Gutenberg School of Management and Economics

& Research Unit “Interdisciplinary Public Policy”

Discussion Paper Series

# *Deciding how to decide on public goods provision:*

# *The role of instrumental vs. intrinsic motives*

Philipp Harms, Claudia Landwehr, Maximilian Lutz, Markus Tepe

July 01, 2020

Discussion paper number 2018

Johannes Gutenberg University Mainz
Gutenberg School of Management and Economics
Jakob-Welder-Weg 9
55128 Mainz
Germany
wiwi.uni-mainz.de

Contact Details:

Philipp Harms
Gutenberg School of Management and Economics
Johannes Gutenberg University Mainz
Jakob-Welder-Weg 4
55128 Mainz, Germany

philipp.harms@uni-mainz.de

Claudia Landwehr
Department of Political Science
Johannes Gutenberg University Mainz
Jakob-Welder-Weg 12
55128 Mainz, Germany

landwehr@politik.uni-mainz.de

Maximilian Lutz
Department of Social Science
University of Oldenburg
Ammerländer Heerstraße 114-118
26129 Oldenburg, Germany

maximilian.lutz@uni-oldenburg.de

Markus Tepe
Department of Social Science
University of Oldenburg
Ammerländer Heerstraße 114-118
26129 Oldenburg, Germany

markus.tepe@uni-oldenburg.de

# Deciding how to decide on public goods provision: The role of instrumental vs. intrinsic motives

by

**Philipp Harms[1]** **Claudia Landwehr[2]**

**Maximilian Lutz[3]** **Markus Tepe[4]**

July 1, 2020

**Acknowledgement:** Generous funding by the Research Unit *Interdisciplinary Public Policy (IPP)* at Johannes Gutenberg University Mainz is gratefully acknowledged.

[1] Johannes Gutenberg University Mainz; Gutenberg School of Management and Economics, Jakob-Welder-Weg 4, 55128 Mainz, Germany; E-mail: philipp.harms@uni-mainz.de

[2] Johannes Gutenberg University Mainz; Department of Political Science, Jakob-Welder-Weg 12, 55128 Mainz, Germany; E-mail: landwehr@politik.uni-mainz.de

[3] University of Oldenburg, Department of Social Science, Ammerländer Heerstraße 114 – 118, 26129 Oldenburg, Germany; E-Mail: maximilian.lutz@uni-oldenburg.de

[4] University of Oldenburg, Department of Social Science, Ammerländer Heerstraße 114 – 118, 26129 Oldenburg, Germany; E-Mail: markus.tepe@uni-oldenburg.de

## Abstract

What determines citizens' preferences over alternative decision-making procedures – the expected personal gain associated with a procedure, or the intrinsic value assigned to it? To answer this question, we present the results of a laboratory experiment in which participants select a procedure to decide on the provision of a public good. In the first stage of the experiment, they choose between majority voting and delegation to a welfare-maximizing "expert" as alternative decision-making procedures. In the second stage of the experiment, subjects either vote on the provision of the public good, or the decision is taken by the expert. We define three treatments in which participants receive information about whether a majority in the group faces a positive or negative payoff from the provision of the public good, about whether there is a positive group benefit from its provision, or neither kind of information. Our findings confirm the importance of instrumental motives in procedural choices. At the same time, however, a significant share of participants chooses a procedure that does not maximize their individual benefit. While majority voting seems to be preferred for intrinsic values of fairness and equality, support for delegation to the welfare-maximizing expert increases if the group benefit from a public good is known – even in participants who are net payers for its provision.



**Keywords:** process preferences, public goods, laboratory experiment

## 1. Motivation

It is an open empirical question in how far citizens base their political preferences and decisions on individual utility calculations or more collective concerns, with public opinion research and electoral studies providing evidence for both to play a role. However, given the sheer number of political decisions that need to be taken in modern mass democracies, the central question may not even be what drives individual preferences on single substantive decisions, but what drives individuals' preferences over *how and by whom* collectively binding political decisions are taken. Procedural preferences have in recent years become a fruitful field of research, with findings indicating the relevance of both intrinsic (or normative) and instrumental motives for these (see, for example Wenzel, Bowler et al., 2000, Hibbing, 2001, Bengtsson and Mattila, 2009, Font, Wojcieszak et al., 2015, Landwehr and Harms, 2019, Harms and Landwehr, 2020). In other words, individual citizens evaluate alternative decision-making procedures both by their intrinsic merits, e.g. the degree to which they regard them as fair or democratic, and by their instrumental value in bringing about decisions that maximize their individual utility.

At the same time, a potential limit to understanding the *relative* weight of intrinsic and instrumental motives for procedural preferences is that the bulk of existing studies is based on survey data. A problem here is that in responding to a single survey item, e.g. on whether they support referenda or expert decisions, participants often express a mix of different attitudes and react to a number of different stimuli, including social desirability or halo effects from preceding items. To isolate the respective effects of intrinsic and instrumental motives, it seems necessary to take an experimental approach that allows controlling for influencing factors and subjecting participants to real incentives. In methodological terms, our experiment contributes to previous research on endogenous institutional choice and procedural fairness (e.g. Greif and Laitin, 2004, Sutter, Haigner et al., 2010,Dold and Khadjavi, 2017).

With the goal of reaching a better understanding of how individuals form procedural preferences – preferences over how and by whom collective decisions should be taken –, we thus designed a laboratory experiment that was conducted at the MABELLA lab of Johannes Gutenberg University Mainz in the fall of 2018. More specifically, we were interested in whether and under what conditions participants preferred a majority decision or a delegated decision by an “expert” who maximizes the collective (or “group”) benefit. A majority decision may be seen to have the intrinsic value of being egalitarian and “democratic”. Given a majority for the own preferred option, however, it can also be instrumental to maximizing individual utility. The delegated expert decision has the intrinsic value of promoting the group benefit, but can also be instrumental to getting what one wants – if this happens to coincide with a decision in the collective interest.

Our experimental set-up, which we describe in more detail in the following section, reflects problems and choices in the ‘real world’ of politics in the following ways: First, we assume that there is a great deal of controversy over whether important decisions should be taken in a directly democratic, purely majoritarian way, or whether they should be left in the hands of elected representatives who presumably have a better overview and access to superior expertise. In forming preferences over how and by whom a decision on a given matter should be taken, citizens are, secondly, more or less ignorant with regard to two relevant variables. While we may assume that everyone can more or less judge how a policy measure that is to be decided upon will affect his or her own utility, there is less knowledge about the preferences of other members of society. That is, it is typically more difficult to decide whether there exists a democratic majority for the own position. Judging whether a given measure is in the collective interest or maximizes the collective benefit requires even more information and will often be almost impossible – even if most people still hold respective opinions.

In essence, our experiment accordingly tests how individuals who know how a substantive decision will affect their own pay-off will, under conditions of ignorance or information about a) the group’s majority position and b) the collective interest, choose between the alternative decision procedures of majority voting and delegation to an ‘expert’ decider. Put somewhat differently, we explore whether individuals prefer a directly democratic or an expert decision, depending on whether they can identify a dominant strategy to maximize their own utility and whether they are informed about the effects the decision has on the group benefit.

## 2. Experimental Design and Hypotheses

In our experiment, subjects are randomly assigned to a group of three. The group faces the task of deciding on the provision of a public good. Each subject receives an initial endowment of 8 monetary units and is informed about the "individual utility" (also expressed in monetary units) she or he derives from the provision of the good. Individual utility can be positive (such that the provision is beneficial) or negative (such that the provision is detrimental). Subjects' individual utilities are randomly varied in each round, but always remain private information. An individual's payoff in a given round depends on whether the public good is provided or not. If the good is not provided, the payoff coincides with the initial endowment. If it is provided, the payoff is the sum of the initial endowment and the subject's individual utility.

The decision on the provision of the good is made in two stages. In the first stage, the decision procedure is determined. Subjects can choose between two alternative decision-making procedures, *majority vote* (MV) or *delegation* (DE). Delegation means that the decision to provide the public good is taken by an (automated) "expert" who knows all subjects' individual utilities associated with the provision of the public good. The expert maximizes the group benefit, defined as the (unweighted) sum of individual utilities. Thus, the expert chooses provision if the group benefit is positive, and chooses not to provide the public good if the group benefit is negative.[5] In the second stage, the decision on the provision of the good is made on the basis of the decision-making procedure selected in the first stage.

When deciding on their preferred decision-making procedure in the first stage of the experiment, subjects are randomly assigned to one of the following three treatment conditions, each of which entails a different information set. (1) *Group Majority Treatment*: Subjects are informed about whether a majority of the group, i.e., two or more players, derive positive individual utility from the provision of the public good. However, subjects are *not* informed about whether the group benefit is positive or negative. This information is private knowledge of the expert. (2) *Group Benefit Treatment*: Subjects are informed about whether the group benefit is positive or

[5] In our experimental design, there are no situations in which the group benefit is zero.

negative, but they have no information about whether a majority of the group members derive a positive individual benefit. In the (3) (*baseline) No Information Treatment*, subjects receive neither information about the group majority nor about the group benefit.

The instructions given to participants are presented in Appendix A. Each participant plays 12 rounds of this two-stage experiment, with subjects randomly assigned to new groups of three in every round. At the end of the experiment, one round is randomly selected for every participant, and earnings in this round determine their payoff in Euros. The experimental sessions were conducted at the MABELLA lab of Johannes Gutenberg University Mainz. A total of 162 subjects participated in the study (7 sessions, no information 48 subjects, group majority 69 subjects, group benefit 45 subjects). The experiment was programmed and conducted using the laboratory experimental software zTree (Fischbacher, 2007). Screenshots are presented in Appendix B.

### ***Hypotheses***

In Appendix C1, we present a simple model on an individual's rational choice between the two alternative decision-making procedures: majority vote (MV) and delegation to an expert (DE). Distinguishing between three scenarios on the information available to participants, this allows us to derive the following hypotheses:

**H1:** If individuals know the individual utility they derive from the provision of the public good and whether a majority prefers or opposes provision, they select MV if the majority's interests are aligned with their own preferences, and DE if they perceive themselves as part of a minority.

**H2:** If individuals know the individual utility they derive from the provision of the public good and whether the group benefit is positive or negative, they select MV if they prefer (reject) provision and the group benefit is negative (positive). Conversely, they choose DE if both their individual utility and the group benefit are either positive or negative.

The intuition behind H1 and H2 is straightforward: knowing the majority's preferences, rational individuals have an incentive to support MV if this procedure is certain to result in their favored outcome. Conversely, if individuals only know the group benefit, they support MV if this helps them to avert an outcome that is beneficial for the group as a whole, but unfavorable for them. The choice situation is different under conditions of uncertainty, i.e. in the baseline treatment. Here, we may expect subjects to base their procedural choice on merits of the procedure itself:

**H3:** If individuals are only informed about the individual utility they derive from the provision of the public good, but neither know whether their own preferences are shared by a majority, nor the group benefit, they cannot base their choice on a comparison of expected material benefits. As a result, they are likely to select the procedure they prefer for intrinsic reasons.

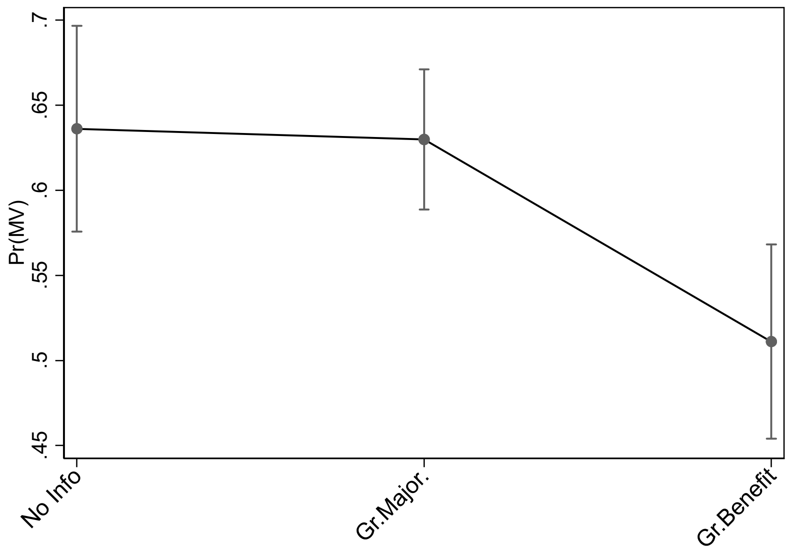
## 3. Empirical Findings

To test our hypotheses, we define a dummy variable *Dum_MV*, which equals one whenever an individual selected the majority vote (MV) at the first stage of the experiment, and zero if she or he selected delegation (DE). We then ran a set of logit regressions, using dummy variables to control for participants' gender and the experiment round. In what follows, we will use predicted effect plots to visualize the estimation results using the *margins* and *marginsplot* command in Stata 15.[6] The plots show predicted probabilities of agents choosing MV, conditional on the variable given on the horizontal axis, and averaged across all participants. The plots also give 95-percent confidence intervals for the estimated probabilities.

**Figure 1** simply distinguishes between the three groups (*Group Majority Treatment, Group Benefit Treatment, No Information Treatment*) and displays the predicted probabilities of selecting MV, regardless of the individual utility/majority or individual utility/group benefit constellation. Interestingly, the estimated likelihood of choosing MV for participants exposed to the No Information treatment is significantly larger than 51 percent, suggesting an *intrinsic preference* for the majority vote.

[6] The estimated coefficients as well as diagnostic statistics are presented in Table A5 in Appendix D

**Figure 1.** Treatment effects




**Note:** See Model 1 of Table A5 in Appendix D for estimated coefficients.

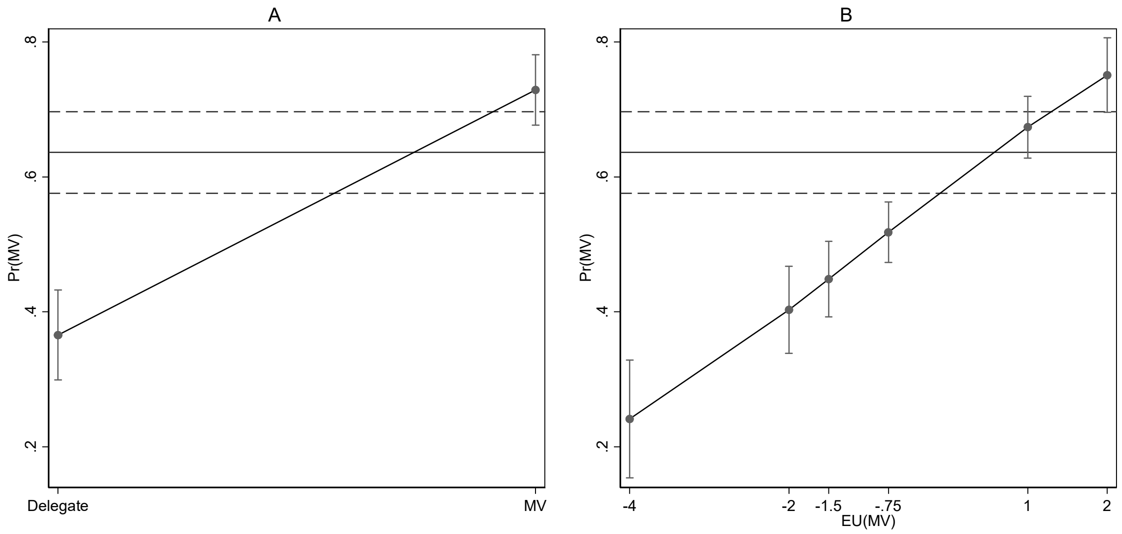
For the Group Majority Treatment group, the probability of choosing MV is practically the same – which is not surprising, given that, in Figure 1, we do not differentiate between those who expect to lose and those who expect to gain from a majority vote. By contrast, however, the probability of selecting MV drops significantly as soon as participants are informed about the group benefit. This is interesting, as it indicates that, regardless of whether the decision of an expert would be favorable or detrimental, knowledge of the group benefit enhances individuals' support for a delegated decision.

In a next step, we defined dummy variables to reflect whether an individual would rationally prefer MV. Moreover, we computed the expected utility an individual derives from MV ($EU_i(MV)$) – i.e. the difference between the expected payoff she or he receives if MV is used as a procedure and the expected payoff in case DE is used.[7] As outlined in the previous section, we expect rational individuals who know about the majority's position to choose MV if their own preference on public goods provision

[7] Recall that a participant's payoff is given by the sum of his or her initial endowment of 8 and his or her individual utility (in monetary terms) associated with the provision or non-provision of the public good. The computation of $EU_i(MV)$ is described in Appendix C2.

coincides with the majority's preference. Conversely, rational individuals who know about the group benefit choose MV if the group benefit from public goods provision is positive (negative) while their individual utility is negative (positive). Recall that subjects who only know about their individual utility cannot rationally assess which procedure is preferable.

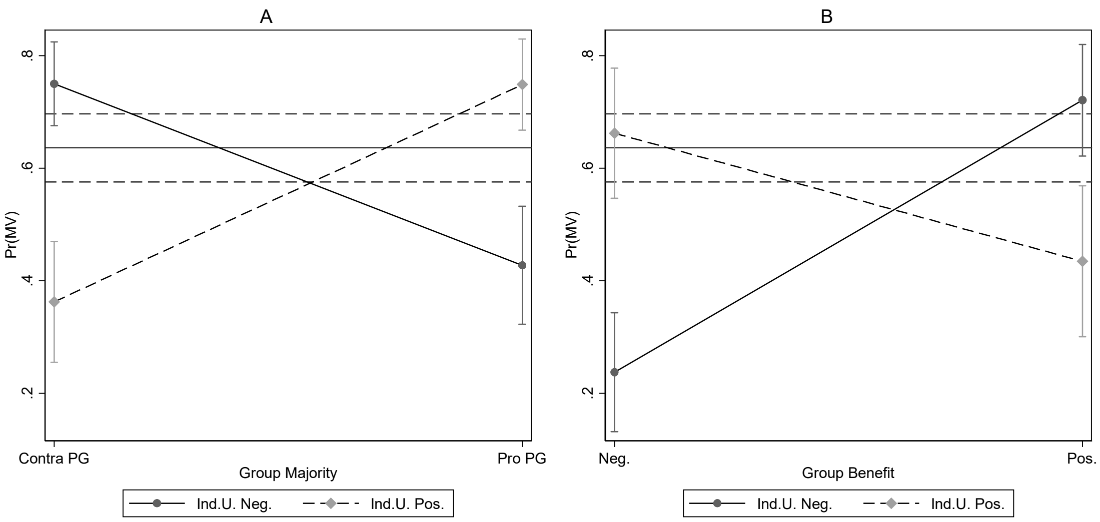
**Figure 2.** Rational procedural choice




**Note:** See Models 2a and 2b of Table A5 in Appendix D for estimated coefficients. The solid horizontal line represents Pr(MV) in the No.Info Treatment. The dashed lines represent the 95% confidence interval.

In both panels of **Figure 2**, the predicted likelihood of choosing MV for members of the No Information Treatment Group is represented as the horizontal line (at 64 percent, with 95-percent confidence intervals on both sides). Figure 2A (left) demonstrates that this likelihood drops substantially in cases where we expect rational agents to select DE. This suggests that instrumental motivations *do* have a significant effect on individuals' preferences over procedures. Interestingly, however, the likelihood of choosing MV is still significantly higher than zero, with the point estimate being 37 percent. This, in turn, indicates that a sizable percentage of participants is either unable (or unwilling) to make a rational decision, or willing to sacrifice material benefits for the sake of a procedure that they consider superior for intrinsic reasons. Note, finally, that the predicted likelihood of choosing MV increases if we identify MV as the rationally preferred procedure, with the point estimate assuming a value of 73 percent, but the difference to the *No-Information* Treatment group is not significantly different from zero. Figure 2B (right) confirms the notion that instrumental motives are important in shaping individuals' procedural preferences by relating the predicted likelihood of choosing MV to the expected payoff associated with a majority vote. The graph illustrates that individuals who expect to lose 4 points if MV is used are significantly less likely to opt for that decision-making procedure (24 percent) than those who expect to lose 0.75 points. Conversely, the perspective of gaining 2 points significantly raises the predicted likelihood of choosing MV above the "No-Information"-benchmark (75 percent).

**Figure 3.** Rational procedural choice in the Group Majority and the Group Benefit Treatment




**Note:** See Models 3a and 3b of Table A5 in Appendix D for estimated coefficients. The solid horizontal line represents Pr(MV) in the No.Info Treatment. The dashed lines represent the 95% confidence interval.

The two panels in **Figure 3**, finally, are based on separate estimates for the Group Majority Treatment and the Group Benefit Treatment groups (with the horizontal lines in both panels indicating the predicted likelihood of choosing MV for a member of the No-Information Treatment group). Both panels, once more, support the notion that material motivations are a significant determinant of subjects' choice between alternative procedures: if a majority is known to *reject* a provision of the public good ("Contra PG"), individuals to whom provision yields *negative* individual utility are significantly more likely to select MV than agents for whom individual utility is *positive* (75 percent vs. 36 percent, see Figure 3A). Conversely, if the majority is known to *support* provision of the public good ("Pro PG"), individuals who derive *negative* individual utility from provision are significantly *less* likely to select MV than agents with positive individual utility (43 percent vs. 75 percent). Interestingly, while a known *contrast* between the majority's position and an individual's own position significantly reduces support for MV (relative to the *No-Information Treatment*), *congruence* between individual and majority preferences raises support for MV, but – as indicated by the overlapping confidence intervals – the difference is not significantly different from zero.

A similar pattern is revealed by Figure 3B: if the group benefit is *negative* ("Neg."), such that the "expert" would decide against a provision of the public good, subjects who derive positive individual utility from provision are significantly more likely to support MV than those who derive negative utility (66 percent vs. 24 percent). Conversely, if the group benefit is *positive* ("Pos."), subjects who derive negative individual utility from provision are significantly more likely to support MV than those with positive individual utility (72 percent vs. 43 percent). As in Figure 2A, having access to additional information does not significantly raise support for a majority vote (relative to the No-Information treatment) if MV is in an agent's material interest. However, if MV is associated with a lower expected payoff than DE, this significantly reduces support for a majority vote (relative to the No-Information treatment).

We interpret the pattern displayed in Figure 3 as evidence that participants in our experiment tend to generally support a majority vote as a decision-making procedure, most likely for intrinsic values assigned to it (self-determination, equality, or fairness). If it turns out that MV also raises an individual's expected payoff – either because personal preferences coincide with the majority's preferences, or because a majority vote possibly prevents an expert decision which would be in conflict with personal interests – this gives an additional boost to agents' sympathy for MV, but the difference in predicted probabilities of selecting MV is not significant. Conversely, if a majority vote is expected to *lower* an individual's payoff, support for MV significantly cools off, with predicted probabilities of selecting a majority vote dropping by up to 37 percent. At the same time, however, the predicted probability of selecting MV is always significantly larger than zero – i.e. there is a substantial percentage of participants who support a decision-making procedure even if its implementation would run against their own material interests.

## 4. Discussion and Conclusions

The results of our laboratory experiment provide strong evidence for the relevance of instrumental motives for procedural preferences. By and large, individuals are inclined to choose the dominant strategy where a procedural choice maximises the own expected pay-off from the resulting substantive decision. This finding may be less surprising to economists than to political scientists, who are more inclined to explain procedural preferences with the intrinsic values – self-determination, fairness, equality – of procedures. However, the significant effect of individual utility maximisation is not the entire story in our results. First, we also find that, in a situation where a lack of information obscures the outcome effects of the decision procedure, subjects tend to prefer majority voting over delegated decision-making, presumably because they see an intrinsic value in exercising autonomy or "having their own say" in a decision. Secondly, we find that information about the effects of a decision for the group benefit increases the probability with which subjects choose to delegate to a welfare-maximizing "expert". Finally, we also see that a small, but relevant share of participants does not choose the instrumentally dominant strategy, but apparently base their selection on the intrinsic merits they ascribe to a procedure.

What is the external validity and relevance of our findings for the real world of politics? That is, what implications does the observed behaviour in a highly artificial environment have for interpreting and predicting preferences and choices of citizens? We believe that the most relevant finding concerns the effects of information about the majority position or, alternatively, the collective welfare effects of a decision. In the media and the political public sphere, majority positions in public opinion polls typically feature prominently. Such information makes it seemingly easy to infer whether or not there exists a majority for the own position, and may advance the demand for decisions by referenda – at least in those who believe to be part of a majority. This instrumental demand for direct democracy is not only problematic from a point of view of normative democratic theory, but may also be based on wrong assumptions, as pollsters tend to keep back “don’t know” and non-responses. In the present Covid-19 crisis, by contrast, news reporting has been dominated by expert opinions from virologists and epidemiologists on how to protect collective health and welfare. In many countries, support for representative governments has soared and trust in delegated decision-making has increased. Political communication and the kind of information it focuses on thus seems to have an effect on procedural preferences as well as on support for existing decision-making procedures and the demand for alternatives.

## References


Bengtsson, A. and M. Mattila (2009). "Direct Democracy and its Critics: Support for Direct Democracy and 'Stealth' Democracy in Finland." *West European Politics* **32**(5): 1031-1048.

Dold, M. and M. Khadjavi (2017). "Jumping the queue: An experiment on procedural preferences." *Games and Economic Behavior* **102**: 127-137.

Fischbacher, U. (2007). "z-Tree: Zurich toolbox for ready-made economic experiments." *Experimental economics* **10**(2): 171-178.

Font, J., M. Wojcieszak and C. J. Navarro (2015). "Participation, representation and expertise: Citizen preferences for political decision-making processes." *Political Studies* **63**: 153-172.

Greif, A. and D. D. Laitin (2004). "A theory of endogenous institutional change." *American Political Science Review*: 633-652.

Harms, P. and C. Landwehr (2020): “Is money where the fun ends? Material interests and individuals’ preference for direct democracy”, *European Journal of Political Economy* **61**, 101818

Hibbing, J. R. (2001). "Process preferences and American politics: What the people want government to be." *American Political Science Review* **95**(1): 145-153.

Landwehr, C. and P. Harms (2019). "Preferences for Referenda: Intrinsic or Instrumental? Evidence from a Survey Experiment." *Political Studies*: 0032321719879619.

Sutter, M., S. Haigner and M. G. Kocher (2010). "Choosing the carrot or the stick? Endogenous institutional choice in social dilemma situations." *The Review of Economic Studies* **77**(4): 1540-1566.

Wenzel, J. P., S. Bowler and D. J. Lanoue (2000). "Citizen Opinion and Constitutional Choices: The Case of the UK." *Political Behavior* **22**(3): 241-265.

## Appendices

### Appendix A: Instructions

You are randomly assigned to a group of three people. Each group member receives an initial 8 points in each round. The group is faced with the task of deciding together on the provision of a public good. The individual utility that the provision of the public good provides can be positive or negative for you. This individual utility varies between the three group members. Likewise, the group benefit of providing the public good varies. The group benefit is defined as the sum of the individual utilities of the three group members and can also be positive or negative. If the public good is not provided, you keep your initial endowment. Here are two reading examples.

**Table A1.** Positive group benefit

| | | Player 1 | Player 2 | Player 3 | *Group Benefit* |
|---|---|---|---|---|---|
| Endowment | | 8 | 8 | 8 | |
| ***Individual Utility*** | | ***+3*** | ***+3*** | ***-3*** | ***3*** |
| **Payoff** | with provision | 11 | 11 | 5 | |
| | without provision | 8 | 8 | 8 | |

In the decision situation shown in Table A1, the individual utility of providing the public good is positive for Player 1 and Player 2 (+3 each), while for Player 3 the individual utility of providing the good is negative (-3). The group benefit, defined as the sum of the individual utilities of the three group members, is also positive at +3+3-3=+3.

**Table A2.** Negative group benefit

| | | Player 1 | Player 2 | Player 3 | *Group Benefit* |
|---|---|---|---|---|---|
| Endowment | | 8 | 8 | 8 | |
| ***Individual Utility*** | | ***+3*** | ***+3*** | ***-8*** | ***-2*** |
| **Payoff** | with provision | 11 | 11 | 0 | |
| | without provision | 8 | 8 | 8 | |

In the decision situation shown in Table A2, the individual utility of providing the public good continues to be positive for Player 1 and Player 2 (+3 in each case), while for Player 3 the individual utility of providing the good is significantly more negative (-8) than in the previous decision situation. The group utility is therefore also negative at +3+3-8=-2.

**Information**

While the initial endowment for all three group members is always 8 points, your individual utility is determined randomly and communicated to you at the beginning of each round. You do not know the individual utility that has been allocated to the other players in your group. [Not shown in the instructions]

**[Group Majority Treatment]** However, you will be informed if a majority of players in your group have been given a positive utility. You will not be informed whether the group utility is positive or negative. Only the computer has this information.

**[Group Utility Treatment]** However, you will receive information about whether the group utility is positive or negative. You will not be informed whether a majority of the group, i.e. two or more players, have been assigned a positive utility.

**[No Information Treatment]** You will not be informed whether the group utility is positive or negative. You will also not be informed whether a majority of the group, i.e. two or more players, have been assigned a positive utility.

The decision on the provision of the good is made in two stages. In the first stage, the decision procedure is determined. In the second stage, the decision on the provision of the good is made on the basis of the decision-making procedure.

**First Stage: Decision Procedure**

In the first stage, you cast your vote for your preferred decision-making procedure. From the three votes cast in the group, one is drawn at random, and this vote determines the decision procedure. There are two procedures to choose from:

A) Majority Vote: Each group member has one vote. The public good will only be made available if at least two group members vote to make it available.

B) Delegation: The decision to provide the good is delegated to the computer. The computer takes the role of an expert who knows the group's utility. The expert's decisions is based on the group benefit. If the group benefit is positive, the expert always chooses to provide the public good. If the group benefit is negative, the expert always chooses not to provide the public good.

**Second Stage: Decision on Provision**

At this stage the decision procedure selected by lot is applied.

A) Majority Vote: If majority voting was selected as the decision-making procedure, you now decide for or against the provision of the public good. You will then be informed of the voting results and your earnings during this round.

B) Delegation: The computer makes a decision about the provision. You will then be informed of the selected result and your earnings during this round.

**Repetitions**

This procedure is repeated twelve times in total. Each time, you will be randomly assigned to a new group of three. At the end of the experiment, one round is randomly drawn and your earnings in this selected round is taken into account for your payment in Euros.

## Appendix B: Screenshots

**Figure A1:** First stage decision screen (Group benefit treatment)

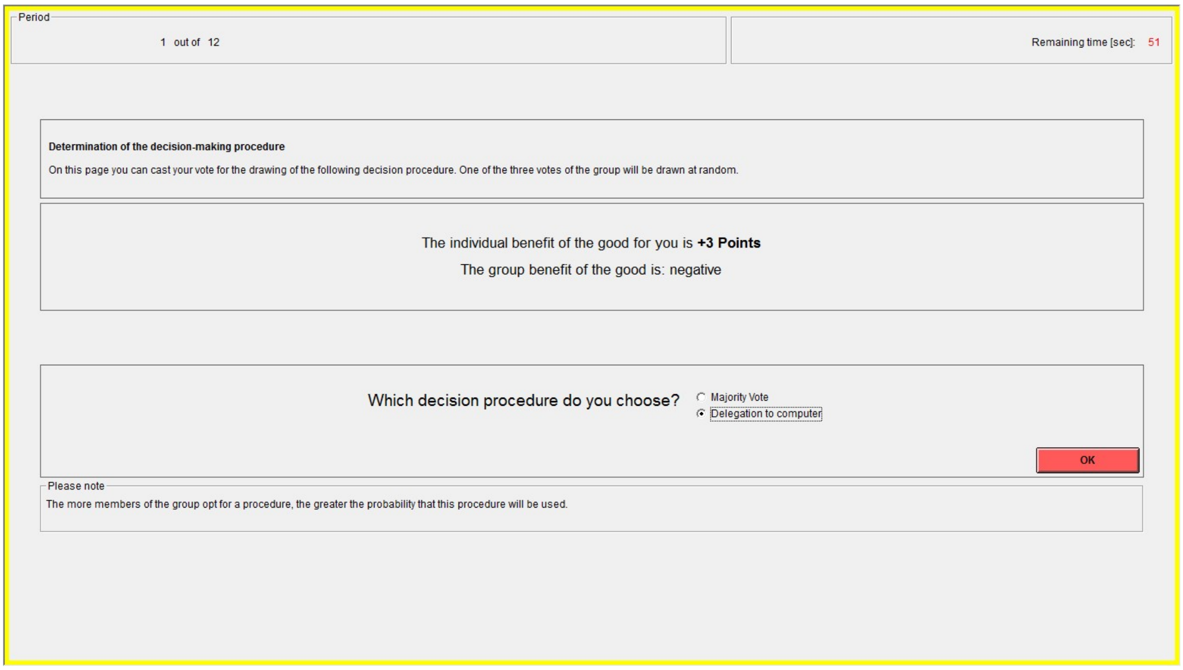



**Figure A2:** Second stage MV (Group benefit treatment)

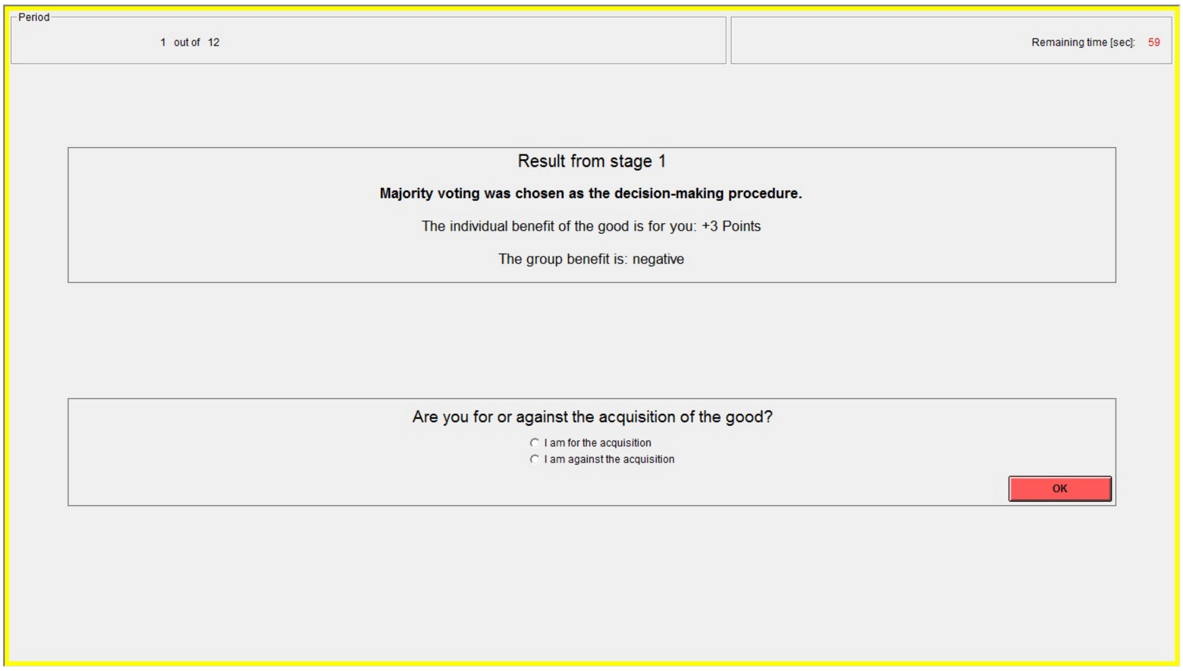
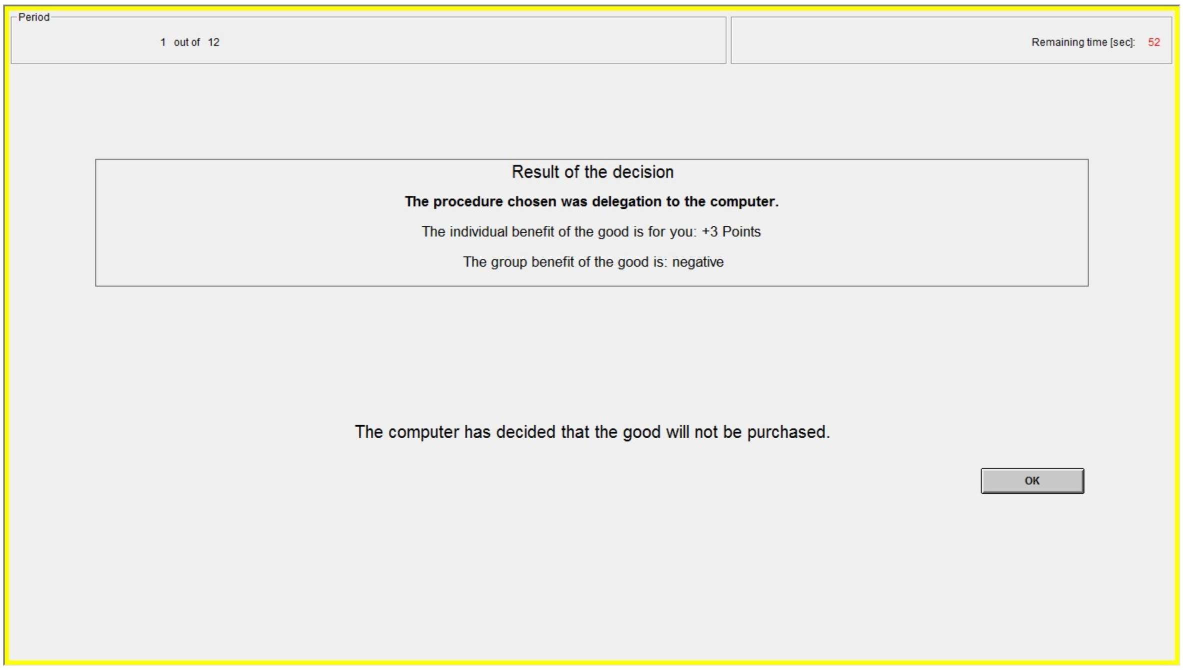


**Figure A3:** Second stage DE (Group benefit treatment)



## Appendix C: A Simple Model of Rational Procedural Choice

*Appendix C1: Deriving Hypotheses on Rational Decisions*

In this section, we demonstrate how we expect a rational individual to select among the alternative procedures that can be used to decide on public-goods provision: *majority vote* (MV) and *delegation to an expert* (DE). We denote by $\Pi_i$ the utility individual *i* derives from the provision of the public good (relative to non-provision). Recall that $\Pi_i$ is randomly assigned to individuals and may be positive or negative. By $p_i(MV)$ we denote the probability that the public good is provided under a majority vote, while $p_i(DE)$ is the probability that the good is provided under delegation. The subscript *i* signals the fact that these (subjective) probabilities possibly differ across individuals. It is straightforward to show that a rational individual *i* strictly prefers MV over DE if

(1) $$\left[p_i(MV)-p_i(DE)\right]\cdot\Pi_i>0$$

If individuals are informed about whether a majority or a minority derives positive utility from the provision of the public good, they can assign values to the difference $\left[p_i(MV)-p_i(DE)\right]$. More specifically, we have

(2) $$p_i(MV)-p_i(DE)=\begin{cases}1-q_i & if \quad \sum_i \mathbf{1}_{\Pi_i>0}\geq 2\\ -q_i & if \quad \sum_i \mathbf{1}_{\Pi_i>0}\leq 1\end{cases}$$

where $q_i\in[0,1]$ is the subjective probability that individual *i* assigns to the (unknown) *group benefit being strictly positive*. While there is little she or he can base the assessment of $q_i$ on, it is very unlikely that this subjective probability assumes one of the extreme values, zero or one. By contrast, we can make a definite statement on

$p_i(MV)$: if $\sum_i \mathbf{1}_{\Pi_i>0} \geq 2$, i.e. if the utility derived from a provision of the public good is strictly positive for at least two individuals, the probability that the good will be provided in case of a majority vote is one. Conversely, if $\sum_i \mathbf{1}_{\Pi_i>0} \leq 1$, i.e. if only a minority derives positive utility from the good, the probability of a majority vote resulting in provision is zero. Combining this insight with the decision rule in (1), we conclude that individuals with $\Pi_i > 0$ support MV if they are informed that a majority of respondents also derives positive utility from provision, while individuals with $\Pi_i < 0$ support MV if they know that a majority is *against* provision. By contrast, if their own preferences are *not* aligned with the majority's interests, rational individuals select DE, since this preserves the chance that the group-benefit maximizing expert selects their preferred outcome.

A similar logic applies to the treatment where individuals are informed about the group benefit. In this case, we have

(3) $$p_i(MV) - p_i(DE) = \begin{cases} z_i - 1 & if \quad \sum_i \Pi_i > 0 \\ z_i & if \quad \sum_i \Pi_i < 0 \end{cases}$$

where $z_i \in [\,0,1\,]$ is the subjective probability that individual *i* assigns to the event that a *majority of participants derives positive utility* from the provision of the public good. The decision rule for the expert guarantees that $p_i(DE) = 1$ if $\sum_i \Pi_i > 0$, i.e. if the group benefit is strictly positive. By contrast, $p_i(DE) = 0$ if $\sum_i \Pi_i < 0$. Combining (3) with (1), we see that a rational individual with $\Pi_i > 0$ ( $\Pi_i < 0$ ) prefers MV if the group benefit is negative (positive). In both cases, a majority vote preserves the chance that the decision on the provision of the public good results in a favorable outcome for the individual.

Finally, If respondents are only informed about their individual utility $\Pi_i$, but *not* about majority preferences and/or the group benefit, they cannot base their assessment of the probabilities $p_i(MV)$ and $p_i(DE)$ on any objective information. It is therefore unclear whether $\left[p_i(MV)-p_i(DE)\right]$ is greater or smaller than zero, and we conjecture that, in such a situation, individuals choose the procedure that they prefer for intrinsic reasons.

*Appendix C2: Computing the Expected Benefit of a Majority Vote*

Equation (1) in Appendix C1 allows distinguishing between individuals who expect to gain from MV and those who expect to lose. In the empirical analysis underlying Figures 2A and 3, we constructed dummy variables based on this expression, using (2) and (3) to determine the sign of the term in squared brackets. This, however, ignores information on the *size* of agents' expected gains and losses.

To test whether it is not just the *sign* of the expression $\left[p_i(MV)-p_i(DE)\right]\cdot\Pi_i$ that matters for agents' procedural choices, but also its *value*, we have to assess the probabilities $q_i$ and $z_i$ in (2) and (3) – i.e. we have to quantify the subjective probability that an individual who knows the majority's preference assigns to the event that the group benefit from the provision of the public good is positive ($q_i$), and the subjective probability that an individual who knows the sign of the group benefit assigns to the event that a majority favors provision ($z_i$). Tables A3 and A4 present these probabilities and the resulting values of $\left[p_i(MV)-p_i(DE)\right]\cdot\Pi_i$ for the different individual utilities we defined and the two treatment groups. In what follows, we will focus on the consideration of participant 1, i.e. we will set i = 1. Of course, the same logic applies to the other two members of the group.

Members of the *Group Majority Treatment* are informed whether a majority is in favor of or against provision of the public good. This information yields trivial values for $p_1(MV)$, which is either one or zero. To compute $p_1(DE)=q_1$, participant 1 has to combine information on her individual utility with information on the majority's preferences. We make the following assumptions: (a) If there is no information on whether the group benefit is positive or negative, individuals assign equal probability to both outcomes. (2) Moreover, given the information they have, individuals assign identical probabilities to all combinations of group members' individual utilities. To illustrate this logic, we consider two examples: suppose that participant 1 is assigned an individual utility of -8 and learns that a majority of group members is *in favor of provision*. This implies that the two other members must be assigned positive individual utility. However, it is not clear whether the group benefit – i.e. the sum of all utilities – is positive or negative, and following assumption (a), we thus put $q_1 = 0.5$ into the upper left cell of Table A3. By contrast, if $\Pi_1 = -8$, and participant 1 learns that a majority is *against provision*, there are two constellations where one member's positive individual utility dominates the other two players' negative utility ($\Pi_2 > 0, \Pi_3 < 0, \sum_{i=1}^{3} \Pi_i > 0; \Pi_2 < 0, \Pi_3 > 0, \sum_{i=1}^{3} \Pi_i > 0$), and one constellation where all three group members derive negative utility ($\Pi_2 < 0, \Pi_3 < 0$), excluding a positive group benefit. Based on this logic we can compute $q_1 = 1/3 \cdot 0.5 + 1/3 \cdot 0.5 + 1/3 \cdot 0 = 1/3$. The computation of the values for $q_1$ in the remaining cells of Table A3 follows the same logic. Note that, if a majority of group members favors provision, the expected net payoff from MV monotonically increases in participant 1's individual utility (see the third column of Table A3). By contrast, if a majority is against provision, the expected net payoff from MV monotonically *decreases* in $\Pi_1$ (see the fifth column of Table A3).

| Info: | Majority in favor of provision | | Majority against provision | |
|---|---|---|---|---|
| $\Pi_1$ | $q_1$ | $(1-q_1) \cdot \Pi_1$ | $q_1$ | $-q_1 \cdot \Pi_1$ |
| -8 | 0.5 | -4 | 1/3 | 8/3 |
| -3 | 0.5 | -1.5 | 1/3 | 1 |
| 3 | 2/3 | 1 | 0.5 | -1.5 |
| 8 | 2/3 | 8/3 | 0.5 | -4 |

**Table A3**: Deriving the expected benefit of a majority vote for the **Group Majority Treatment**. (The values shaded in grey are the ones that actually materialize, given the allocation of individual utilities in the different rounds.)

Members of the *Group Benefit Treatment* are informed whether the group benefit is positive or negative. This information yields trivial values for $p_1(DE)$, which is either one or zero. To compute $p_1(MV) = z_1$, participant 1 has to combine information on her individual utility with information on the group benefit. Making the same assumptions as above, we can compute the values of $z_1$, which are displayed in Table A4. Suppose that participant 1 is assigned an individual utility of -8 and learns that the group benefit associated with provision is positive. This allows for three constellations: in the first one, the other two participants' individual utilities are both positive ($\Pi_2 > 0, \Pi_3 > 0$). In the second and the third one, one other participant's individual utility is positive while the other one's is negative ($\Pi_2 > 0, \Pi_3 < 0; \Pi_2 < 0, \Pi_3 > 0$). While all three – by assumption equally likely – constellations allow for a positive group benefit, only the first one is associated with a majority in favor of provision, hence the entry of $q_1$ = 1/3 in the upper left cell of Table A4. By contrast, if $\Pi_1$ = -8, and participant 1 learns that the group benefit is *negative*, there are four equally likely combinations ($\Pi_2 > 0, \Pi_3 > 0; \Pi_2 < 0, \Pi_3 < 0; \Pi_2 > 0, \Pi_3 < 0; \Pi_2 < 0, \Pi_3 > 0$) that are compatible with a negative group benefit, but only the first one implies a majority in favor of provision, hence $q_1$ = 1/4 in the upper right cell. The computation of the values for $q_1$ in the remaining cells of Table A4 follows the same logic.

| Info: | Group benefit positive | | Group benefit negative | |
|---|---|---|---|---|
| $\Pi_1$ | $z_1$ | $(z_1 - 1) \cdot \Pi_1$ | $z_1$ | $z_1 \cdot \Pi_1$ |
| -8 | 1/3 | 16/3 | ¼ | -2 |
| -3 | 1/3 | 2 | ¼ | -3/4 |
| 3 | 3/4 | -3/4 | 2/3 | 2 |
| 8 | 3/4 | -2 | 2/3 | 16/3 |

**Table A4**: Deriving the expected benefit of a majority vote for the **Group Benefit Treatment**. (The values shaded in grey are the ones that actually materialize given the allocation of individual utilities in the different rounds.)

Note that if the group benefit is positive, the expected payoff associated with MV monotonically decreases in participant 1's individual utility. By contrast, the expected payoff of MV monotonically increases in $\Pi_1$ if the group benefit is known to be negative.

Of course, we doubt that, given the short time interval available for selecting between alternative procedures, participants are able to exactly compute the probabilities and expected benefits displayed in Tables A3 and A4. However, using these values allows testing the idea that agents' decisions are also influenced by how much is at stake.

## Appendix D: Regression Results

The entries in Table 5 give the estimated coefficients from logit regressions whose dependent variable is a dummy which is one if a participant selects MV as decision-making procedure. Standard errors are given in brackets.

Model 1 regresses this variable on dummies that reflect participants' membership in the two treatment groups (Group Majority and Group Benefit). Predicted effects are visualized in Figure 1. Model 2a regresses the MV-dummy on a dummy variable that assumes the value of one if a rational choice would amount to selecting MV, regardless of the treatment group a participant belongs to. Predicted effects are visualized in Figure 2A. Model 2b uses $EU_i(MV)$, i.e. the expected payoff associated with MV, as a regressor. Predicted effects are visualized in Figure 2B. Model 3a focuses on the Group Majority Treatment and uses three dummy variables as regressors: one that equals one if individual utility associated with the provision of the public good is positive, one that equals one if a majority of the group is in favor of provision, and a dummy variable that interacts these two dummies. Predicted effects are visualized in Figure 3A. Model 3b uses three dummy variables as regressors: one that equals one if individual utility associated with the provision of the public good is positive, one that equals one if the group benefit is positive, and a dummy variable that interacts these two dummies. All regressions also control for participants' gender by using a dummy that equals one if a participant is female.

**Table A5**. Determinants of choosing MV

| | **Model 1** | **Model 2a** | **Model 2b** | **Model 3a** | **Model 3b** |
|---|---|---|---|---|---|
| **Treatment (Ref. No Info.)** | | | | | |
| Group Majority | -0.0298 | | | | |
| | [0.18] | | | | |
| Group Benefit | -0.567*** | | | | |
| | [0.19] | | | | |
| **Rational preference** | | | | | |
| MV (Dummy, Ref. DE) | | 1.694*** | | | |
| | | [0.26] | | | |
| $EU_i$(MV) | | | 0.424*** | | |
| | | | [0.07] | | |
| **Conditional** | | | | | |
| Ind. Utility is Positive (Dummy) | | | | -1.810*** | 2.159*** |
| | | | | [0.38] | [0.48] |
| Group is Pro PG (Dummy) | | | | -1.513*** | |
| | | | | [0.37] | |
| Group is Pro PG (Dummy) # Ind. Utility is Positive (Dummy) | | | | 3.316*** | |
| | | | | [0.61] | |
| Group Benefit is Positive (Dummy) | | | | | 2.482*** |
| | | | | | [0.57] |
| Group Benefit is Positive (Dummy) # Ind. Utility is Positive (Dummy) | | | | | -3.589*** |
| | | | | | [0.92] |
| Female | 0.227 | 0.113 | 0.126 | 0.174 | 0.00507 |
| | [0.14] | [0.18] | [0.19] | [0.22] | [0.31] |
| **Observations** | 1944 | 1368 | 1368 | 828 | 540 |
| **AIC** | 2560.8 | 1662.7 | 1692.3 | 1000.0 | 669.1 |
| **BIC** | 2650.0 | 1741.0 | 1770.6 | 1080.2 | 742.1 |
| **Log pseudo lik.** | -1264.4 | -816.3 | -831.1 | -483.0 | -317.6 |

**Note:** Dep. var. 1=MV, 0 otherwise. Random-effects logistic regression. Robust standard errors in brackets, period dummies and constant incuded but not reported. * p<0.10, ** p<0.05, *** p<0.01