after alternatives have (or have not) been proposed (*DD Policy*), and the final policy considering the costs induced by proposing alternatives (*DD net*). Furthermore, for the endogenous treatments the lighter bars show the respective efficiencies when the costs of running for election are additionally considered.

Before turning to treatment comparisons, I take a brief look at each treatment's performance with regard to the theoretical prediction of policy efficiency. The average efficiency level in EXRD is significantly higher than predicted (Sign-Test, $p=0.0577$)

²⁶ Remember that in the treatments with the purely representative institution the status quo automatically becomes the final policy determining utility.

but theory overestimates the effect of the direct democratic institution as the average efficiency in EXDD is significantly lower than predicted (Sign Test, $p=0.0001$). In the treatments ENRD and ENDD the measured average efficiencies never reach the predicted levels (Sign-Test, $p<0.01$ for all comparisons). However, calculating theoretical efficiencies on the basis of elected group leaders reveals the same observation. In ENRD the average efficiency is significantly higher than predicted (two-tailed Wilcoxon Signed-Ranks, $p=0.0607$) and in ENDD it is significantly lower than predicted (two-tailed Wilcoxon Signed Ranks, $p=0.0001$).²⁷ Obviously, in contrast to Proposition 2 on average randomly appointed group leaders who are restricted (not restricted) by direct democracy act more (less) selfishly than predicted.

The remainder of this section deals with treatment comparisons of status quo and policy efficiencies. Comparisons are based on a two-tailed Wilcoxon Signed Ranks Test for within-subjects comparisons and a two-tailed Mann-Whitney U-Test for between-subjects comparisons. The average of the considered efficiency levels and the p-values for all pairwise comparisons are shown in Table 7.

²⁷ The status quo/policy efficiencies in the data may fall short of the predicted overall efficiencies for two reasons. Either the group leaders behave differently than predicted or the outcome of the candidate election differs from the theoretical prediction. To evaluate the group leaders' behavior the theoretical efficiency levels on the basis of the actually elected group leader needs to be calculated. The resulting efficiencies are 0.90 (ENRD) and 0.95 (ENDD), considering election costs they are 0.77 (ENRD) and 0.87 (ENDD).

												with election costs		
			EXRD	EXDD			ENRD	ENDD			ENRD	ENDD		
			avg	SQ	Policy	net		SQ	Policy	net		SQ	Policy	net
avg			0.88	0.92	0.94	0.91	0.91	0.92	0.94	0.91	0.78	0.83	0.85	0.82
	EXRD		0.88	-										
	EXDD	SQ	0.92	0.003	-									
		Policy	0.94	0.000	0.000	-								
		net	0.91	0.037	0.003	0.000	-							
	ENRD		0.91	0.006	0.402	0.000	0.552	-						
ENDD	SQ	0.92	0.003	0.829	0.002	0.185	0.279	-						
	Policy	0.94	0.000	0.008	0.570	0.000	0.002	0.000	-					
	net	0.91	0.037	0.074	0.000	1.000	0.654	0.008	0.000	-				
with election costs	ENRD		0.78	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-		
	ENDD	SQ	0.83	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	-	
		Policy	0.85	0.079	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-
	net	0.82	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.008	0.000	-

Table 7: Average status quo and final policy efficiency levels for all treatments (grey cells) and p-values of pairwise treatment comparisons (central white cells). Statistically significant differences in bold.

I first turn to the treatments with *exogenous leadership*. In the purely representative institution the efficiency is always significantly lower than the efficiency of either status quo or final policy in any other treatment (in all pairwise comparisons $p < 0.05$). When the direct democratic institution is available efficiency of the status quo set by the group leader is substantially and significantly higher than in the purely representative democracy (two-tailed Wilcoxon Signed Ranks, $p = 0.0028$). This difference in efficiency can be attributed to the indirect effect of direct democracy as the group leaders anticipate and seek to avoid the other group members to propose alternatives to the status quo. Through the process of proposing alternatives the average efficiency of the final policy is even larger than the status quo efficiency (two-tailed Wilcoxon Signed Ranks, $p = 0.0001$). The difference between status quo and policy efficiency reflects the direct effect of direct democracy. However, considering the costs induced by this process the efficiency of the final policy is significantly lower than the status quo's efficiency (two-tailed Wilcoxon Signed Ranks, $p = 0.0026$), but still higher than the policy efficiency in the purely representative institution (two-tailed Wilcoxon Signed Ranks, $p = 0.0366$). The costs of proposing alternatives more than outweigh the direct effect of direct democracy (i.e. the immediate benefit of actually proposing alternatives), and also partly but not completely abolish the indirect effect of direct democracy.

Average efficiency levels in the treatments with *endogenous leadership* reveal a similar picture. However, there is no statistically significant difference between the status quo efficiencies of purely representative and direct democratic institution (two-tailed Wilcoxon Signed Ranks, $p=0.279$), i.e. there is no measurable indirect effect of direct democracy when group leaders can be elected by the group. After alternatives have been proposed and decided on by the group the final policy efficiency is significantly higher than both status quo efficiencies in RD and DD (two-tailed Wilcoxon Signed Ranks, $p=0.0017$ and $p=0.0001$, respectively). Hence, a direct effect of direct democracy can be observed. However, considering the costs of proposing alternatives the final policy efficiency is statistically lower than the initial status quo in DD and not significantly different from the status quo in RD (two-tailed Wilcoxon Signed Ranks, $p=0.008$ and $p=0.654$, respectively). As in the exogenous treatments the direct effect of direct democracy is completely abolished; the costs of direct democracy more than outweigh its benefit.

After comparing efficiency levels within the different leadership treatments I now investigate the effect of the type of leadership on status quo and policy efficiency. The possibility of electing the group leader leads to a significantly higher efficiency in a purely representative institution (two-tailed Mann-Whitney U-Test, $p=0.0058$). In contrast, when the direct democratic institution is available the type of leadership does not have a significant effect on either status quo or policy efficiencies.

Finally, if I take into account the costs of running for election in the *endogenous* treatments the respective efficiency levels drop substantially and significantly even beyond the efficiency level of the final policy in EXRD. However, when comparing the resulting total net efficiency levels the indirect effect of direct democracy reappears, i.e. now the direct democratic institution causes the final policy efficiency to be higher than the final policy in the purely representative institution again. This is due to the fact that the actual costs of running for election are much higher in ENRD than in ENDD. Because being the group leader is much more attractive in ENRD more group members might choose to run for election in this treatment inducing more costs. In ENDD the average number of candidates might be lower because group members know that as a leader they are restricted in their action space by the direct democratic institution. I look at this aspect in more detail in Section 5.2.

Concluding this section, it can be asserted that, despite not meeting the theoretical predictions quantitatively, the data qualitatively confirms the picture that theory draws. There is a strong indirect effect of direct democracy when group leaders have discretionary power (i.e. they are randomly appointed) and when they are elected and

election costs are considered. In contrast to Proposition 2, the data also shows a sizeable direct effect of direct democracy which is nullified by the costs the institution entails.

Result 1 (Status Quo and Policy Efficiency)

- (i) *There is an indirect effect of direct democracy when leadership is exogenous. The indirect effect can also be observed under endogenous leadership only when the costs of running for election are considered.*
- (ii) *Efficiency levels under the direct democratic institution do not differ irrespective of whether the group leader was appointed exogenously or endogenously.*
- (iii) *There is always a strong direct effect of direct democracy.*
- (iv) *The cost of the direct democratic institution always outweighs the direct effect of direct democracy and even partly abolishes its indirect effect.*

5.2 Candidates and Leader Types

In this section I investigate two possible reasons for the fact that overall net policy efficiency levels in the treatments with endogenous leadership are not as high as theory would predict. One reason might be that too many group members run for being elected as the group leader. Another reason might be that the wrong “types” of group members are running (and, in turn, are elected). To investigate the latter reason, I define three types of group leaders: (i) the *median leader* who is the group member with the median ideal policy point of the group, (ii) the *coalitional leader* whose ideal policy point is on either end of the current ideal policy set but is close enough to the other members to not provoke the proposition of an alternative (when the direct democratic institution is available) by setting his own ideal policy point as the status quo,²⁸ and (iii) the *extreme leader* whose selfish interests are always in conflict with the preferences of the other group members. Figure 4 shows the distribution of these leader types in the different treatments as well as average number of candidates running for election in the endogenous treatments.

²⁸ Thus, if e.g. the coalitional leader’s ideal policy point is x_3 his optimal status quo is $s^* = \min \left\{ \max \left\{ c_a, x_2 + \frac{c_a}{2} \right\}, x_3 \right\} = x_3$.

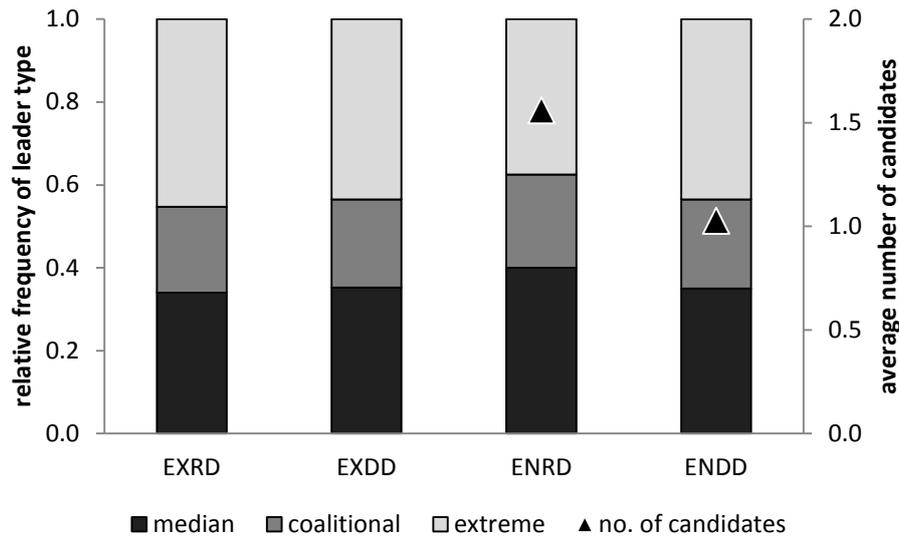


Figure 4: Relative frequencies of leader types in the different treatments and average number of candidates in the EN treatments

First, on average there are significantly more candidates in ENRD than in ENDD (1.56 vs. 1.03, two-tailed Wilcoxon Signed Ranks, $p=0.0001$). This finding is in line with Proposition 3 and corroborates the conjecture from the previous section that in ENRD being the group leader is more attractive, resulting in more candidates running for election and thus generating higher costs than in ENDD. Second, the distributions of group leader types in the exogenous treatments (EXRD and EXDD) serve as a benchmark because leadership is determined randomly here. Unsurprisingly, there is no statistically significant difference between these two treatments. The distribution of group leader types in ENDD does not significantly differ from either benchmark distribution. Because group leaders are indirectly restricted in their status quo choice by the direct democratic institution in this treatment the actual type of the group leader is not decisive for the policy outcome. Although observing the same distribution in EXRD, EXDD, and ENDD, the efficiency levels in the direct democratic treatments are always higher, i.e. here it is the direct democratic institution that is (indirectly) driving policy outcomes. In ENRD the relative frequency of extreme group leaders is smaller than in the other treatments. However, this frequency is only significantly different in comparison to EXRD (two-tailed Whitney-Mann U-Test, $p=0.0422$). Given the difference in efficiency levels between EXRD and ENRD, the group leader type seems to play an important part in driving the policy outcomes.

To further investigate the direct relationship between leader types and policy efficiency I run a panel regression with the status quo efficiency as the dependent variable for the RD and DD treatments separately. The regression results are reported in Table 8.

	<i>RD (1)</i>	<i>RD (2)</i>	<i>DD (1)</i>	<i>DD (2)</i>
endogenous leadership	0.0458*** (0.013)	0.0508*** (0.018)	0.0001 (0.007)	0.0097 (0.014)
group leader types (<i>ref.:median</i>)				
coalitional	-0.0313*** (0.011)	-0.008 (0.016)	-0.0152 (0.010)	-0.0104 (0.014)
extreme	-0.2085*** (0.009)	-0.2192*** (0.013)	-0.1329*** (0.008)	-0.1249*** (0.012)
endogenous * coalitional		-0.0460** (0.022)		-0.0104 (0.020)
endogenous * extreme		0.0234 (0.018)		-0.0157 (0.017)
candidates	-0.0171*** (0.006)	-0.0201*** (0.006)	-0.0039 (0.006)	-0.0045 (0.006)
period	-0.0017*** (0.001)	-0.0016** (0.001)	0.0022*** (0.001)	0.0022*** (0.001)
constant	0.9956***	0.9945***	0.9592***	0.9546***
N	800	800	800	800
R ²	0.4380	0.4454	0.2911	0.2920

Table 8: Status quo efficiency; OLS Panel Regression for different political institutions on the group level, separately, standard errors in parentheses, levels of significance: $p < 0.01$ (***), $p < 0.05$ (**), $p < 0.1$ (*)

The dummy variable for endogenous leadership takes on the value 0 if leadership is exogenous and 1 if leadership is endogenous. In the RD treatments the endogeneity of leadership has a substantial and significant positive impact on efficiency while in the DD treatments it has none. This is in line with my previous results that the indirect effect of direct democracy is the main driver of high (status quo) efficiency irrespective the type of leadership. I also include dummies for the leader types (with the median leader as the reference type). Both for the RD and DD treatments the estimation models (1) and (2) differ with respect to the inclusion of interactions terms interacting leadership institution and leader type. An extreme leader always has a strong and significant negative effect on status quo efficiency. This effect is much stronger in the RD treatments as in the DD treatments the indirect effect of direct democracy mitigates the behavior of extreme leaders. Coalitional leaders only have a significant negative impact on status quo efficiency in the RD treatment with endogenous leadership, i.e. they only systematically exploit their position as policy maker if they are elected which may be due to a notion of entitlement through the election. The number of candidates only has a significant negative effect on efficiency in the RD treatments as well. This result also hints towards the notion of entitlement when being elected. Because in the

RD treatments, once appointed, group leaders are not institutionally restricted they might feel entitled to serve their own interest as they invested in running for election (and have actually been elected), even more so if the competition during election was stronger. Finally, I include the period to check whether efficiency changes over time. In the RD treatments the period has a significant negative effect on efficiency while in the DD treatments the effect is significantly positive. This indicates that leaders in RD seem to “learn” to act more selfishly while in DD leaders seem to “learn” that they are restricted in their actions by the threat of the direct democratic institution.

Result 2 (Candidates and Leader Types)

- (i) There are more group members running for election in the purely representative institution than in the direct democratic institution.*
- (ii) On average the possibility to be elected as group leader results in less extreme group leaders in the purely representative institution.*
- (iii) When leadership is endogenous the distribution of leader types in the direct democratic institution does not differ from a randomly determined distribution of leader types.*
- (iv) Extreme leaders reduce the status quo efficiency irrespective of the political institution; the reduction is stronger when the direct democratic institution is not available. Coalitional leaders only reduce the status quo efficiency when leadership is endogenous and the direct democratic institution is not available.*

5.3 Proposition of Alternatives

In this section I take a detailed look at the alternatives being proposed under the direct democratic institution to investigate the direct effect of direct democracy and, in particular, why the net efficiency after the proposition of an alternative is lower than the initial status quo. Figure 5 depicts for each treatment the relative frequency of cases which proposing an alternative would be beneficial in, i.e. the net gain of proposing an alternative is positive (black bars). For the DD treatments only, the grey bars represent the relative frequencies of cases at least one alternative is actually proposed in when it is beneficial to do so (dark grey) and when it is not beneficial to do so (light grey). Cumulating the corresponding grey bars results in the total relative frequency of cases at least one alternative is actually proposed in.

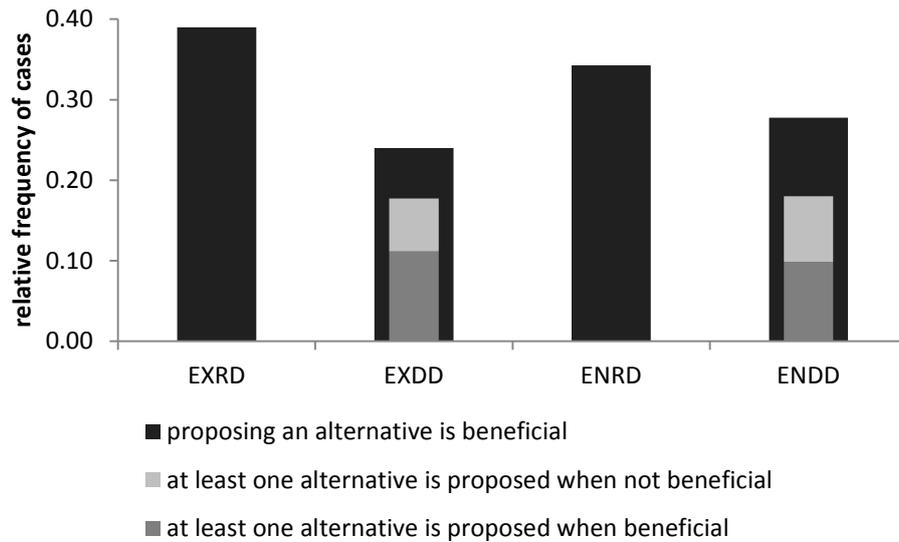


Figure 5: Relative frequencies of cases permitting beneficial alternatives and cases actually causing the proposition of an alternative (beneficial or unbeneficial) for every treatment

The relative frequencies of cases where the proposition of an alternative would be beneficial are significantly higher in the treatments with the purely representative institution than in the treatments with direct democracy (for all pairwise comparisons $p < 0.05$).²⁹ The comparison of the type of leadership appointment for a given political institution reveals no significant difference in these frequencies. Obviously, it is rather the direct democratic institution than the endogeneity of leadership that leads group leaders to completely avert the proposition of alternatives more often by adjusting their status quo to the median member's ideal policy point. This corroborates the results from Section 5.1 and is in line with Proposition 2 regarding the indirect effect of direct democracy. However, the other group members actually propose any alternative significantly less often than it is called for in both direct democratic treatments (two-tailed Wilcoxon Signed Ranks, $p = 0.0423$ (EXDD) and $p = 0.0077$ (ENDD)).³⁰ Moreover, in only 63% (55%) of all cases in the EXDD (ENDD) treatment when an alternative is actually proposed, the status quo potentially allows for a beneficial alternative. There is no statistically significant difference between these rates. This observation is in conflict with Proposition 1 which states that alternatives should be proposed if they are beneficial to the majority of the group. Moreover, the relative frequency of actually proposing an alternative does not significantly differ across the direct democratic

²⁹ Again, all within-subject comparisons are based on a two-tailed Wilcoxon Signed Ranks Test and between-subjects comparisons are based on a Whitney-Mann U-Test. Specifically, the p-values for the pairwise comparisons are: EXRD vs. EXDD, $p = 0.0029$; EXRD vs. ENDD, $p = 0.0041$; ENRD vs. EXDD, $p = 0.0182$; ENRD vs. ENDD, $p = 0.025$.

³⁰ The sum of the lighter bars reflects the frequency of cases when any alternative (beneficial or unbeneficial) is actually proposed.

treatments. Hence, while excessive use of the direct democratic institution cannot be the reason of the weak net direct effect of direct democracy,³¹ its cause lies in the choice of alternatives being proposed which will be dealt with next.

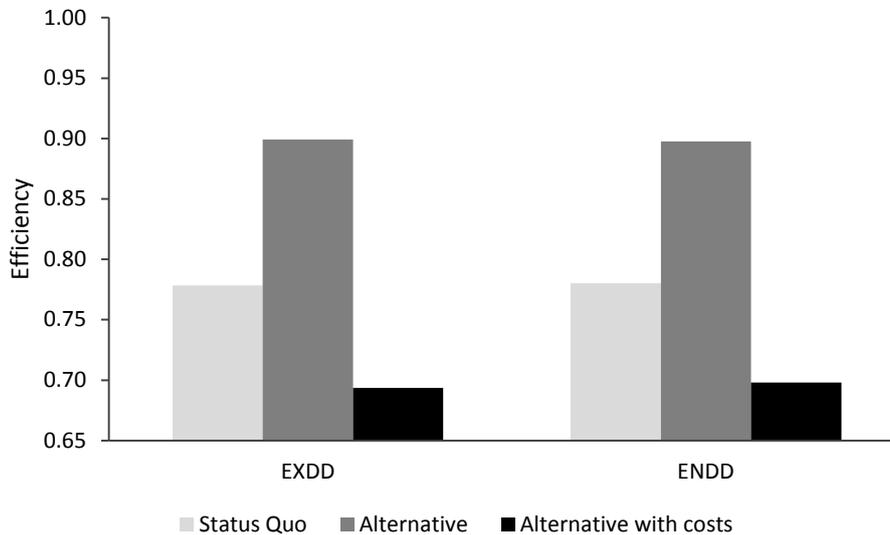


Figure 6: Average status quo efficiency of all occasions when an alternative was proposed vs. average proposed alternative efficiency (with and without costs) in the direct democratic treatments

Figure 6 shows the average efficiency levels of proposed alternatives with and without the consideration of the costs of the initiative. These efficiencies are contrasted with the corresponding average status quo efficiencies of all occasions when an alternative was proposed. In both treatments, the alternative itself leads to significantly higher efficiency levels than the status quo (Wilcoxon Signed Ranks, $p=0.0002$ (EXDD) and $p=0.0009$ (ENDD)). However, considering the costs of proposing an alternative reveals that the resulting average net efficiencies are significantly lower than the status quo (Wilcoxon Signed Ranks, $p=0.0048$ (EXDD) and $p=0.0032$ (ENDD)). It is noteworthy that 85% (78%) of all proposed alternatives in EXDD (ENDD) are accepted by the majority.³² Again, this is in conflict to Proposition 1. In addition to the fact that also unaccepted alternatives generate costs, these observations result in the relatively weak net policy efficiencies observed in Section 5.1. This leads to the conjecture that group members do not only use the direct democratic institution to produce a more efficient

³¹ Actually proposing two alternatives at the same time is also possible reason for the efficiency reducing nature of the observed direct effect of direct democracy. As only one alternative can be accepted the extra alternative generates additional costs without any efficiency gain. However, this only happens very rarely and thus does not drive the effect.

³² Considering only the average net efficiency of the alternatives that are actually accepted by the majority of a group delivers almost equal values, thus they are not reported here.

outcome but rather to punish the group leader for not conforming with the entire group even if it means incurring additional and, from an efficiency standpoint, unnecessary costs.³³

Result 3 (Proposing Alternatives)

- (i) *The frequency of status quo decisions that allow for the beneficial proposal of an alternative is lower under the direct democratic institution than under the purely representative institution. However, it is not affected by the method of leadership appointment.*
- (ii) *Alternatives are proposed less often than would be beneficial for the group.*
- (iii) *In a sizeable share of all occasions an alternative is proposed at, proposing is not beneficial to the group.*
- (iv) *On average the proposed alternatives are more efficient than the status quo but considering the costs of proposing an alternative the resulting net efficiency is lower.*

6 Conclusion

This paper presents the results of a laboratory experiment to investigate the effects of the initiative on net outcome efficiency by explicitly taking into account the costs of the political process and allowing for endogenous appointment of the policy setter. Among a group of three agents a group leader is assigned who sets a status quo. Each group member's payoff is determined by the status quo's relative position to her respective ideal policy point while all agents have complete information about the ideal policy set. In one dimension treatments vary in the political institution. In the purely representative democracy the group leader's status quo is final, and in direct democracy any other group member may oppose the status quo by proposing a costly alternative policy subject to a simple majority vote. In another dimension treatments vary in the method group leadership is determined. It can be either exogenous (by random assignment) or endogenous (by candidate election while running for election is costly).

The experimental results show a strong indirect effect of direct democracy on outcome efficiencies under exogenous leadership, i.e. the group leader sets a moderate status quo in order to avert an alternative proposal. However, the availability of the direct democratic institution does not improve efficiency levels when the group leader is determined endogenously. While the direct democratic institution serves as a means to discipline even extreme group leaders, the sole possibility to be elected results in less

³³ For example Fehr and Gächter (2000) make a similar argument for punishment in public good games.

extreme group leaders in the first place. The combination of both direct democracy and endogenous leadership does not enhance status quo efficiency any further. Taking into account the election costs in the endogenous treatments reveals that direct democracy reduces candidate competition to a high degree, thus substantially reducing election costs and increasing net efficiency again. These observations are in line with the theoretical analysis of the game. A direct effect of direct democracy caused by the actual use of the direct democratic institution can always be observed. However, this effect is always completely balanced out by the costs generated by the process but the indirect effect remains. This is mainly due to the fact that on average too often alternatives are proposed that are unable to compensate the costs they induce. The fact that the initiative is used even when its costs are higher than its benefits allows conjecturing that the initiative is seen as a costly punishment device and used as such.

The experimental data essentially confirms theoretical (e.g. Gerber, 1996) and empirical findings (e.g. Matsusaka, 2005a) that the possibility of direct democracy, especially the initiative, serves as a credible threat towards politicians who, in turn, pass laws that are closer to the median voter's preferences leading to outcomes that are more efficient. This is also in line with the findings of Güth et al. (2004). Moreover, this is true even without the actual use of the direct democratic institution. However, the results also show that either the election of the representative or the initiative suffices to achieve high policy efficiencies. While running for election is costly the sole availability of the initiative is "free of charge" making it superior with regard to overall outcome efficiency. The initiative averts inefficiencies by excessive competition during candidate election because only "sincere" candidates run for office that are willing to serve the median voter's preferences to some degree, and thus increase group efficiency. This conjecture is supported by the fact that status quo efficiencies in the endogenous treatments do not differ although on average there is always a positive number of candidates and the distribution of leader types is different across the endogenous treatments. Given that there are elections on a regular basis in democratic systems the provision of the initiative has a two-fold efficiency enhancing indirect effect. It affects policy making decisions by the government as a credible threat and, in turn, reduces campaign costs by decreasing candidate competition. But the data also give some support to arguments stating that the costs of direct democracy cancel out utility gains (Grillo, 1997) as the observed direct effect is even overcompensated by the costs. To a certain degree this can be related to the results of Fischer and Nicklisch (2007) where the costs of rejecting the provision of a particular public good induces reduce overall efficiency. This argument does not apply to the indirect effect of direct democracy, however.

A natural extension of my experiment would be the inclusion of preference uncertainty. Complete information about all group members' ideal policy points was chosen for the sake of keeping the experiment simple and the interpretation of behavior straightforward but this assumption is clearly violated in practice. Asymmetric information among political agents about preferences or uncertainty about the consequences of political actions could be the focus of future experimental studies. Another interesting issue along this line is to what extent and at what cost voters are willing to actively become informed about political issues and the possible outcomes of policies. An extension of my model following Kessler (2004) to incorporate preference uncertainty and information might be possible. Additional treatments could also deal with the issue of different costs of the direct democratic process. Higher costs make it more difficult for the opposition to propose a beneficial alternative. Thus, the policy setter gains more leeway to implement self-serving policies. It might be interesting to observe how the indirect effect depends on the costs of the process and to what extent (in terms of costs) group members are willing to punish the group leader. And lastly, to get a focus on the reputation and commitment of leadership the model might be extended by introducing legislative periods where leaders are "in the office" for more than one period. I leave those questions and extensions to future research.

References

- Benz, M. and Stutzer, A. (2004). Are voters better informed when they have a larger say in politics? – Evidence for the European Union and Switzerland, *Public Choice*, 119, 31-59.
- Besley, T. and Coate, S. (1997). An Economic Model of Representative Democracy, *The Quarterly Journal of Economics*, 112(1), 85-114.
- Besly, T. and Coate, S. (2000). Issue Unbundling Via Citizens' Initiatives, *NBER Working Paper* 8036.
- Blume, L., Müller, J., and Voigt, S. (2009). The Economic Effects of Direct Democracy – A First Global Assessment, *Public Choice*, 140, 431-461.
- Blume, L. and Voigt, S. (2012). Institutional details matter – more economic effects of direct democracy, *Economics of Governance*, 13, 287-310.
- Butler, D. and Ranney, A., Eds. (1994). *Referendums Around the World: The Growing Use of Direct Democracy*, Washington DC: AEI Press.
- Downs, A. (1957). *An economic theory of democracy*, Harper Collins Publishers, New York.
- Feld, L. P. and Kirchgässner, G. (2001a). Does direct democracy reduce public debt? Evidence from Swiss municipalities, *Public Choice*, 109, 347-370.
- Feld, L. P. and Kirchgässner, G. (2001b). The political economy of direct legislation: direct democracy and local decision-making, *Economic Policy*, 16(33), 329-367.
- Feld, L. P. and Kirchgässner, G. (2004). The Role of Direct Democracy in the European Union. In: Blankart, C. B. and Mueller, D. C. (Eds.): *A Constitution for the European Union*, Cambridge: MIT Press, 203-235.
- Feld, L. P., Kirchgässner, G., and Schaltegger, C. A. (2010). Decentralized Taxation and the Size of Government: Evidence from Swiss State and Local Government, *Southern Economic Journal*, 77(1), 27-48.
- Feld, L. P. and Matsusaka, J. G. (2003). Budget referendums and government spending: evidence from Swiss cantons, *Journal of Public Economics*, 87, 2703-2724.
- Feld, L. P. and Tyran, J.-R. (2002). Tax Evasion and Voting: An Experimental Analysis, *KYKLOS*, 55, 197-222.
- Fehr, E. and Gächter, S. (2000). Cooperation and Punishment in Public Goods Experiments, *American Economic Review*, 90, 980-994.
- Fischbacher, U. (2007). z-tree: Zurich Toolbox for Ready-made Economic Experiments,

- Experimental Economics*, 10(2), 171-178.
- Fischer, S. and Nicklisch, A. (2007). Ex Interim Voting: An Experimental Study of Referendums for Public Good Provision, *Journal of Institutional and Theoretical Economics*, 163, 56-74.
- Frey, B. S. (1994). Direct Democracy: Politico-Economic Lessons from Swiss Experience, *American Economic Review*, 84(2), 338-342.
- Frey, B. S., Benz, M., and Stutzer, A. (2004). Introducing Procedural Utility: Not Only What, but Also How Matters, *Journal of Institutional and Theoretical Economics*, 160, 377-401.
- Gerber, E. (1996). Legislative Response to the Threat of Popular Initiatives, *American Journal of Political Science*, 40(1), 99-128.
- Greiner, B. (2004). An Online Recruitment System for Economic Experiments. In: Kremer, K. and Macho, V. (Eds.): *Forschung und wissenschaftliches Rechnen 2003, GWDG Bericht 63*, Göttingen: Ges. für Wiss. Datenverarbeitung, 79-93.
- Grillo, M. (1997). Democracy, Competition, and the principle of Osonomia: An economic analysis of the political exchange as an incomplete contract. In: Albert Breton, Gianluigi Galeotti, Pierre Salmon and Ronald Wintrobe (Eds.): *Understanding Democracy: Economic and Political Perspectives*, New York: Cambridge University Press, 47-63.
- Güth, W., Kocher, M., Pantz, K., and Sutter, M. (2004). Public Choice by Referenda or Delegation. An Experimental Comparison of Direct and Indirect Democracy, Max Planck Institute for Research into Economic Systems, Jena, *mimeo*.
- Hug, S. (2004). Occurrence and Policy Consequences of Referendums, *Journal of Theoretical Politics*, 16(3), 321-356.
- Kaufmann, B., Büchi, R., and Braun, N. (2010). *Guidebook to Direct Democracy – in Switzerland and Beyond*, Marburg: The Initiative and Referendum Institute Europe.
- Kessler, A. S. (2005). Representative versus direct democracy: The role of informational asymmetries, *Public Choice*, 122, 9-38.
- Kirchgässner, G., Feld, L. P., and Savioz, M. R. (1999). *Die direkte Demokratie: Erfolgreich, modern, entwicklungs- und exportfähig*, Basel, München: Vahlen.

- Lupia, A. (1994). The effects of information on voting behavior and electoral outcomes: An experimental study of direct legislation, *Public Choice*, 78, 65-86.
- Matsusaka, J. G. (2004). For the Many or the Few – The Initiative Process, Public Policy, and American Democracy, Chicago: University of Chicago Press.
- Matsusaka, J. G. (2005a). Direct Democracy Works, *Journal of Economic Perspectives*, 19(2), 185-206.
- Matsusaka, J. G. (2005b). The eclipse of legislature: Direct democracy in the 21st century, *Public Choice*, 124, 157-177.
- Matsusaka, J. G. and McCarty, N. M. (2001). Political Resource Allocation: Benefits and Costs of Voter Initiatives, *Journal of Law, Economics & Organisation*, 17(2), 413-448.
- Niskanen, W. A. (1975): Bureaucrats and Politicians, *Journal of Law and Economics*, 18(3), 617-643.
- Osborne, M. J. and Slivinski, A. (1996). A Model of Political Competition with Citizen-Candidates, *Quarterly Journal of Economics*, 111(1), 65-96.
- Pommerehne, W. W. (1983). Private vs. öffentliche Müllabfuhr, nochmals betrachtet, *Finanzarchiv*, 41, 466-475.
- Schiller, T. (2002). *Direkte Demokratie – Eine Einführung*, Frankfurt: Campus.
- Torgler, B. (2005). Tax morale and direct democracy, *European Journal of Political Economy*, 21, 525-531.
- Tyran, J.-R. and Feld, L. P. (2006). Achieving Compliance when Legal Sanctions are Non-deterrent, *Scandinavian Journal of Economics*, 108(1), 135-156.

Appendices

A Supplemental Tables and Figures

Group member 3 Run		Group member 2	
		Run	Do Not Run
Group member 1	Run	$\left(-x_2 - c_e; \frac{2}{3}(-x_2) - c_e; -x_2 - c_e\right)$	$(-x_2 - c_e; -x_2; -x_2 - c_e)$
	Do Not Run	$(-x_2; -c_e; -x_2 - c_e)$	$(-2x_2; -x_2; -c_e)$
Group member 3 Do Not Run		Group member 2	
		Run	Do Not Run
Group member 1	Run	$(-x_2 - c_e; -c_e; -x_2)$	$(-c_e; -x_2; -2x_2)$
	Do Not Run	$(-x_2; -c_e; -x_2)$	$\left(-x_2; \frac{2}{3}(-x_2); -x_2\right)$

Table A.1: Payoff matrix of the stage “Run for Election” under the purely representative institution for $x_3 = 2x_2$; within each cell the first payoff belongs to group member 1, the second to group member 2, and the third to group member 3.

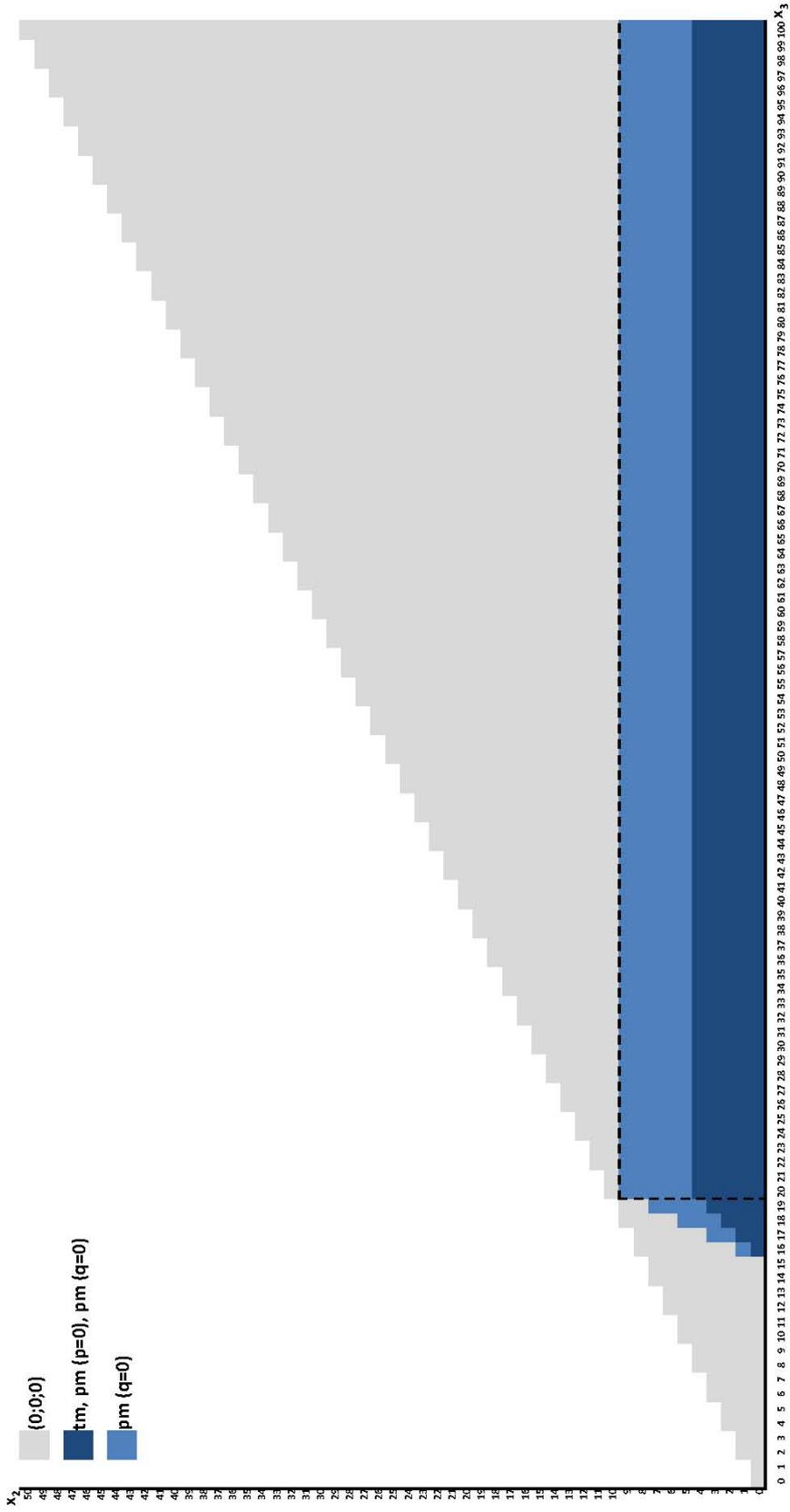


Figure A.2: Graphical representation of Nash equilibria in the “Running for Election” Stage in ENDD for different combinations of group member’s ideal policy points. Different colors represent areas with different possible equilibria. *Equilibria in pure strategies* are expressed as triples $(p; q; r)$, “tm” stands for *totally mixed equilibria* where all group members use a mixed strategy (but with different probabilities within an area), and “pm” stands for *partially mixed equilibria* where one group member uses a pure strategy (given in brackets) while the other two mix.

B Instructions (for Session ENDD-ENRD)

(translated from the German version, screenshots remain in German; the instructions for ENRD-ENDD differ with respect to the order the two parts are conducted in, the instructions for EXRD-EXDD and EXDD-EXRD do not include the Stage “Election of the Group Representative”; the other instructions are available on request)

Welcome to this experiment! You receive 2.50 Euro for showing up on time. Depending on your decisions and the decisions of other participants you can earn additional money. During the experiment we use points instead of Euro. These will be exchanged at the following rate:

$$300 \text{ points} = 1 \text{ Euro}$$

At the end of the experiment your total amount of points will be exchanged into Euro and, including the show-up fee of 2.50 Euro, paid to you in cash. All payments are made anonymously, i.e. no other participant will be informed about your payment. **Please do not communicate with other participants during the experiment.** Should you have any questions, please raise your hand. We will then come to you and gladly answer your questions individually. Compliance with this rule is very important. Otherwise the experimental results will be scientifically useless.

‘Parts A and B’ and ‘Decision Periods’

The experiment consists of two parts, *Part A* and *Part B*. We begin with the instructions for Part A. You will learn about the details of Part B after Part A is completed. Part A consists of *20 Decision Periods*.

Instructions for Part A

Groups

At the beginning of the first period all participants are *randomly* divided into groups of three by the computer. The composition of the groups *does not change* throughout the 20 periods, i.e. there are always the same participants in a group. Thus, besides yourself there are two other participants in your group. You will never learn who the other two participants in your group are. At the beginning of the first period each member of your group will be assigned a number between 1 and 3 which does not change for the entire 20 periods. This number only serves the purpose of identifying group members and has no effect on any decisions or profits.

Ideal Points and Signals

At the beginning of *each period* you will be assigned a randomly drawn Ideal Point. This is an integer between 0 and 100 where every number is drawn with equal probability. The other group members will also be assigned a randomly drawn Ideal Point between 0 and 100. Your own Ideal Point is independent of the other group members' Ideal Points. In each period you learn about the other group members' Ideal Points, just as the other group members learn about your Ideal Point. Thus, each member is informed about all Ideal Points within a group.

Group Representative and Status Quo

At the beginning of *each period* one member of your group will be elected Group Representative. Each group member who wants to be elected has to run for election and bear costs of 10 points. There are no costs to any group member who does not run for election. If there is a voting *all* group members may cast a vote. The Group Representative's task is to choose a **Status Quo** for the respective period that determines the profits of all group members. The **Status Quo** will be chosen each period by the respective Group Representative .which may be any integer between 0 and 100. Until further notice, the Status Quo will affect your profit at the end of the period.

Election of the Group Representative

If **no group member** runs for election the Group Representative will be determined randomly by the computer in this period. The probability of becoming the Group Representative is equal for each group member.

If **one group member** runs for election she will automatically become the Group Representative in this period.

If **two or three group members** run for election all three group members must vote for one of the candidates. The candidate with the highest number of votes will become Group Representative in this period. If there are three candidates with one vote each the Group Representative will be determined randomly by the computer. Again, the probability of becoming the Group Representative is equal for each group member.

After the Group Representative has been determined, all group members learn about the election result and the Group Representative chooses the **Status Quo**. Until further notice, each group member's profit depends on the absolute distance between her own Ideal Point and the chosen **Status Quo**. The closer the Status Quo is to your Ideal Point the higher is your profit in this period. The farther away it is the lower is your profit. (The exact formula to calculate the profit is presented further below.)

Again: The smaller the distance between your Ideal Point and the Status Quo the higher is your profit in this period.

The larger the distance between your Ideal Point and the Status Quo the lower is your profit in this period.

Proposing an Alternatives

After the Group Representative has chosen the Status Quo the other two group members may propose an Alternative to the Status Quo. Costs of 20 points will accrue to each group member proposing an Alternative which will be deducted from her profit at the end of the period. If you do not propose an Alternative no costs accrue. Each member proposing an Alternative will have to state a number between 0 and 100 as her Alternative.

Voting on Alternatives

After all group members have decided whether to propose an Alternative and stated a number accordingly, the Alternatives are revealed to everyone and the *whole group* (including the Group Representative) votes on the proposed Alternatives.

If **no Alternative** has been proposed there is no voting and the Group Representative's Status Quo is final.

If **one Alternative** has been proposed each group member casts a vote on whether to accept or reject the proposal. If the majority of the group (i.e. two or three group members) accepts the Alternative it becomes the final Status Quo and, thus, affects the profit of all group members at the end of the period. Otherwise, the Status Quo chosen by the Group Representative remains.

If **two Alternatives** have been proposed each group member casts a vote on each proposal separately whether to accept or reject the proposal. Furthermore, each member has to state which proposal she favors in case both proposals are accepted by the majority. If the majority of the group accepts one of the Alternatives it will become the final Status Quo. If both proposals are accepted the Alternative favored by the majority will become the final Status Quo. If no Alternative is accepted by the majority the Status Quo chosen by the Group Representative remains.

Period Profit

Finally, your profit of the period is calculated subject to the final Status Quo determined by the group's decisions in this period and subject to the costs that accrued to you if you ran for election or proposed an Alternative.

Your profit in this period

$$\begin{aligned} &= 100 - \text{absolute distance between Status Quo and your Ideal Point} \\ &- \text{costs accrued by running for election and/or proposing an Alternative} \end{aligned}$$

Example 1: Assume your Ideal Point is 73. The final Status Quo is 45. The absolute distance between your Ideal Point and the Status Quo is 28. Your profit in this period is $100 - 28 = 72$. If you ran for election of the Group Representative your profit decreases by 10, resulting in a total of 62.

Example 2: Assume the Group Representative chooses the Status Quo your Ideal Point is 17. You decide to propose an Alternative (which costs 20 points) and choose 24. Your proposal is accepted by the majority and becomes the final Status Quo. The absolute distance between your Ideal Point and the Status Quo is $24 - 17 = 7$. Your profit in this period calculates as follows: $100 - \text{distance between Ideal Point and Status Quo (7)} - \text{costs for proposing an Alternative (20)} = 73$. If, additionally, you ran for election of the Group Representative your profit decreases by another 10 points, resulting in a total of 63.

Summary of the Sequence of a Period:

1. Each group member receives a randomly drawn Ideal Point between 0 and 100.
2. Each group member learns about the Ideal Points of all group members.
3. Each group member decides whether to run for election of the Group Representative (for costs of 10 points) or not.
4. The Group Representative is determined (by voting or randomly, depending on the number of candidates).
5. The Group Representative chooses a Status Quo.
6. All group members; apart from the Group Representative, simultaneously decide whether to propose an Alternative to the Status Quo (for costs of 20 points) and, if so, state their proposal.
7. All three group members vote on the proposed Alternatives, if any have been made.
8. The most supported Alternative will become the final Status Quo. If no Alternative has been proposed or no Alternative is accepted by the majority the Group Representative's Status Quo remains.

9. All group members receive their profit subject to the final Status Quo and their costs in this period.

Computer Screens

In this part of the experiment there are eight relevant screens. The following information will be displayed on every screen:

- In the upper left corner the current period is displayed.
- Below that your identification number is shown.
- In the next box you find a list of your own as well as the Ideal Points of the other group members.

Screen “Running for Election”

Periode 1 von 1

Verbleibende Zeit [sec]: 28

Sie sind Gruppenmitglied

Ihr Idealpunkt in dieser Periode:

Die Idealpunkte der anderen Gruppenmitglieder

Gruppenmitglied 2:

Gruppenmitglied 3:

Möchten Sie für die Position des Gruppenvertreters kandidieren?

Ja (Kosten = 10)

Nein (Kosten = 0)

- In the lower part of the screen you can decide whether to run for election of the Group Representative for costs of 10 points by clicking on the respective button.

Screen “Election of the Group Representative”

Periode 1 von 1 Verbleibende Zeit [sec]: 28

Sie sind Gruppenmitglied

Ihr Idealpunkt in dieser Periode:

Die Idealpunkte der anderen Gruppenmitglieder

Gruppenmitglied 1:

Gruppenmitglied 3:

Folgende Kandidaten stellen sich zur Wahl zum Gruppenvertreter

Kandidat A: Gruppenmitglied

Kandidat B: Gruppenmitglied

Für welchen Kandidaten stimmen Sie?

- You will see this screen only if at least two of the three group members ran for election of the Group Representative.
- Depending on the number of candidates, two (as in the figure) or three candidates are shown in the lower part of the screen. By clicking on the respective button you can vote for one of the candidates.

Screen “Election Result”

- Here you will learn who is the Group Representative in this period and how he was determined (no figure).
- Confirm with “OK”.

Screen "Choose Status Quo"

Periode 1 von 1

Verbleibende Zeit [sec]: 24

Sie sind Gruppenmitglied

Ihr Idealpunkt in dieser Periode:

Die Idealpunkte der anderen Gruppenmitglieder

Gruppenmitglied 2:

Gruppenmitglied 3:

Mitglied ist in dieser Periode Gruppenvertreter.

OK

- In the lower part the Group Representative in this period will be displayed. If you are the Group Representative yourself, you have to choose and enter the Status Quo.
- Confirm with "OK".

Screen “Propose Alternative?”

The screenshot shows a web interface for a group decision-making process. At the top, there is a header bar with 'Periode' on the left, '1 von 1' in the center, and 'Verbleibende Zeit [sec]: 29' on the right. Below the header, the main content area is divided into three horizontal sections. The first section contains the text 'Sie sind Gruppenmitglied' followed by a grey square. The second section contains 'Ihr Idealpunkt in dieser Periode:' followed by a grey square, and 'Die Idealpunkte der anderen Gruppenmitglieder' followed by 'Gruppenmitglied 1:' and 'Gruppenmitglied 3:', each with a grey square. The third section contains 'Mitglied [] ist in dieser Periode Gruppenvertreter und hat folgenden Status Quo gewählt' followed by a grey square, and 'Der Abstand Ihres Idealpunkts zum Status Quo beträgt' followed by a grey square. At the bottom of this section, there is a question 'Möchten Sie eine Alternative vorschlagen (Kosten = 20)?' with two red buttons: 'Ja (Kosten = 20)' and 'Nein (Kosten = 0)'.

- You will only see this screen if you are not the Group Representative.
- In the lower part the Group Representative along with his chosen Status Quo are displayed. Additionally, you are informed about the distance between your Ideal Point and this Status Quo.
- By clicking on the respective button you can decide whether to propose an Alternative at costs of 20 points or not.

Screen “Choosing the Alternative”

Periode 1 von 1 Verbleibende Zeit [sec]: 22

Sie sind Gruppenmitglied

Ihr Idealpunkt in dieser Periode:

Die Idealpunkte der anderen Gruppenmitglieder

Gruppenmitglied 1:

Gruppenmitglied 3:

Mitglied ist in dieser Periode Gruppenvertreter und hat folgenden Status Quo gewählt:

Der Abstand Ihres Idealpunkts zum Status Quo beträgt

Geben Sie bitte Ihren Vorschlag an (0-100):

- You will only see this screen if you are not the Group Representative and have decided to propose an Alternative.
- At the bottom of the screen you have to enter your Alternative.
- Confirm with “OK”.

Screen "Voting"

Periode 1 von 1

Verbleibende Zeit [sec]: 26

Sie sind Gruppenmitglied

Ihr Idealpunkt in dieser Periode:

Die Idealpunkte der anderen Gruppenmitglieder

Gruppenmitglied

Gruppenmitglied

Gruppenmitglied 1 ist Gruppenvertreter und hat in dieser Periode folgenden Status Quo gewählt:

Der Abstand Ihres Idealpunkts zum Status Quo beträgt

Es wurden zwei Alternativen vorgeschlagen.

Alternative A von Gruppenmitglied

Der Abstand Ihres Idealpunkts zu dieser Alternative:

Stimmen Sie der Alternative zu? Ja Nein

Alternative B von Gruppenmitglied

Der Abstand Ihres Idealpunkts zu dieser Alternative:

Stimmen Sie der Alternative zu? Ja Nein

Falls beide Alternativen eine Mehrheit erhalten, welche würden Sie bevorzugen? Alternative A Alternative B

OK

You will only see this screen if at least one Alternative has been proposed.

- Depending on the number of proposed Alternatives, one or two Alternatives (like in the figure) are shown in the lower part of the screen. Along with each Alternative the distance between your Ideal Point and this Alternative is displayed. For each Alternative you have to decide whether you accept or reject it. If two Alternatives have been proposed you additionally must state which one you favor.
- Confirm with "OK".

Screen “Period Result”

Periode

1 von 1

Verbleibende Zeit [sec]: 4

Sie sind Gruppenmitglied

Sie sind in dieser Periode der Gruppenvertreter und haben folgenden Status Quo gewählt:

Die vorgeschlagene Alternative wurde mehrheitlich angenommen.

Der endgültige Status Quo lautet damit:

Ihr Idealpunkt in dieser Periode:

Abstand zum Status Quo:

Ihnen sind diese Periode folgende Kosten entstanden:

Ihr Gewinn in dieser Periode: 100 - Abstand - Kosten =

Ihr neuer Punktestand:

OK

- In the upper part of the screen the Status Quo chosen by the Group Representative is displayed.
- Below you find all information regarding the period result: if and which Alternative was accepted, your Ideal Point, its distance to the Status Quo, if any costs accrued by running for election and/or proposing an Alternative, as well as the resulting profit in this period. Furthermore, the current total points in this part of the experiment are shown.
- Confirm with “OK”.

Further course of the experiment

We will now begin with Part A of the experiment. If you have any questions, please raise your hand. One of the experimenters will come to you and give you an answer.

Instructions for Part B

This is *Part B* of the experiment. The procedure of Part B will now be shortened by one element. Your group still consists of exactly the same participants as in Part A. Again, the group composition will not change for all 20 periods of Part B. Each group member still has the same identification number as in Part A. Again, every group member receives a randomly drawn Ideal Point between 0 and 100 at the beginning of each period. The Ideal Points of all group members are known to the whole group. In each group a Group Representative will be chosen by running for election and voting (as in Part A) at the beginning of each period. The Group Representative then chooses a Status Quo affecting the profit of each group member. Remember: The closer the Status Quo is to your Ideal Point the larger is your profit in this period. The farther away it is the lower is your profit.

The **difference** to Part A is that now no group member may propose an Alternative to the Status Quo chosen by the Group Representative.

Period Profit

Each group member's profit in each period now depends on the absolute distance between the own Ideal Point and the chosen Status Quo as well as the costs resulting from running for election. Since no Alternatives can be proposed no costs can accrue to this regard. The profit in a period is calculated as follows:

$$\begin{aligned} & \textbf{Your profit in this period} \\ & = \textbf{100} - \textbf{absolute distance between Status Quo and your Ideal Point} \\ & \quad - \textbf{costs accrued by running for election} \end{aligned}$$

The closer the Status Quo is to your Ideal Point the larger is your profit in this period. The farther away it is the lower is your profit.

Summary of the Sequence of a Period:

1. Each group member receives a randomly drawn Ideal Point between 0 and 100.
2. Each group member learns about the Ideal Points of all group members.
3. Each group member decides whether to run for election of the Group Representative (for costs of 10 points) or not.
4. The Group Representative is determined (by voting or randomly, depending on the number of candidates).
5. The Group Representative chooses a Status Quo.
6. All group members receive their profit subject to the Status Quo and their costs in this period.

Computer Screens

In this part of the experiment there are only the screens “*Running for Election*”, “*Election of the Group Representative*”, “*Choose Status Quo*”, and “*Period Result*” which you all know from Part A.

Further course of the experiment

We will now begin with Part B of the experiment. If you have any questions, please raise your hand. One of the experimenters will come to you and give you an answer.

Diskussionspapiere 2014 Discussion Papers 2014

- 01/2014 **Rybizki, Lydia:** Learning cost sensitive binary classification rules accounting for uncertain and unequal misclassification costs
- 02/2014 **Abbiati, Lorenzo, Antinyan, Armenak and Corazzini, Lucca:** Are Taxes Beautiful? A Survey Experiment on Information, Tax Choice and Perceived Adequacy of the Tax Burden
- 03/2014 **Feicht, Robert, Grimm, Veronika and Seebauer, Michael:** An Experimental Study of Corporate Social Responsibility through Charitable Giving in Bertrand Markets
- 04/2014 **Grimm, Veronika, Martin, Alexander, Weibelzahl, Martin and Zoettl, Gregor:** Transmission and Generation Investment in Electricity Markets: The Effects of Market Splitting and Network Fee Regimes
- 05/2014 **Cygan-Rehm, Kamila and Riphahn, Regina:** Teenage Pregnancies and Births in Germany: Patterns and Developments
- 06/2014 **Martin, Alexander and Weibelzahl, Martin:** Where and when to Pray? - Optimal Mass Planning and Efficient Resource Allocation in the Church
- 07/2014 **Abraham, Martin, Lorek, Kerstin, Richter, Friedemann and Wrede, Matthias:** Strictness of Tax Compliance Norms: A Factorial Survey on the Acceptance of Inheritance Tax Evasion in Germany
- 08/2014 **Hirsch, Boris, Oberfichtner, Michael and Schnabel Claus:** The levelling effect of product market competition on gender wage discrimination
- 09/2014 **Mangold, Benedikt:** Plausible Prior Estimation
- 10/2014 **Gehrke, Britta:** Fiscal Rules and Unemployment
- 11/2014 **Gehrke, Britta and Yao, Fang:** Phillips Curve Shocks and Real Exchange Rate Fluctuations: SVAR Evidence
- 12/2014 **Mäder, Miriam, Müller, Steffen, Riphahn, Regina and Schwientek, Caroline:** Intergenerational transmission of unemployment - evidence for German sons
- 13/2014 **Casal, Sandro, Ploner, Matteo and Sproten, Alec N.:** Fostering the Best Execution Regime. An Experiment about Pecuniary Sanctions and Accountability in Fiduciary Money Management
- 14/2014 **Lochner, Benjamin:** Employment protection in dual labor markets - Any amplification of macroeconomic shocks?

15/2014 **Herrmann, Klaus, Teis, Stefan and Yu, Weijun:** Components of Intraday Volatility and Their Prediction at Different Sampling Frequencies with Application to DAX and BUND Futures

Diskussionspapiere 2013 Discussion Papers 2013

01/2013 **Wrede, Matthias:** Rational choice of itemized deductions

02/2013 **Wrede, Matthias:** Fair Inheritance Taxation in the Presence of Tax Planning

03/2013 **Tinkl, Fabian:** Quasi-maximum likelihood estimation in generalized polynomial autoregressive conditional heteroscedasticity models

04/2013 **Cygan-Rehm, Kamila:** Do Immigrants Follow Their Home Country's Fertility Norms?

05/2013 **Ardelean, Vlad and Pleier, Thomas:** Outliers & Predicting Time Series: A comparative study

06/2013 **Fackler, Daniel and Schnabel, Claus:** Survival of spinoffs and other startups: First evidence for the private sector in Germany, 1976-2008

07/2013 **Schild, Christopher-Johannes:** Do Female Mayors Make a Difference? Evidence from Bavaria

08/2013 **Brenzel, Hanna, Gartner, Hermann and Schnabel Claus:** Wage posting or wage bargaining? Evidence from the employers' side

09/2013 **Lechmann, Daniel S. and Schnabel Claus:** Absence from work of the self-employed: A comparison with paid employees

10/2013 **Bünnings, Ch. and Tauchmann, H.:** Who Opt's Out of the Statutory Health Insurance? A Discrete Time Hazard Model for Germany

Diskussionspapiere 2012 Discussion Papers 2012

01/2012 **Wrede, Matthias:** Wages, Rents, Unemployment, and the Quality of Life

02/2012 **Schild, Christopher-Johannes:** Trust and Innovation Activity in European Regions - A Geographic Instrumental Variables Approach

- 03/2012 **Fischer, Matthias:** A skew and leptokurtic distribution with polynomial tails and characterizing functions in closed form
- 04/2012 **Wrede, Matthias:** Heterogeneous Skills and Homogeneous Land: Segmentation and Agglomeration
- 05/2012 **Ardelean, Vlad:** Detecting Outliers in Time Series

Diskussionspapiere 2011 Discussion Papers 2011

- 01/2011 **Klein, Ingo, Fischer, Matthias and Pleier, Thomas:** Weighted Power Mean Copulas: Theory and Application
- 02/2011 **Kiss, David:** The Impact of Peer Ability and Heterogeneity on Student Achievement: Evidence from a Natural Experiment
- 03/2011 **Zibrowius, Michael:** Convergence or divergence? Immigrant wage assimilation patterns in Germany
- 04/2011 **Klein, Ingo and Christa, Florian:** Families of Copulas closed under the Construction of Generalized Linear Means
- 05/2011 **Schnitzlein, Daniel:** How important is the family? Evidence from sibling correlations in permanent earnings in the US, Germany and Denmark
- 06/2011 **Schnitzlein, Daniel:** How important is cultural background for the level of intergenerational mobility?
- 07/2011 **Steffen Mueller:** Teacher Experience and the Class Size Effect - Experimental Evidence
- 08/2011 **Klein, Ingo:** Van Zwet Ordering for Fechner Asymmetry
- 09/2011 **Tinkl, Fabian and Reichert Katja:** Dynamic copula-based Markov chains at work: Theory, testing and performance in modeling daily stock returns
- 10/2011 **Hirsch, Boris and Schnabel, Claus:** Let's Take Bargaining Models Seriously: The Decline in Union Power in Germany, 1992 – 2009
- 11/2011 **Lechmann, Daniel S.J. and Schnabel, Claus :** Are the self-employed really jacks-of-all-trades? Testing the assumptions and implications of Lazear's theory of entrepreneurship with German data
- 12/2011 **Wrede, Matthias:** Unemployment, Commuting, and Search Intensity

13/2011 **Klein, Ingo:** Van Zwet Ordering and the Ferreira-Steel Family of Skewed Distributions

Diskussionspapiere 2010 Discussion Papers 2010

- 01/2010 **Mosthaf, Alexander, Schnabel, Claus and Stephani, Jens:** Low-wage careers: Are there dead-end firms and dead-end jobs?
- 02/2010 **Schlüter, Stephan and Matt Davison:** Pricing an European Gas Storage Facility using a Continuous-Time Spot Price Model with GARCH Diffusion
- 03/2010 **Fischer, Matthias, Gao, Yang and Herrmann, Klaus:** Volatility Models with Innovations from New Maximum Entropy Densities at Work
- 04/2010 **Schlüter, Stephan and Deuschle, Carola:** Using Wavelets for Time Series Forecasting – Does it Pay Off?
- 05/2010 **Feicht, Robert and Stummer, Wolfgang:** Complete closed-form solution to a stochastic growth model and corresponding speed of economic recovery.
- 06/2010 **Hirsch, Boris and Schnabel, Claus:** Women Move Differently: Job Separations and Gender.
- 07/2010 **Gartner, Hermann, Schank, Thorsten and Schnabel, Claus:** Wage cyclicality under different regimes of industrial relations.
- 08/2010 **Tinkl, Fabian:** A note on Hadamard differentiability and differentiability in quadratic mean.

Diskussionspapiere 2009 Discussion Papers 2009

- 01/2009 **Addison, John T. and Claus Schnabel:** Worker Directors: A German Product that Didn't Export?
- 02/2009 **Uhde, André and Ulrich Heimeshoff:** Consolidation in banking and financial stability in Europe: Empirical evidence
- 03/2009 **Gu, Yiquan and Tobias Wenzel:** Product Variety, Price Elasticity of Demand and Fixed Cost in Spatial Models

- 04/2009 **Schlüter, Stephan:** A Two-Factor Model for Electricity Prices with Dynamic Volatility
- 05/2009 **Schlüter, Stephan and Fischer, Matthias:** A Tail Quantile Approximation Formula for the Student t and the Symmetric Generalized Hyperbolic Distribution
- 06/2009 **Ardelean, Vlad:** The impacts of outliers on different estimators for GARCH processes: an empirical study
- 07/2009 **Herrmann, Klaus:** Non-Extensivity versus Informative Moments for Financial Models - A Unifying Framework and Empirical Results
- 08/2009 **Herr, Annika:** Product differentiation and welfare in a mixed duopoly with regulated prices: The case of a public and a private hospital
- 09/2009 **Dewenter, Ralf, Haucap, Justus and Wenzel, Tobias:** Indirect Network Effects with Two Salop Circles: The Example of the Music Industry
- 10/2009 **Stuehmeier, Torben and Wenzel, Tobias:** Getting Beer During Commercials: Adverse Effects of Ad-Avoidance
- 11/2009 **Klein, Ingo, Köck, Christian and Tinkl, Fabian:** Spatial-serial dependency in multivariate GARCH models and dynamic copulas: A simulation study
- 12/2009 **Schlüter, Stephan:** Constructing a Quasilinear Moving Average Using the Scaling Function
- 13/2009 **Blien, Uwe, Dauth, Wolfgang, Schank, Thorsten and Schnabel, Claus:** The institutional context of an "empirical law": The wage curve under different regimes of collective bargaining
- 14/2009 **Mosthaf, Alexander, Schank, Thorsten and Schnabel, Claus:** Low-wage employment versus unemployment: Which one provides better prospects for women?

Diskussionspapiere 2008 Discussion Papers 2008

- 01/2008 **Grimm, Veronika and Gregor Zoettl:** Strategic Capacity Choice under Uncertainty: The Impact of Market Structure on Investment and Welfare
- 02/2008 **Grimm, Veronika and Gregor Zoettl:** Production under Uncertainty: A Characterization of Welfare Enhancing and Optimal Price Caps
- 03/2008 **Engelmann, Dirk and Veronika Grimm:** Mechanisms for Efficient Voting with Private Information about Preferences

- 04/2008 **Schnabel, Claus and Joachim Wagner:** The Aging of the Unions in West Germany, 1980-2006
- 05/2008 **Wenzel, Tobias:** On the Incentives to Form Strategic Coalitions in ATM Markets
- 06/2008 **Herrmann, Klaus:** Models for Time-varying Moments Using Maximum Entropy Applied to a Generalized Measure of Volatility
- 07/2008 **Klein, Ingo and Michael Grottke:** On J.M. Keynes' "The Principal Averages and the Laws of Error which Lead to Them" - Refinement and Generalisation