Essays on Environmental and Political Behaviour

Inaugural-Dissertation

zur Erlangung des Grades

Doctor oeconomiae publicae (Dr. oec. publ.)

an der Ludwig-Maximilians-Universität München

2021

vorgelegt von

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Promotionsabschlussberatung: 03 February 2021

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Introduction

Everyday economic life involves not only decisions an individual makes for herself, but also decisions an individual makes in the context of a larger group. Some examples of these collective actions involve choosing to wear a face-mask during the pandemic, voting in elections, deciding to get vaccinated, or choosing to engage in a pro-environment activity like recycling. In many of these cases, actions do not translate directly into the final outcome. They are consequential only in a limited sense, either because the likelihood of being pivotal in the outcome is low (as in the case of voting), or because the magnitude of the action is very small in the larger picture (as in the case of recycling).

The first chapter of this dissertation is built on the fact that we often observe policy interventions to encourage individual contributions to such collective actions. Several measures are in place across countries to 'nudge' individuals to engage in pro-environment behaviours. For example, the Nordic Council of Ministers in 2016 recommended the use of interventions such as providing individuals with peer comparisons on energy consumption and offering renewable energy as the default source. Another measure is the proposed European Union restrictions on the use of single-use plastics.[1] While the effect of these policies on target behaviours like energy consumption and use of single-use plastics is extensively documented, little is known about how these interventions affect non-target pro-environment behaviours.

My paper, titled "Are pro-environment behaviours substitutes or complements?" looks at the effect of interventions on non-target behaviours. I set up a field experiment in India

[1]Press release from the EU on the ban on single-use plastics: https://www.consilium.europa.eu/en/press/press-releases/2019/05/21/council-adopts-ban-on-single-use-plastics/

to study how an intervention to increase one pro-environment activity, namely, recycling single-use plastic carry bags, spills over to other pro-environment activities like planting trees, using public transport, or reducing air-pollution. Single-use plastic recycling centers were set up in 30 schools covering over 3,750 students, for over a year. Monthly collection drives are organized in these schools where students can bring items to recycle. The baseline recycling levels are close to zero across all the schools.

The interventions are rolled out as follows. The first group is the control group where there is no intervention. In the second group I provide students with information on the environmental consequences of single-use plastics and the need to recycle them. In the third group students are given incentives to recycle in addition to the information content. To identify spillovers from these interventions to other pro-environment behaviours, I use simultaneous lab-in-the-field experiments. I collect data on students' willingness to pay (WTP) for a list of pro-environment activities before and after the interventions in all three treatments.

I find that providing information alone does not change the recycling behaviour, whereas an additional incentive significantly increases the average recycling levels. Students in this treatment who increase their recycling levels also increase their willingness to pay for other pro-environment activities. This indicates a positive spillover from the intervention. To discuss possible channels through which these spillovers operate, I complement the data from the field with administrative data on socio-demographic characteristics and survey data on environmental awareness, intrinsic motivation to engage in environment activities, and elicited classroom norms on pro-environment behaviours.

The second and third chapters in the dissertation focus on another dimension of collective action - voting behaviour. Since the likelihood of individual actions changing the final outcome is close to zero and most of these activities involve at least a small cost, a straightforward cost-benefit analysis implies that individuals do not engage in them. Yet, we see positive participation in collective actions, such as voter turnouts in elections. Due to the very low chance that a single vote tips the outcome, voters are often guided by reasons other than changing the results. These motivations to vote are

collectively called the 'expressive motives'. The second chapter of the dissertation provides a comprehensive overview of the various expressive motives individuals state regarding why they turn out to vote. This chapter uses an online survey conducted in April 2019 in the United States to identify several expressive voting motives and quantify the relative importance of each of them.

The results indicate that one of the main reasons for respondents go to polls is the desire to be part of the democratic process irrespective of whether they can change the outcome. Many of the respondents also believe that if they do not vote, they cannot complain about the government or the state of the democracy at a later stage. Individuals who belong to racial minorities state that they turn out to vote because voting is a privilege not extended to their past generations.

The paper also finds that the likelihood that an individual votes expressively is positively correlated with other expressive political behaviours like donations to political parties, participating in a demonstration, and posting political opinions online. Additionally, individuals who identify with certain dimensions of 'being a good citizen' are more likely to vote expressively. Older individuals and those with higher income and education levels are also more likely to state that they engage in expressive voting.

The third chapter, based on joint work with Kai A. Konrad (Konrad and Sherif (2019)), explores another dimension of voting behaviour - whether voters can ensure that their elected office-holders remain accountable to them. Once elected, office-holders can use their position to extract rents for themselves at the expense of the voters unless voters keep them in check. An effective mechanism to keep office-holders in check is retrospective voting, where voters punish an unaccountable incumbent by removing them from office at the next election. The threat of losing the re-election keeps office-holders accountable, assuming that re-election is valuable to them.

However, being in office often provides office-holders with additional skills that make them better law-makers and representatives. This experience is thus desirable from the point of view of voters, who would rather re-elect a skilled incumbent than a challenger with unknown skills. In such a setting, the incumbent office-holder has an evident

advantage, as they know that the voters benefit from their re-election, giving them an opportunity to extract rents. From the voter's perspective, this incentive to re-elect an experienced incumbent is at odds with using re-election as a tool to ensure accountability. Voters in such a situation face the trade off between re-electing the skilled incumbent and keeping the incumbent accountable. We examine whether it is possible to ensure the accountability of the office-holder in such settings.

We consider the accountability problem in a theoretical model, using a voting framework with multiple voters, where voters have strong incentives to re-elect the incumbent. Incumbents in office have a budget that they can either distribute to the voters (accountable behaviour) or keep for themselves. At the end of the office period, they are up for re-election. The candidates only need a majority vote to be re-elected and hence each voter is only pivotal with a small probability. These pivotality considerations support equilibria where incumbents cultivate a favoured minimum majorities and behave accountably only to this majority. Evidence from an accompanying laboratory experiment confirm these theoretical results. We find that there is heterogeneity among incumbents in terms of their accountability. Some incumbents extract significant rents, others do not. Incumbents who extract much are less likely to be re-elected. Although this is weaker when voters get a benefit from re-election, we find that at least some degree of accountability is ensured. We also find that voters correctly form beliefs about the probability of their vote being pivotal in the election based on whether they belong to this majority that is treated favourably by the incumbent.

Chapter 1

Are pro-environment behaviours substitutes or complements?

1.1 Introduction

Policy interventions aiming to encourage individuals to adopt pro-environment behaviours are very common. A recent example is the proposed European Union ban on single-use plastics.[1] While this might lead to a reduction in the use of single-use plastics, little is known about how this will affect other domains of pro-environment behaviours, for example, using public transport or changing diet. Would individuals who reduce the consumption of single-use plastics consider that they have done their share towards the environment and reduce other pro-environment behaviours? Or do they increase other pro-environment behaviours to be consistent with the broader goal? This paper looks at the effect of interventions targeted at influencing one pro-environment behaviour on other pro-environment behaviours.

I use a field experiment among school students in the state of Kerala, in India, to study spillover effects from interventions. As part of the study, single-use plastic recycling centers are set up across 30 schools covering over 3,750 students. The students can bring

[1]Press release from the EU on the ban on single-use plastics: https://www.consilium.europa.eu/en/press/press-releases/2019/05/21/council-adopts-ban-on-single-use-plastics/

plastic items to these school recycling centers, which are then counted, measured and sorted by weight, and recycled at a centralized location.

These recycling centers are used to collect baseline data on individual student's recycling levels. After several months of baseline data collection, we divide the sample schools into three treatment groups. The first group is the control group where there is no intervention. In the second group of schools, called the information treatment, we provide information on the environmental consequences of single-use plastics and why it is important to recycle them. In the third group, the information plus incentive treatment, we provide incentives to students to bring more items to recycle in addition to communicating the information content that is the same as the treatment before.

I observe that the baseline recycling levels at all the schools are very low. They are statistically not different from zero. I find that providing information alone does not change the recycling behaviour. The incentive treatment, on the other hand, has a positive and significant effect on the recycling levels of the students.

To measure the spillover effects from these interventions into other behaviours, I collect data on students' willingness to pay (WTP) for a list of seven environment activities before and after the interventions in all three treatments. The WTP data is collected through a lab-in-the-field experiment. Positive spillovers occur when the students are willing to pay more for environment activities after the intervention than what they were willing to pay before. We look if the changes in the WTP before and after interventions vary across the treatments. We observe that the information treatment does not have any spillovers into the WTPs for different environment activities. But the incentive treatment spills over positively to each of the seven other environment activities. This result indicates that the incentive intervention targeted at increasing recycling of single-use plastic bags increased the WTP for other environment activities. This brings out the complementarities between recycling of single-use plastics and other environment behaviours.

Since the realization that environmental quality depends significantly on human behaviour, and given the ubiquity of behavioural tools, efforts at various scales have been in place to encourage or 'nudge' individuals to adopt pro-environment behaviours.

For example, the Nordic Council of Ministers in 2016 recommended using "nudging to promote more environmentally friendly behaviour in energy consumption, waste, and resource efficiency". Some of the suggested nudges include provision of renewable energy as the default choice of energy source or providing information on the energy use of others to bring in peer comparisons and social norms. Other examples include discounted or free parking spaces for low emission cars in the cities of Helsinki[2] or Leeds.[3]

In this context, this paper relates to three main fields of literature. The first is the extensive literature on nudges aimed to encourage more pro-environment behaviours. The array of choice architectures used to influence sustainable behaviours have included the following mechanisms.

1. First, is information provision interventions like that of Allcott and Rogers (2014). They study the effect of providing households with "home energy reports" that include personalized energy reports and information on energy conservation. Similarly Torres and Carlsson (2018) studies the effect of information campaigns to encourage residential water savings in Colombia. Results indicate that social information and appeals reduce household water use by 7%. A meta-analysis of information interventions on energy conservation by Delmas et al. (2013) finds significant reductions in individual energy use.

2. The second involves changing the defaults. For example, Araña and León (2013) looks at the decision to pay for carbon offsetting policies by participants signing up for a conference. They find that more participants contribute to carbon offsets when the default was that the extra price was already included in the conference fee and the participants had to opt out, compared to the default where the participants had to opt in and actively choose to pay the extra amount. Similarly, Brown et al. (2012) studies the effects of defaults on the thermostat settings of OECD employees. They find that reducing the default setting leads to a reduction in the temperature chosen by individuals and increases building level energy efficiency.

[2]https://www.hel.fi/helsinki/en/maps-and-transport/parking/vahapaastoisten$_a lennus$

[3]https://news.leeds.gov.uk/news/council-to-introduce-free-parking-for-low-emission-vehicles

3. The third mechanism involves the use of social comparisons and norms. Farrow et al. (2017) provides a meta-analysis of the different studies and concludes that various social norm interventions cause significant and consistent changes in behaviour. The effect of social comparisons and norms on household energy use has been extensively documented by Nolan et al. (2008), Allcott and Rogers (2014), Schultz et al. (2007), Ayres et al. (2013) and Ferraro and Price (2013).

4. Finally, studies have also looked at the effectiveness of changing the physical environment. For example Kallbekken and Sælen (2013) shows that reducing plate size in hotel restaurants reduces food waste by 20%.

Secondly, There is an active literature on spillovers between different pro-social behaviours in general, and different environment behaviours in particular. Evans et al. (2013) looks at the relationship between two pro-environment behaviours, namely, recycling rates and car sharing. Their study suggests that there are some positive spillovers from messages aimed at increasing car sharing to recycling. These occurred when self-transcending reasons to promote car sharing (like protecting the environment) are made salient, and not when self-interested reasons (e.g. economic reasons) are made salient. Similarly, Lanzini and Thøgersen (2014) use self reported surveys to find a positive relationship between "green" shopping and other pro-environment behaviours, but these spillovers are limited to low cost behaviours. Other studies like Poortinga et al. (2013) look at spillovers from a single-use carrier bag charge in Wales and find no effects. Some studies also find a negative spillover from one environment activity to the other. Tiefenbeck et al. (2013) finds that an intervention to reduce water use in households achieved the goal, but increased the electricity consumption relative to the pre-intervention baseline. Other studies that find a negative spillover between environment activities are Sachdeva et al. (2009) and Klöckner et al. (2013). For a summary of the research in the field see Truelove et al. (2014).

As evident from above, there is extensive research into the direct and indirect effects of interventions on the target behaviour, however, little is known about how they influence non-target behaviours. This paper contributes by providing empirical evidence on the effectiveness of nudging in changing target behaviour as well as the spill over effects of

these interventions on non-target, closely related behaviours. Another challenge in the literature has been the difficulty in finding observational data on multiple environment behaviours as individuals are highly likely to over report when asked about environment behaviours. This makes causal estimation of spillovers difficult. I device a lab-in-the-field experiment to overcome this challenge and collect data on multiple environment behaviours.

Thirdly, the paper also relates to a growing literature on pro-social behaviours and moral licensing, as in the broader context, pro-environment behaviours are a sub category of pro-social behaviours. Gneezy et al. (2012) find that the cost of the initial pro-social behaviour influences whether the said behaviour is repeated in the future. They find that, if individuals engage in a costly pro-social behaviour, it serves as a signal of pro-social identity and individuals are more likely to stick to that identity and repeat the behaviour. On the other hand, if the behaviour is costless, there is no signalling and the behaviour is repeated less often. Individuals may even reduce the behaviour, a finding consistent with the growing literature on moral licensing (see Blanken et al. (2015) for an overview). Moral licensing occurs when an individual initially behaving in a moral way (for example engaging in a pro-social or pro-environment activity) finds it acceptable to later engage in behaviours that are immoral or questionable. The initial good deed offers enough moral credit or license to engage in later questionable behaviours. Evidence for moral licensing is observed most frequently in charitable donations (Conway and Peetz (2012), Sachdeva et al. (2009)). In the environmental domain Mazar and Zhong (2010) shows that after shopping in a green store (a pro-environment activity) compared to a regular store, people were more likely to engage in less ethical behaviour in lab experiments on dictator games and lying games. Following this line of logic, interventions that encourage one pro-environment action thus give individuals the license to reduce other pro-environment actions.

The rest of the paper is structured as follows. In the next section, I describe the design of the field experiment, lab-in-the-field experiment and sources of administrative and survey data. Section 1.3 discusses the hypotheses and empirical strategy. Section

1.4 outlines the data and results. Section 1.5 discusses the possible mechanisms behind the results and section 1.6 concludes.

1.2 Research design

The experiment is conducted among school students aged 12 to 15 in the district of Ernakulam in the state of Kerala in Southern India. Collection and safe disposal of solid waste is a continuing challenge for the state of Kerala. The state currently relies on a decentralized system of waste management where households themselves manage the waste generated by either burning or burying the waste in their premises or dumping in open spaces or water bodies (Government-of Kerala (2020)). Almost half of the municipal waste generated in the state is collected by local government bodies and disposed in local landfills. Plastic waste is occasionally separated at source; however, most of it eventually ends up in the landfills or in water bodies, exacerbating pollution due to plastic waste on the rivers, lakes and along its 560 km long coastline threatening biodiversity and human lifestyle.

Thirty schools were randomly chosen to participate in the experiment, providing a sample size of around 3750 students who are in classes 8 and 9. Schools are assigned into three treatments with roughly 1250 students in each treatment based on power calculations and a randomization algorithm.[4]

I look at different pro-environment behaviours of students, with a special focus on recycling of single-use plastics. To do this, I set up a plastic waste collection facility at all the schools in our sample. Plastic collection drives are organized once a month and students are informed in advance of the days they can use the collection boxes at schools to dispose their recyclable single-use plastic waste from home. There is no regular recycling services offered by the city authorities. Once the students have brought items to recycle and deposited them in our collection boxes, we sort them, count the number of items, measure the weight and thickness, and take them to the centralized recycling

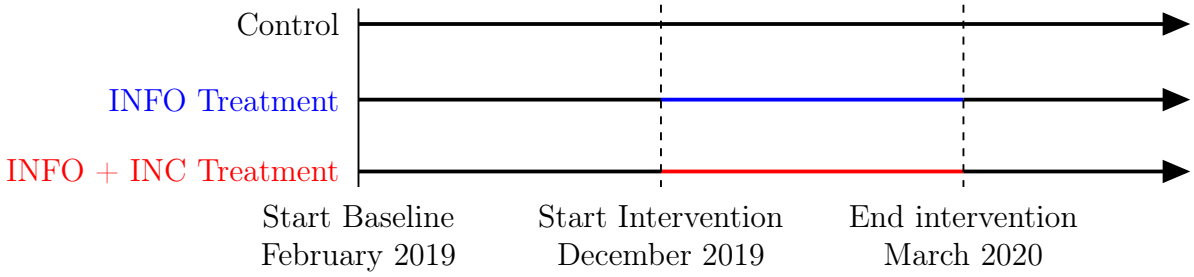
[4]The number of subjects required in each treatment was determined using power calculations. We can detect effect sizes of .10 pp at $\alpha = 0.05$ with power $p > 0.05$. The algorithm assumes that the baseline recycling levels are similar across the three treatments.

facility. The data on recycling of single-use plastics by the students is collected for over nine months pre-intervention and three months post-intervention. The data set includes monthly student level data on the number, total weight and composition of single-use plastic items that the student recycles.

1.2.1 Treatments

After collecting baseline recycling data for nine months, the schools are divided into three treatments as illustrated in figure 1.1.

Figure 1.1: Treatment design and timeline



Control treatment. In the schools that fall in the control treatment, we change nothing and continue to measure the number of single-use plastic items that the students bring to recycle.

INFO treatment. In the schools in the second treatment I provide information to students on the need to recycle single-use plastics through posters and regular awareness sessions. These awareness sessions involved classroom presentations by our research team on the consequences of single-use plastics ending up in the landfills and rivers of Kerala. In these sessions, the instructors emphasized the importance of recycling single-use plastics and the impact it has on the environment. The research team followed the same script in each of the classrooms that received the information treatment. Additionally, a poster highlighting the need to recycle and the environmental benefits of recycling was put up in each of the classrooms throughout the intervention period, serving as a reminder to

the students. We continued to collect data on the amount of recycling of the students. This treatment is referred as the INFO treatment.

INFO + INC treatment. Students in the schools in the third treatment are incentivized to increase their recycling, in addition to receiving the above information on the importance of recycling. The top five students in each class who recycle the most (by item and by weight) received certificates from the district administration for their contributions to the welfare of the state and were invited to a celebratory "evening with a celebrity". The awareness sessions remain exactly the same as the INFO treatment. But at the end of the awareness sessions, the incentive structure is announced to the students. Posters in the classrooms under this treatment highlighted both the importance of recycling as well as the mentioned incentives. We continued to collect data on the amount of recycling of the students. This treatment is referred as the INFO + INC treatment.

1.2.2 WTP for pro-environment behaviours: Lottery task

While the levels of recycling are directly observable, it is more challenging to observe and accurately measure other different environment activities that the students may (or may not) engage in. To capture dimensions of pro-environment behaviours in addition to recycling, I conducted a lab experiment among the students. The experiment is designed to elicit students' willingness to pay for different environment activities like tree planting, paper recycling, pollution reduction etc. The willingness to pay measure captures to what extend students care about each of these activities, and in the absence of observational data on environment activities, it serves as a close proxy.

I use a lottery task to elicit the WTP. Every student gets a lottery that gives them a 1/10 chance of winning 100 INR ($\approx$ 1.50 USD, roughly equivalent to the average weekly allowance for school children in towns in urban India.[5])

Before drawing the winner of the lottery, students are given a list of 7 environment activities. They are as follows:

[5]https://www.livemint.com/Leisure/U3YMZKANJLUgbMCQKtzi2N/Pocketsize-expenses.html

1. Plastic recycling
2. Paper recycling
3. Reduce air pollution
4. Reduce water pollution
5. Plant trees
6. Promote public transport
7. Save wildlife

They are then asked if they want to give a(ny) share of their earnings towards each activity, in case they win. Students have to enter an amount (between 0 and 100, both limits inclusive) that they are willing to give towards every activity item on the list.

The students are informed *before* they enter the amounts, that in case they win the lottery, one of these activities will be randomly picked, the amount they agreed to spend on the picked activity will be deducted and the rest paid to them. Students are informed that we use the amount they give to perform the activity. Students receive the exact details of how their contribution to a particular activity will be spent before they decide their contributions. The contributions of every student is spent exactly in the same way. For example, if a student gave 10 INR for planting trees, we use the money to buy saplings and plant them in a particular location in the school district.[6]

Once the students have entered the amounts for the 7 activities, we draw the lottery. For each of the winners we randomly pick an activity from the list. We deduct their contributions to the picked activity from the prize money and pay the remaining to the winner. The payoffs are realized immediately after the task. All the subjects undertake

[6]Contributions to plastic (paper) recycling is spent to run an awareness campaign in the city on the need to recycle plastics (paper). Contributions to reduce air (water) pollution is spent to run an awareness campaign in the city to reduce air (water) pollution. Contributions to promote public transport is used to run an awareness campaign to increase the use of public transport among the city residents. Contributions to save wildlife is spent on running a campaign to create awareness about and protect endangered animals in the region.

the lottery task a month before the treatment interventions and three months after the interventions.

Such a task overcomes several difficulties encountered in observational data. Firstly, it is not straightforward to come up with an exhaustive list of environment activities that students across the 30 schools engage in. Even if a subset of these activities are identified, we do not have observational data on to what extend students engage in them. Instead of relying on self reported environmental activities that students engage in, we rely on an experimental elicitation. Secondly, performing pro-environment activities are costly for individuals (Thøgersen and Crompton (2009)). This poses a difficulty in analysing observational data because we have to make additional assumptions on how these costs are distributed among the different individuals. This cost is experimentally controlled in the lottery task. Every individual is given a lottery with 1 in 10 chance of winning 100 INR. This is the maximum amount that the individual can spend on each of the pro-environment activities. Keeping the costs the same is also important from the point of view of Gneezy et al. (2012), who show that the cost of initial environment activities can affect the direction of spillovers, with high cost initial action increasing the likelihood of further pro-environment actions and vice-versa.

1.2.3 Survey questionnaire

Environment attitudes and behaviours. I use a survey questionnaire to collect data on additional control measures like attitudes and beliefs of students towards environment, different pro-environment activities that they undertake in everyday life and intrinsic motivations towards engaging in pro-environment behaviours. Based on the responses in the survey, an environment score is computed for all the subjects. The full survey design and scoring is presented in the appendix.

Additionally, classroom norms pertaining to recycling and other pro-environment behaviours are elicited in a two stage process consistent with the Krupka - Weber elicitation method (Krupka and Weber (2013)). First, the students are asked a series of four questions on their self-behaviour. These questions concern whether they recycle, switch off electrical appliances after use, litter, or use disposable plastic cups and plates.

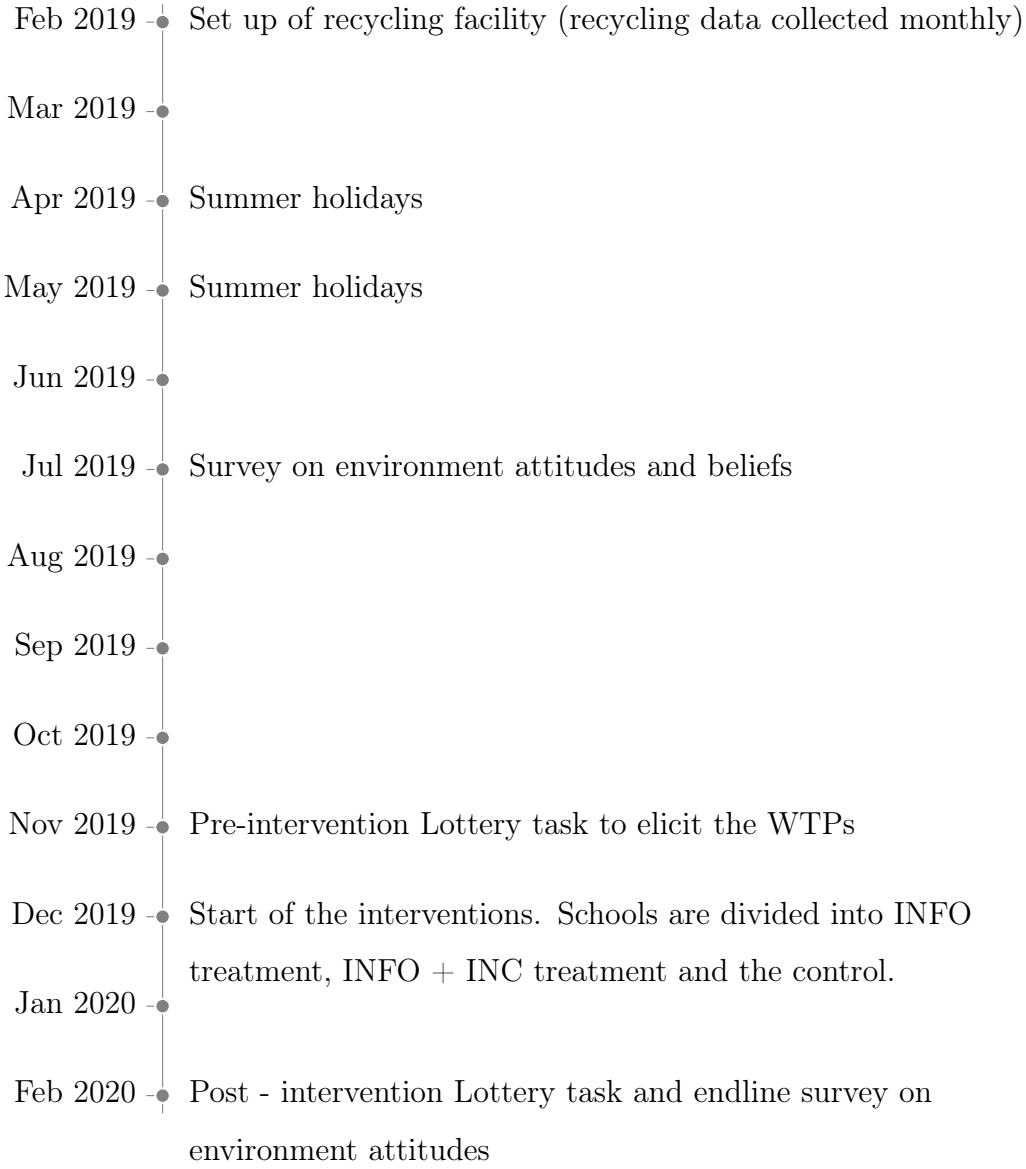
After students have responded, they are informed that their classmates also answered these questions, and are asked how many of their classmates said they engage in each of the activities. Students are given a four point scale with options including "almost all my classmates", "some of my classmates", "not a lot of my classmates" to "none of my classmates". If majority of the students believe that most of their classmates behave pro-environmentally on the four questions, I categorize the classroom as having strong norms regarding environment activities. The questionnaire for norm elicitation is also presented in the appendix.

The survey also collects data on social desirability bias by using the Marlowe-Crowne scale as developed by Crowne and Marlowe (1960) and Reynolds (1982). It measures the respondent's propensity to give responses that are considered socially desirable or those responses that they think experimenters expect from them.

Other background data. Additional data collected includes socio-demographic characteristics like gender, age, household income and education of the parents.

To summarize, the outcome variables are recycling levels of subjects and their willingness to pay for different pro-environment behaviours. Control variables include pre-treatment environment score of subjects that captures attitudes and beliefs towards environment, environmental norms among peers in classrooms, and demographic characteristics collected through surveys. Figure 1.2 represents the timeline of the study and the order in which data is collected.

Figure 1.2: Timeline of the data collection

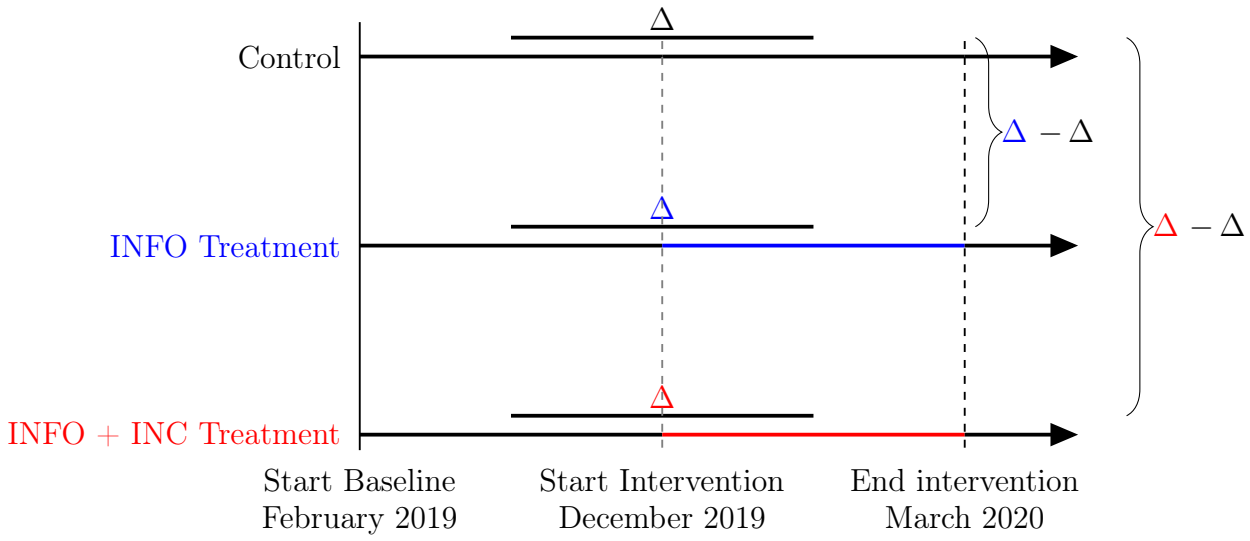


1.3 Hypotheses

This study measures the effect of the interventions (INFO and INFO + INC) on the level of single-use plastic recycling and on the WTP for different pro-environment behaviours. The first goal is to check if the treatments succeed in changing the recycling behaviours of the students. I use a difference-in-difference estimation. This is essential because there is

no information about the recycling behaviour of the students at the start of the study as they do not have access to any recycling facilities. The city does not offer regular recycling services. Therefore, baseline recycling data is collected from all schools in the sample on baseline recycling levels before dividing the schools into control, INFO treatment and INFO + INC treatment. This gives a difference-in-difference setting where we can measure if the difference in recycling levels pre- and post- intervention of a treatment is different from the difference in the recycling levels pre- and post- intervention in the control group.

Figure 1.3: Difference-in-difference estimation



1.3.1 On recycling levels

As a first step, I measure if there is a difference in the change in recycling levels pre- and post- intervention, between the three treatments. Both the treatments are aimed at nudging the students to increase recycling levels either by providing information on the need to recycle or providing direct incentives to recycle.

Hypothesis 1a Change in recycling level of students in the INFO treatment pre- and post- intervention is larger than the change in recycling level of students in the Control pre- and post- intervention.

$$\Delta \text{Recycling}^{\text{INFO}} - \Delta \text{Recycling}^{\text{Control}} > 0$$

Hypothesis 1b Change in recycling level of students in the INFO + INC treatment pre- and post- intervention is larger than the change in recycling level of students in the Control pre- and post- intervention.

$$\Delta \text{Recycling}^{(\text{INFO} \ + \ \text{INC})} - \Delta \text{Recycling}^{\text{Control}} > 0$$

1.3.2 On WTP for pro-environment activities

I collect the WTP data using the lottery experiment two months before the intervention and two months after. We are interested in the change in the willingness to pay, i.e. $\Delta \, \text{WTP}_{ij} = \text{WTP}_{ij}^{\text{post}} - \text{WTP}_{ij}^{\text{pre}}$, for each student i for each environment activity j in the list of 7 activities. For the rest of the hypotheses we focus on this $\Delta \, \text{WTP}_{ij}$.

If the $\Delta \, \text{WTP}_{ij}$ is positive, it implies that students are willing to pay more for an environment activity j after the intervention compared to before the intervention. If this goes hand in hand with an increase in the levels of recycling, we call these two activities complements. Likewise, a negative $\Delta \, \text{WTP}_{ij}$ indicates that students have lowered their contributions to the environment activity j. And if this happens with those who increase their levels of recycling, we call these two activities substitutes.

We first look at the WTP for promoting plastic recycling. Here, WTP for promoting plastic recycling and actual recycling behaviour are two different expressions of the same underlying behaviour, and hence very close substitutes. However, we are agnostic about the direction of spillovers between the actual recycling behaviour and the WTP measure. Subjects who increase actual recycling as a result of the intervention, could be contributing less to the WTP measure if they believe that they recycle enough through their actions and think that the money is better spent elsewhere. In this case, recycling and contributions for promoting recycling are substitutes. In other words, there is a negative spillover from the intervention to the WTP measure. However, if the increase

in the actual recycling levels co-exist with an increase in the WTP measure, the two behaviours are complements (i.e., there is a positive spillover between the two).

Hypothesis 2a Change in the WTP of the subjects for recycling plastic in the INFO treatment pre- and post- intervention is different than the change in the WTP of the subjects in the Control pre- and post- intervention.

$$\Delta\,\mathrm{WTP}^{\mathrm{INFO}}_{i,\mathrm{plastic}} - \Delta\,\mathrm{WTP}^{\mathrm{Control}}_{i,\mathrm{plastic}} \gtrless 0$$

Hypothesis 2b Change in the WTP of the subjects for recycling plastic in the INFO + INC treatment pre- and post- intervention is different than the change in the WTP of the subjects in the Control pre- and post- intervention.

$$\Delta\,\mathrm{WTP}^{(\mathrm{INFO}\ +\ \mathrm{INC})}_{i,\mathrm{plastic}} - \Delta\,\mathrm{WTP}^{\mathrm{Control}}_{i,\mathrm{plastic}} \gtrless 0$$

We now estimate the effect of the interventions on other pro-environment activities (proxied by the WTP measure elicited in the lottery task).

Hypothesis 3a Change in the WTP of the subjects for an environment activity j in the INFO treatment pre- and post-intervention is different to the change in the WTP for activity j in the Control pre- and post- intervention.

$$\Delta\,\mathrm{WTP}^{\mathrm{INFO}}_{ij} - \Delta\,\mathrm{WTP}^{\mathrm{Control}}_{ij} \gtrless 0$$

Hypothesis 3b Change in the WTP of the subjects for an environment activity j in the INFO + INC treatment pre- and post-intervention is different to the change in the WTP for activity j in the Control pre- and post- intervention.

$$\Delta\,\mathrm{WTP}^{(\mathrm{INFO}\ +\ \mathrm{INC})}_{ij} - \Delta\,\mathrm{WTP}^{\mathrm{Control}}_{ij} \gtrless 0$$

The direction of the change determines if the activities are substitutes of complements. If the change in the WTP for environment activity j of the subjects in the treatments

is larger than the change in the WTP for environment activity j of the subjects in the Control, then the said activity and recycling plastics are complements. If the change in the WTP for environment activity j in the treatments is smaller than the change in the WTP for environment activity j in the Control, then the said activity and recycling plastics are substitutes.

1.4 Data and Results

The study was conducted over the period of February 2019 - March 2020. On average, students recycle about 0.60 carry bags before the intervention. The recycling levels before the intervention are not statistically different in each of the three treatment groups. The baseline averages are shown in table 1.1. On average, most students do not recycle in the Control group even after the intervention, while in the INFO and INFO + INC treatments recycling goes up. On average only around 3% of students recycle before the intervention across the treatments.

Table 1.1: Average recycling and percentage of students who recycle

	Pre-Intervention			Post-Intervention		
	Control	INFO	(INFO + INC)	Control	INFO	(INFO + INC)
Average items recycled	0.46	0.53	0.83	0.53	1.37	3.88
Percentage of students who recycle	3%	4%	3%	1%	3%	7%

1.4.1 On recycling levels

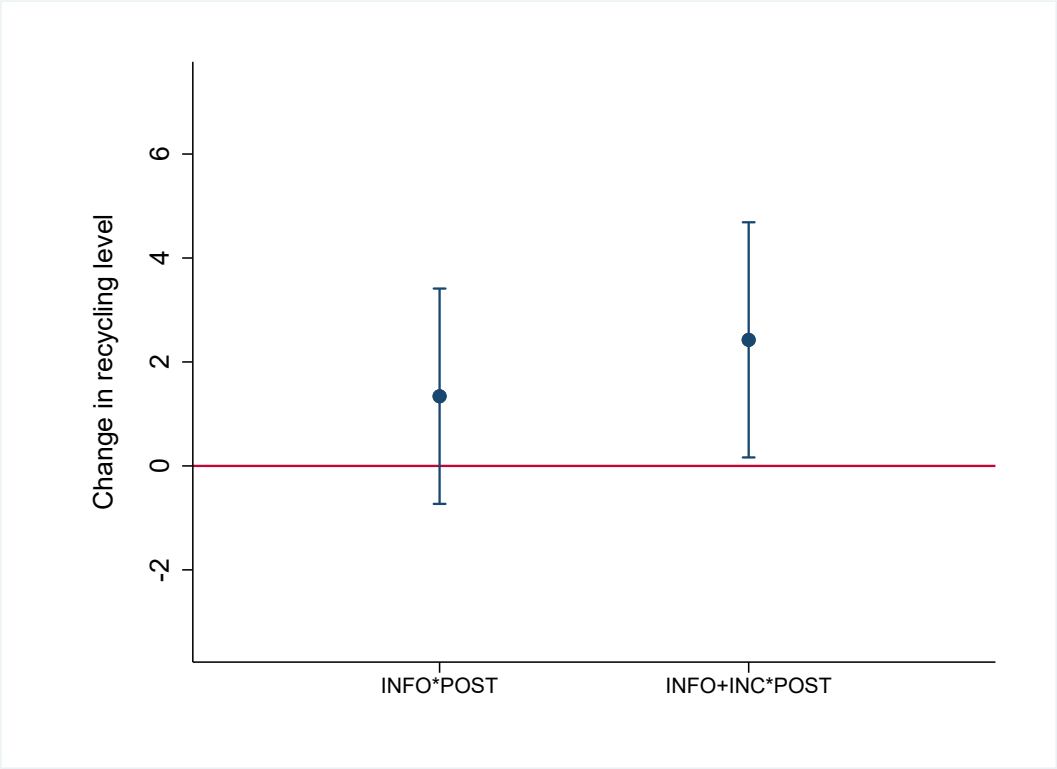
We estimate following difference-in-difference estimation with an OLS regression:

$$Y_i = \beta_0 + \beta_1 t_i + \beta_2 \text{INFO}_i + \beta_3 (\text{INFO + INC})_i + \delta_1 (t_i.\text{INFO}_i) + \delta_2 (t_i.\text{INFO + INC}_i) + \beta_4 X_i + \epsilon_i$$

The outcome variable Y_i indicates the recycling levels for subject i. The variable INFO_i takes value 1 if the subject i is in INFO treatment, $(\text{INFO + INC})_i$ takes the value 1 if subject i is in INFO + INC treatment, t_i takes the value 1 if the observation is from post intervention, and X_i is a vector of control variables including age and gender.

The co-efficients of interest are δ_1 and δ_2 and they capture the effect of being in the treatments post the intervention. In other words, they capture the change in recycling levels for treated schools less the change in recycling levels for control schools. Figure 1.4 shows the first main result. The figure indicates that information alone as a nudge does not lead to a significant increase in recycling levels. The change in recycling levels before and after the information intervention is not significantly different than the change in recycling levels before and after intervention in the control.

Figure 1.4: Recycling of single-use plastic bags



Note: The figure shows the effect of the treatments on the change in the recycling levels. The plots show the coefficient estimates and 95% confidence intervals obtained from difference-in-difference estimation (specification 4 in table 1.2), regressing the outcome variable (change in the recycling level) on the INFO * POST dummy and the (INFO + INC)*Post dummy. The INFO * POST dummy captures the effect of being in the INFO treatment post the intervention. Similarly, the (INFO + INC)*Post dummy captures the effect of being in the INFO + INC treatment post the intervention.

Result 1a: There is no significant difference between the change in recycling level of students in the INFO treatment pre- and post- intervention compared to the the change in recycling level of students in the control pre- and post- intervention.

However, change in the recycling levels of students who are in the INFO + INC treatment pre- and post- intervention is 2.38 percentage points higher than the change in the recycling levels of students in the control pre- and post- intervention. This is significant at the 5% level. This indicates that offering incentives and information increases recycling levels.

Result 1b: Change in recycling level of students in the INFO + INC treatment pre- and post- intervention is larger than the change in recycling level of students in the Control pre- and post- intervention.

Table 1.2 reports these results from the difference-in-difference regressions. The dependent variable is the number of single-use plastic bags recycled. Column (1) of table 1.2 is the baseline OLS estimation, column (2) presents results that are clustered at the classroom level, column (3) adds control variables including demographics and column (4) adds school level fixed effects.

The variables of interest are INFO*Post and (INFO + INC)*Post. INFO*Post is the difference in difference indicator that takes the value 1 if the individual student is in the INFO treatment post the intervention. The estimated co-efficient for INFO*Post variable equals 1.09 and is significant at the 1% level (column (1)). This indicates that the change in recycling level pre- and post- intervention in the INFO treatment is 1.09 percentage points larger than the change in recycling levels pre- and post- intervention in the control schools. However, clustering the standard errors at the classroom level (presented in column (2)) makes the effects insignificant. Additional control variables such as age and gender of students are added in the regression estimates presented in column (3) and school level Fixed Effects are added in column (4), none of which qualitatively change the results.

The variable (INFO + INC) * Post captures the effect of an individual student being in the INFO + INC treatment post the intervention. Column (1) of table 1.2 indicates that

it has an estimated co-efficient of 3.19 which is significant at the 1% level. The change in recycling levels pre- and post- intervention in the INFO + INC treatment is 3.19 percentage points larger than the change in recycling levels pre- and post- intervention in the control schools. I cluster standard errors at the classroom level (grade-by-division-by-school) in columns (2) to (4) in table 1.2. In columns (3) and (4) demographic controls like age and gender of the students are added. Girls are 1.51 percentage points more likely to recycle and younger students are 2.84 percentage points more likely to recycle. Adding control variables and clustering the standard errors gives a revised co-efficient of 2.38 significant at the 5%. Additionally in column (4) I add school level fixed effects to the estimation. Adding school level FE does not further change the results.

Discussion on the assumptions for difference-in-difference estimation. It is important for the difference-in-difference estimation that the co-efficients of the terms INFO and INFO + INC are not significant. It is noteworthy that there is no significant difference in recycling levels between the two treatment groups and the control in my sample *before* the intervention kicks in. In fact, the recycling levels before the intervention of the treatments is statistically no different from zero. There are more periods pre-intervention than post-intervention in the data to credibly establish these parallel trends (as is a recommended best practice).

Moreover, I can credibly establish that the two treatments and control are similar not just in the levels of recycling but also in trends in recycling before the intervention. Figure 1.5 shows the graph plotting the average number of plastic carry bags recycled in the INFO treatment, INFO + INC treatment and the control group over time. The graph indicates that the average number of carry bags recycled is the same across treatment groups before the intervention.

Additionally, there are no spillover effects between the treatment and the control groups, as the randomization happens at the school level and thus, treatment schools are different from control schools. The whole data collection process lasted one school year and students did not drop out of one school and join another in my sample. The control variables like age and demographics are also orthogonal to the treatment interventions.

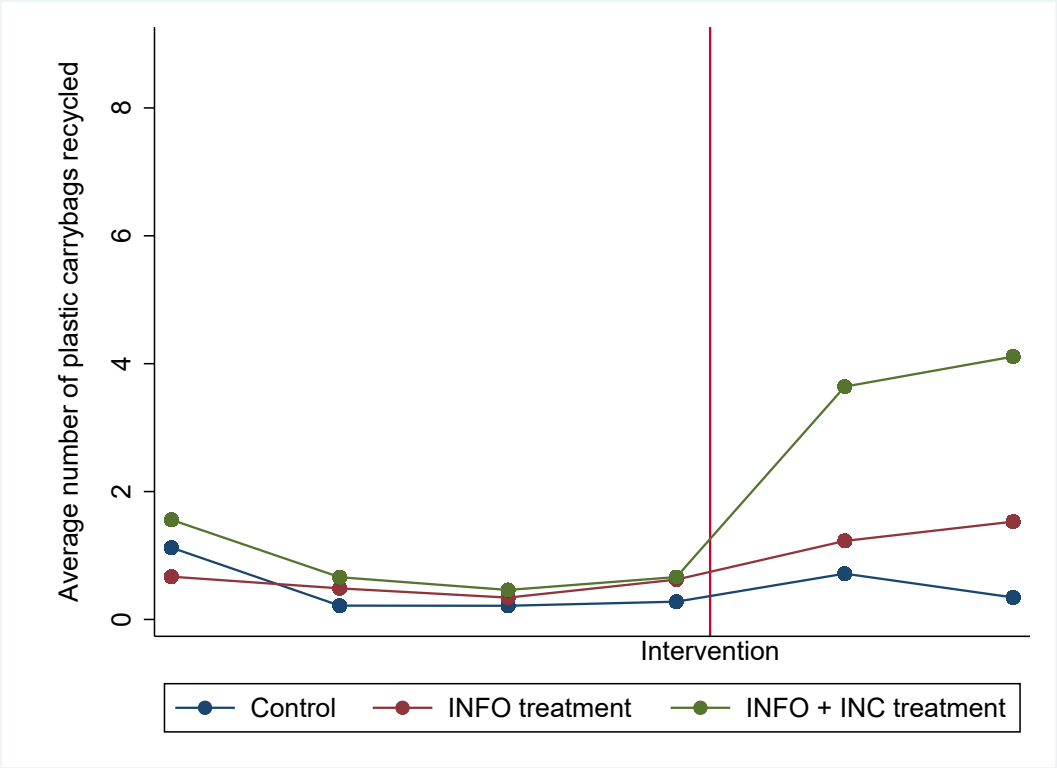
Table 1.2: Effect of treatments on recycling levels

	Number of single-use plastic bags recycled			
	Specification: DID			
	(1)	(2)	(3)	(4)
INFO * Post	1.094***	1.094	1.341	1.295
(Diff-in-Diff)	(0.325)	(0.759)	(1.049)	(1.035)
(INFO + INC) * Post	3.195***	3.195***	2.425**	2.388**
(Diff-in-Diff)	(0.500)	(1.155)	(1.145)	(1.135)
Post	-0.966***	-0.966	-0.943	-0.947
	(0.188)	(0.587)	(0.826)	(0.826)
INFO	-0.256	-0.256	-0.807	-0.873
	(0.191)	(0.663)	(0.990)	(0.995)
INFO + INC	0.150	0.150	0.271	0.534
	(0.190)	(0.600)	(0.801)	(0.729)
Controls	No	No	Yes	Yes
Clustering	No	Yes	Yes	Yes
School FE	No	No	No	Yes
Constant	1.497***	1.497***	25.90***	25.69***
	(0.164)	(0.553)	(7.577)	(7.468)
No. of Obs.	26050	26050	14118	14118
R-Squared	0.00493	0.00493	0.0129	0.0133

Note: Dependent variable in this estimation is the number of single use plastic bags that an individual student brings to recycle. INFO * Post and (INFO + INC) * Post are the Diff-in-diff variables of interest. They capture the effect of being in the respective treatments post the intervention. The variable post takes value 1 if the period is after intervention and 0 if period is before intervention. INFO indicates schools that are in the information treatment. The co-efficients for INFO is not statistically significant in the estimations indicating that the treatment is randomly distributed. Similarly, INFO+INC indicates schools that are in the information + incentive treatment. The co-efficients for INFO+INC is also not statistically significant. Ordinary least squares (OLS). Standard errors are clustered at the classroom level. Robust standard errors in parentheses.

*$p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Figure 1.5: Pre-trends in the recycling of single-use plastic bags



Note: The graph shows average number of plastic carry bags recycled by students every month. Blue dots indicate the control group, red dots indicate the INFO treatment, and green indicates INFO + INC treatment. Before the intervention, the average recycling levels are statistically the same in the three treatment groups and are not statistically different from 0.

Comparisons between the INFO treatment and the INFO + INC treatment shows that the change in recycling levels in INFO + INC treatment is significantly higher than the change in the INFO treatment. This indicates that the incentives drive the increase in the recycling levels. The results are presented in table 1.3. As column (3) indicates. the change in the recycling levels of students in the (INFO + INC) treatment is positive and is 1.66 percentage points larger than that of the INFO treatment.

Table 1.3: Treatment difference in recycling levels

	Number of single-use plastic bags recycled			
	Specification: DID			
	(1)	(2)	(3)	(4)
Baseline: INFO treatment				
(INFO + INC) * Post	2.101***	2.675**	1.660*	1.649*
	(0.533)	(1.067)	(0.853)	(0.851)
Controls	No	No	Yes	Yes
Clustering	No	Yes	Yes	Yes
School FE	No	No	No	Yes
No. of Obs.	17412	26050	14118	14118
R-Squared	0.00528	0.00466	0.0124	0.0128

Note: This table presents estimations using data from only the INFO treatment and (INFO + INC) treatment. Dependent variable in this estimation is the number of single use plastic bags that an individual student brings to recycle. (INFO + INC) * Post is the Diff-in-diff variables of interest. Ordinary least squares (OLS). Standard errors are clustered at the classroom level. Robust standard errors in parentheses.
*$p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The preceding analysis focused on the change in the number of carry bags that students recycle due to the interventions. An equally useful analysis is to look at the decision to recycle or not as a binary variable. The following analysis checks whether students participate in recycling or not and if their decision to participate is influenced by the treatment. As indicated in table 1.1 there is an increase in the number of students who recycle in the INFO + INC treatment post- intervention compared to pre- intervention. However these effects are not significant in the difference-in-difference estimation. Table 1.4 presents the estimation results. The analysis shows that neither of the treatments has an effect on the students' decision to participate in recycling. A closer look into

the recycling also shows that, the effects we identify in Result 1b are driven by a subset of "super-recycler" students (roughly 10% of the total population) who increase their recycling levels substantially in the INFO + INC treatment. Almost all the effect works through the intensive margin, where individuals who already brought some (albeit, very few) plastic items to recycle, after the intervention, significantly raise their recycling levels. There is no significant change in the remaining 90% of students who belong in the INFO + INC treatment.

Table 1.4: Effect of treatments on the decision to recycle

	Decision to recycle			
	Specification: DID			
	(1)	(2)	(3)	(4)
INFO * Post	0.0196***	0.0196	0.0317	0.0311
	(0.00705)	(0.0198)	(0.0225)	(0.0228)
(INFO + INC) * POST	0.00436	0.00436	-0.0126	-0.0130
	(0.00788)	(0.0220)	(0.0226)	(0.0227)
Controls	No	No	Yes	Yes
Clustering	No	Yes	Yes	Yes
School FE	No	No	No	Yes
No. of Obs.	17412	26050	14118	14118
R-Squared	0.00528	0.00466	0.0124	0.0128

Note: Dependent variable in this estimation is a binary variable that captures the student's decision to recycle or not. It takes value 1 if the student recycles and 0 otherwise. LPM. Standard errors are clustered at the classroom level. Robust standard errors in parentheses.

*$p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

1.4.2 On WTP for recycling plastics

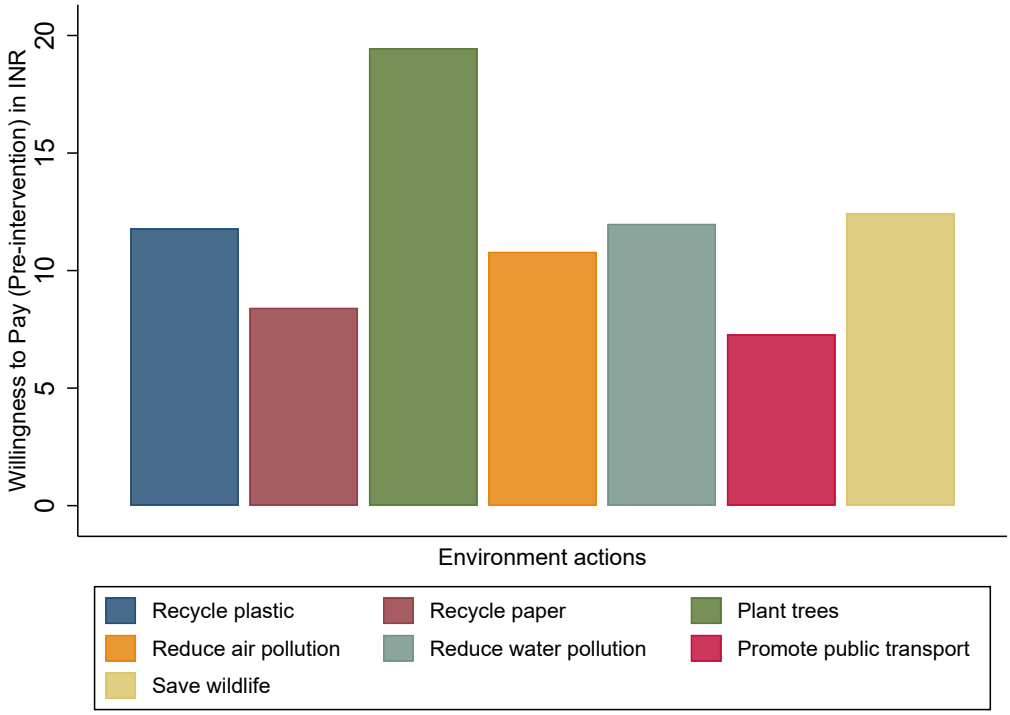
In this section I estimate the spillovers from the treatments to other environment behaviours as measured by the WTP for different activities in the lottery task. The spillover effects from treatment intervention to the WTPs are measured by checking the difference between pre- and post- WTP for an individual student i for each environment activity j ($\Delta WTP_{(i,j)}$) and if this difference varies systematically across treatments. The average WTP for each of the different activities before the intervention are shown in figure 1.6. The pre-intervention WTP ranges between 7.30 INR for promoting public transport to 19.50 INR for planting trees. Table 1.5 presents the average WTP for each of the activities across treatments before and after the interventions.

Table 1.5: Average WTP contributions (in INR)

	Pre-Intervention			Post-Intervention		
	Control	INFO	(INFO + INC)	Control	INFO	(INFO + INC)
Average contribution to WTP						
Recycle plastics	11.49	13.09	11.00	9.98	12.16	12.87
Recycle paper	8.41	9.37	7.62	8.04	9.30	10.03
Plant trees	19.61	22.25	18.24	15.59	16.85	18.95
Reduce air pollution	11.74	11.80	8.99	10.25	11.10	11.29
Reduce water pollution	12.34	12.46	11.24	11.46	11.88	12.87
Promote public transport	7.32	8.09	6.57	7.38	8.78	8.25
Save wildlife	13.24	12.62	11.47	11.07	12.28	12.32

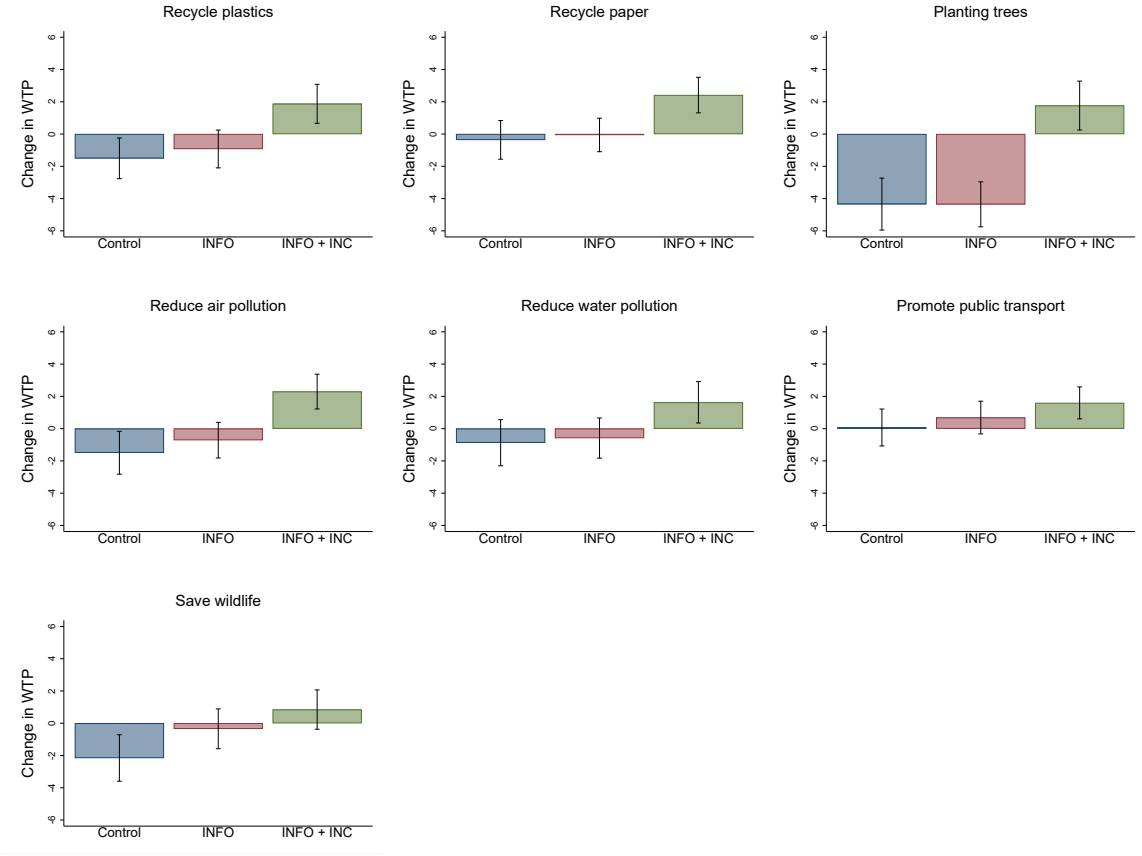
Figure 1.7 graphically shows how the change in WTP for each activity varies across the three treatments. For those students in the control, the WTP for every activity is lower in the post-intervention period compared to the pre-intervention. For those in the INFO treatment the WTP is also lower (or the same) for all the activities, but not as low as in the case of the Control. However, in the (INFO + INC) treatment, there is an increase in the WTP in the post intervention period. This increase is significant at the 95% level for all activities other than saving wildlife.

Figure 1.6: Pre-intervention Willingness To Pay for different environment actions



Note: The graph shows the willingness to pay for each of the environment activity before the interventions. This data is collected from the lottery task. The highest pre-intervention WTP is observed for planting trees (19.50 INR) and the lowest is seen for promoting public transport (7.30 INR)

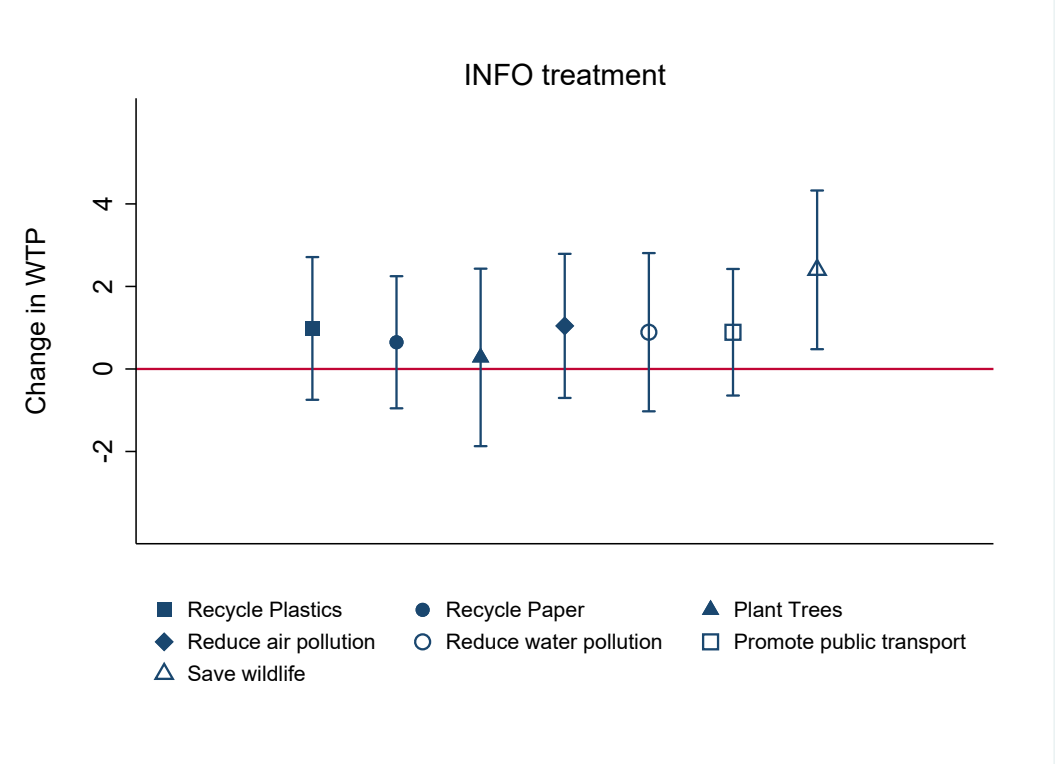
Figure 1.7: Change in the WTP Pre- and Post-intervention



Note: The figures indicate the change in the WTP (Post-intervention WTP − Pre-intervention WTP)

Figure 1.8 shows the effect of being in the INFO treatment on the change in WTP. The change in the WTP for each activity j pre- and post- intervention is not significantly different from 0, except for promoting efforts to save wildlife which sees an increase of 2.4 percentage points. There is no change in the other 6 environment activities. This indicates that students in this treatment on average contribute more or less the same in the pre-intervention and post-intervention lottery tasks and the difference between the contributions is not significantly different from those who are in the control schools. This finding is consistent with the earlier result that INFO treatment alone does not lead to an increase in recycling levels.

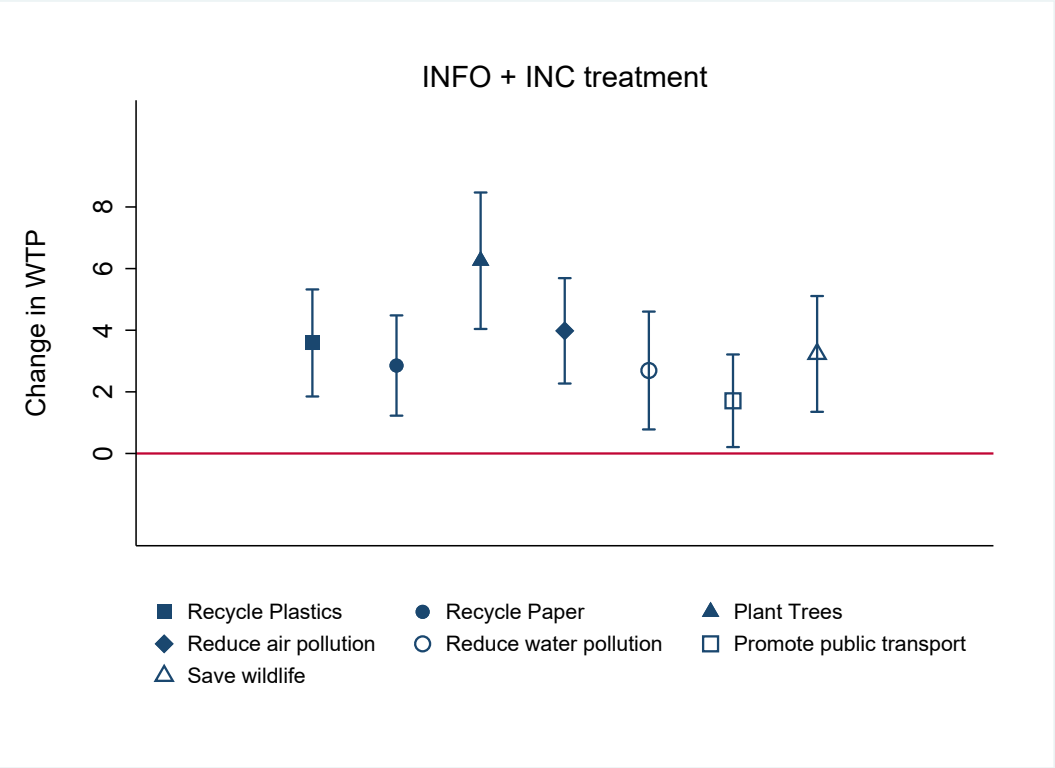
Figure 1.8: Change in the WTP in INFO treatment



Note: The figure shows the effect of the INFO treatment on the change in WTP for different environment activities. The plots show the coefficient estimates and 95% confidence intervals obtained from regressing the outcome variable (change in the WTP) on INFO treatment dummy. Coefficients are obtained from the regression estimation clustered at the classroom level, with all the control variables (same specification in table 1.6). Y-axis displays the outcome variable. The horizontal line at zero represents the control group. Here, the plots indicate that the change in WTP for environment actions of the students in the INFO treatment is not statistically different from that of the control, except in the case of saving wildlife.

INFO + INC treatment, on the other hand, spills over positively into all the seven environment activities. This indicates that students in this treatment on average contribute more in the post-intervention lottery task compared to the pre-intervention lottery task. Figure 1.9 shows that the change in WTPs for every activity j is positive and significantly different from 0 for the students in the INFO + INC treatment.

Figure 1.9: Change in the WTP in INFO + INC treatment



Note: The figure shows the effect of the INFO + INC treatment on the change in WTP for different environment activities. The plots show the coefficient estimates and 95% confidence intervals obtained from regressing the outcome variable (change in the WTP) on INFO + INC treatment dummy. Coefficients are obtained from the regression estimation clustered at the classroom level, with all the control variables (same specification in table 1.6). Y-axis displays the outcome variable. The horizontal line at zero represents the control group. Here, the plots indicate that students in the INFO + INC treatment have a positive and statistically significant change in the WTP for every environment action compared to the control. This indicates that students in this treatment increase their WTP for every environment action.

Table 1.6: WTP for different environment activities

	Dependent variable: $\Delta\, WTP_{ij}$						
	Plastic recycling	Paper recycling	Planting trees	Reduce air pollution	Reduce water pollution	Promote buses	Save wildlife
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Baseline: Control group							
INFO treatment	0.982	0.647	0.280	1.044	0.891	0.890	2.402**
	(0.882)	(0.817)	(1.097)	(0.891)	(0.978)	(0.782)	(0.981)
INFO + INC treatment	3.587***	2.854***	6.255***	3.980***	2.693***	1.711**	3.231***
	(0.886)	(0.830)	(1.129)	(0.872)	(0.975)	(0.766)	(0.958)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of Obs.	3255	3252	3254	3252	3255	3249	3254

Note: Dependent variable in this estimation the change in WTP for each of the environmental activities. Ordinary least squares (OLS). Standard errors are clustered at the classroom level. Robust standard errors in parentheses.

*$p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The regression results presented in table 1.6 confirm this finding. From the last section, we know that the INFO treatment does not change the recycling behaviour of students. Consistent with that, there is no change in the WTP for the environment activities for those students in the INFO treatment. The co-efficients are small and not statistically significant. The only exception is the 2.4 percentage point increase in contributions to saving wildlife, significant at the 5% level.

In contrast, those in the INFO + INC treatment considerably increase their contributions to *every* environment activity. The effect is highly significant ($p < 0.01$). There is a 3.58 pp increase in contributions to promoting plastic recycling, 2.85 pp increase in case of promoting paper recycling, 6.25 pp increase in planting trees, 3.98 pp increase in promoting reduction of air pollution, 2.69 pp increase in promoting reduction of water pollution, 1.71 pp increase in promoting public transport and 3.23 pp increase in contributions to saving wildlife. This analysis implies that when the

intervention is strong enough to induce a change in recycling behaviour, it spills over positively into the other dimensions of environment behaviours that we measure.

1.5 Mechanisms

In this section, I analyse, in detail, some of the mechanisms that possibly drive the effect of the treatments as well as the spillover effects.

1.5.1 Environment attitudes and awareness

One of the results from the earlier section is that the INFO treatment does not have an effect in increasing the recycling levels, whereas the INFO + INC treatment has a significant positive effect. This implies that providing information alone does not affect the behaviour. One of the possible reasons for this is that the levels of awareness about environmental issues and the need for recycling could already be quite high in the baseline, i.e., before any intervention. This would imply that individuals do not recycle not because they don't know that it is important to recycle, but for other reasons.

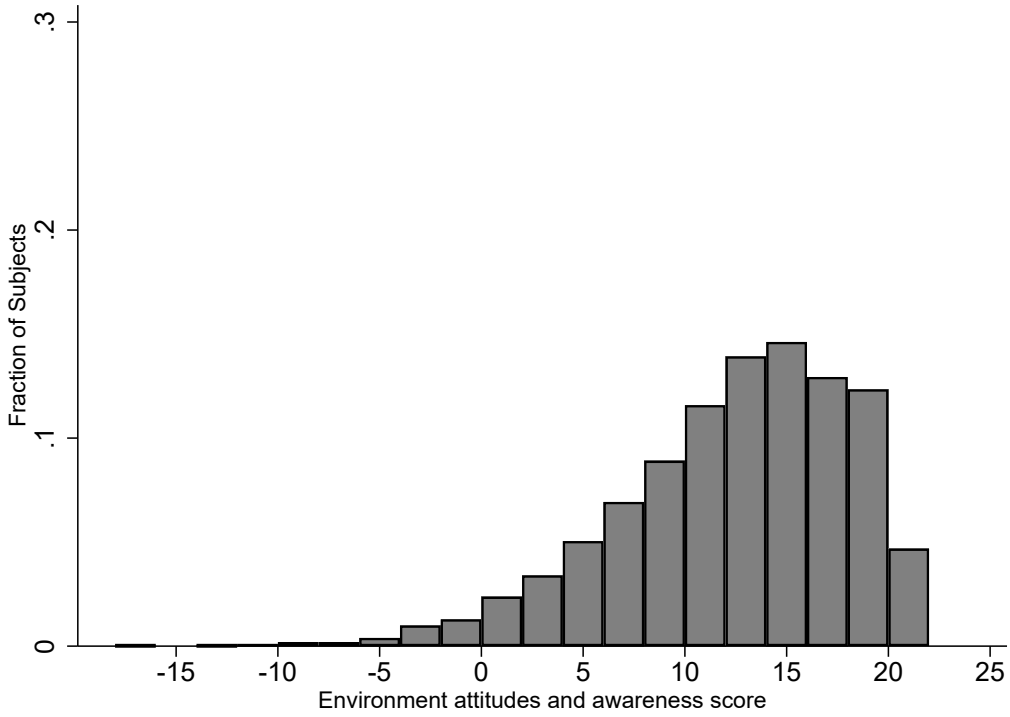
I check this using the data collected using the environment attitudes and awareness survey. The intrinsic link between environment attitudes and subsequent environment behaviours have been extensively documented (Gardner and Stern (1996), Hines et al. (1987)). The underlying principle is that those individuals who exhibit pro-environmental attitudes are more likely to engage in such behaviours, whether they are self-reported or observed. Hence measuring an individual's concern towards the environment is an essential first step in understanding pro-environment behaviours. The New Environmental Paradigm (NEP) scale developed by Dunlap and Van Liere (1978) is the most frequently used tool to measure attitudes towards the environment. I adapt the NEP survey along two dimensions. First, the survey is made age appropriate to suit young adolescents. Second, it is modified to fit the socio-cultural scenario of Kerala and its local environmental issues.

The survey covers beliefs and attitudes that the students have towards the quality of the environment, human actions and its consequences on the environment, and whether they

think that they can engage in activities that can improve the quality of the environment. The responses are made into an environment score – a higher score implies a higher awareness about the environmental issues and a positive attitude about contributing to improving environment quality. The survey is ran in June 2019, five months before the intervention, to collect baseline information on the awareness levels. Three months after the intervention, a simplified, yet similar survey is run among the students to get the post-intervention environmental score. The detailed survey design is in the appendix.

The main finding from the pre-intervention baseline survey is that majority of the respondents in our sample are aware about the threats due to environmental issues and exhibit a concern towards the environment. Figure 1.10 shows the graph plotting pre-intervention environment scores of students. The x-axis plots the environment scores and the y-axis indicates the percentage of respondents with the corresponding score. The figure illustrates that, students on average score on the top quartile of environment scores. This implies that students on average are highly aware about the issues regarding environment quality, suggesting that INFO treatment probably did not do anything to raise awareness levels.

Figure 1.10: Distribution of environment scores



Note: The graph shows the distribution of environment scores among the students. Environment scores are computed using survey data collected at the start of the study. Data is collected several months before the interventions are introduced. The survey is modelled along the New Environment Paradigm scores, and captures attitudes and awareness levels of the students towards environmental quality and the need to improve it.

1.5.2 Sources of spillovers

Behavioural (dis)similarity Truelove et al. (2014) claims that positive spillovers could be observed between environment activities that are behaviourally similar to each other and negative spillovers could be observed between those that are behaviourally dissimilar. Margetts and Kashima (2017) suggests two mechanisms behind spill overs between environment actions. A positive spillover is likely to occur (1) when the two behaviours complement each other in contributing to the final environmental goal and (2) when they use same type of resources. Thøgersen and Ölander (2003) reported that pro-environment behaviours within the same taxonomic categories (i.e., behaviours

similar in terms of the time and place of their performance, the resources employed, etc.) are more likely to be complements. Cornelissen et al. (2008) finds that when individuals are informed that different behaviours contribute to the final goal, more positive spillovers are observed.

The lottery task helps control for behavioural similarity and dissimilarity theories as explanations for substitutability or complementarity. There are different dimensions along which behaviours are similar or dissimilar. Similarity could be in terms of time and place of their action, or the resources required to do it or the type of the inherent activity itself. The list of activities that are used in the task neatly classify into behaviours that are relatively similar to recycle of single-use plastics (e.g. recycling paper) and those that are relatively dissimilar (e.g. planting trees). Our results indicate a consistent positive spillover from recycling plastic bags to WTP for different environment causes. These two however, are not behaviourally similar in terms of time or place of action or the resources required to do it. Moreover, the complementarity is observed between recycling and a wide array of environmental causes. However, it is to be kept in mind that the inherent activity in the lottery game could be simplified as a *contribution* to different causes. In this way, we are capturing spillovers between recycling and willingness to contribute to a pro-environmental cause.

Peer effects and social norms Individual actions are also influenced by the peer group and the change in behaviour could just be a reflection of changes in the peer norms surrounding environment activities in general and recycling in particular. This applies both in case of positive or negative spillover, depending on the direction of the norm change. More specifically, if the treatments change recycling behaviour, that could in turn change the social norms in the classrooms, not just on recycling, but also on environment actions in general. I elicit (non-incentivized) perceived classroom norms on recycling of single-use plastics and other environment activities (namely, littering, switching off electrical appliances after use including lights and fans, and use of single-use plastic cups and plates) among the peer groups using Krupke-Weber norm elicitation method (Krupka and Weber (2013)). The questionnaire for norm elicitation is also in the appendix.

I find no significant differences in norms regarding environment activities pre- and post- intervention across the treatments. However, across treatments, those students who recycle consistently, tend to believe, albeit mistakenly, that most of their peers also recycle (and act pro-environmentally in terms of not littering, switching off electrical appliances after use, and not using single-use plastic cups and plates).

Salience The interventions focus primarily on the recycling of single-use carry bags. Recycling is made very salient, and an increased salience of recycling could lead to students focusing all their energy on that in the lottery task at the expense of other pro-environment behaviours. However, the results do not indicate that students disproportionately favouring recycling of plastic or recycling of paper in the lottery task.

Intrinsic motivation and general pro-environment behavior Complementarity between recycling of single-use plastics and other environment activities could be an artifact of intrinsic motivation towards pro-environment activities. Intrinsic motivation is controlled through a composite measure of environment attitudes, beliefs and activities (details are presented in the appendix). A concern about social approval among subjects could also lead to an increase in several (or all) pro-environment behaviours. We control for this using the Marlowe-Crowne scale.

1.6 Conclusion

In this paper I use a field experiment to study the effects of two interventions aimed at increasing recycling levels on non-target environment behaviours. The objective is to measure if doing one pro-environment behaviour spills over positively or negatively into other environment behaviours. The paper brings together evidence from a randomized control trial, a lab experiment, administrative and survey data.

There are three major findings. Firstly, interventions in the form of information provision do not change recycling behaviour of the students. Secondly, providing incentives in addition to the information provision causes an increase in the recycling levels. Thirdly, there is a positive spillover from the incentive intervention to other environment behaviours. This indicates that the treatment resulted in increased

recycling as well as an increase in the students' willingness to pay for different environment activities, captured through a lab experiment. This indicates there are previously unaccounted benefits from the intervention resulting from complementarities in pro-environment behaviours.

1.7 Additional Materials

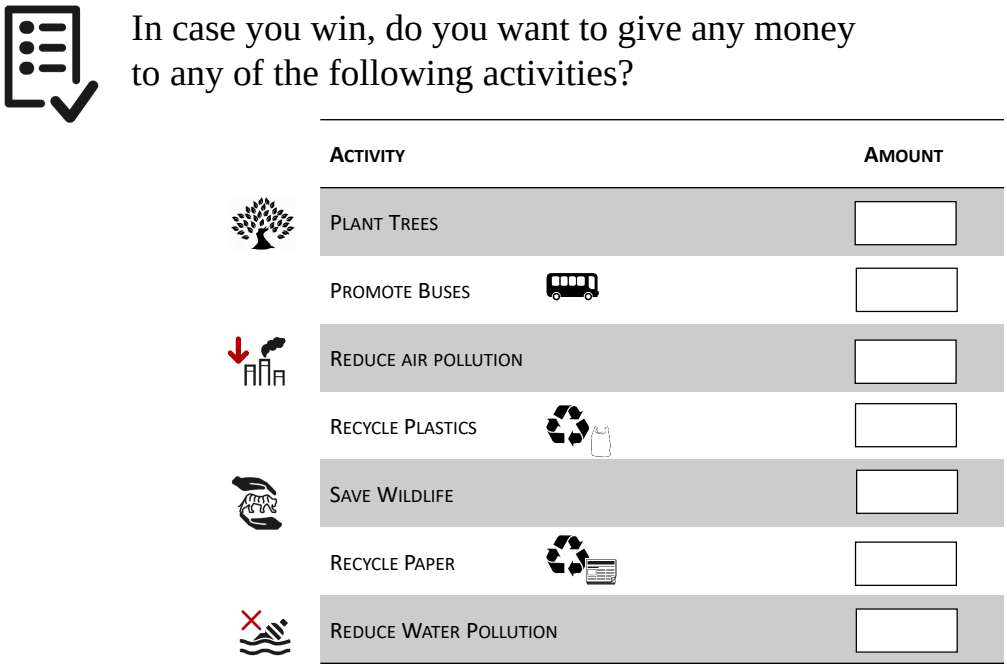
1.7.1 Appendix A1 - Posters for classrooms

Figure 1.11: Poster for INFO treatment

Figure 1.12: Poster for INFO + INC treatment

1.7.2 Appendix A2 - Elicitation of the Willingness To Pay

Figure 1.13: Template for collecting the WTP



Note: This is the template used to elicit the WTP for each of the activities before and after intervention.

1.7.3 Appendix B1 - Survey on environmental attitudes and behaviour

Hello and Welcome! Please take a few minutes to fill the survey. The data collected are for the sole purpose of scientific enquiry and will not be disclosed to third parties. Your participation in this research is voluntary. You are free to leave the survey anytime you wish so. Please tick I AGREE to begin the survey.

1. Below is a list of some items. Please indicate how you feel about each of them.

1.1 The Environment	Very worried Somewhat worried Not so worried Not at all worried
1.2 Climate Change	Very worried Somewhat worried Not so worried Not at all worried
1.3 Pollution	Very worried Somewhat worried Not so worried Not at all worried
1.4 Water resources running out	Very worried Somewhat worried Not so worried Not at all worried

2. Here are some statements about people and the environment. For each statement, please indicate whether you: strongly agree, agree, disagree, or strongly disagree.

2.1 We are reaching the limit of the number of people the earth can support.	Strongly agree Agree Disagree Strongly disagree
2.2 When humans interfere with nature it produces great damage.	Strongly agree Agree Disagree Strongly disagree
2.3 Plants and animals have the same right as humans to exist.	Strongly agree Agree Disagree Strongly disagree
2.4 If we keep going like this, there will be an environmental disaster.	Strongly agree Agree Disagree Strongly disagree
2.5 Humans deserve more natural resources than other species.	Strongly agree Agree Disagree Strongly disagree
2.6 We can protect the environment through our actions.	Strongly agree Agree Disagree Strongly disagree
2.7 In my opinion, many environmental issues are exaggerated by environmentalists.	Strongly agree Agree Disagree Strongly disagree
2.8 It worries me when I think about the environmental conditions in which I probably have to live in the future.	Strongly agree Agree Disagree Strongly disagree

3. Please tick the actions you do at your household.	Recycle newspapers/ other paper waste Recycle plastic waste Rainwater harvesting Separating recyclable waste at home Use solar panels/ heater Make compost from waste

5. Do you do any of the following?

5.1 Turn off all electrical appliances if I leave a room.	Yes No
5.2 Use hot water for showers.	Yes No
5.3 Use public transport/ shared transport/ school bus to come to school.	Yes No
5.4 Completely shut off electrical equipment and do not leave it in stand-by mode.	Yes No
5.5 Participate in environment friendly activities.	Yes No
6. Right now, do you think that you should act to improve the quality of the environment around you?	I already do Yes No
7. Do you consider actively participating in environmental conservation?	Yes No

Age Gender Name of School Class	

1.7.4 Appendix B2 - Survey data analysis

Most adolescents in India receive some form of environmental education in classrooms, either as a separate subject or as part of the general science curricula. However, other than being able to answer factual questions in the exam, whether this develops as a concern for environment is up for debate. While there is a well-established literature on the environmental attitudes among adults there are fewer studies among the youth, and none in the Indian context. Studies have shown that while really young children have an anthropocentric reasoning of the world, by around 11 years children develop an awareness about the potential of human actions to have negative effects on the environment (Evans et al. (2007)). In this survey we focus on the age group 13 - 14 years.

The New Environmental Paradigm (NEP) scale developed by Dunlap and Van Liere (1978) is the most frequently used tool measure attitudes towards the environment. This survey is modelled along the lines of the NEP scale. However, the questions are adapted along two dimensions – (1) they are modified to fit the socio-cultural and environmental issues of Kerala and (2) they are modified to be age appropriate (for a detailed discussion on the adapting survey measures for younger participants, see Evans (2019)). Most of the survey is measured in a Likert scale, where participants are asked to what degree they agree (or disagree) with each statement, and the different environmental activities they engage in.

The survey is divided into the following three distinct categories.

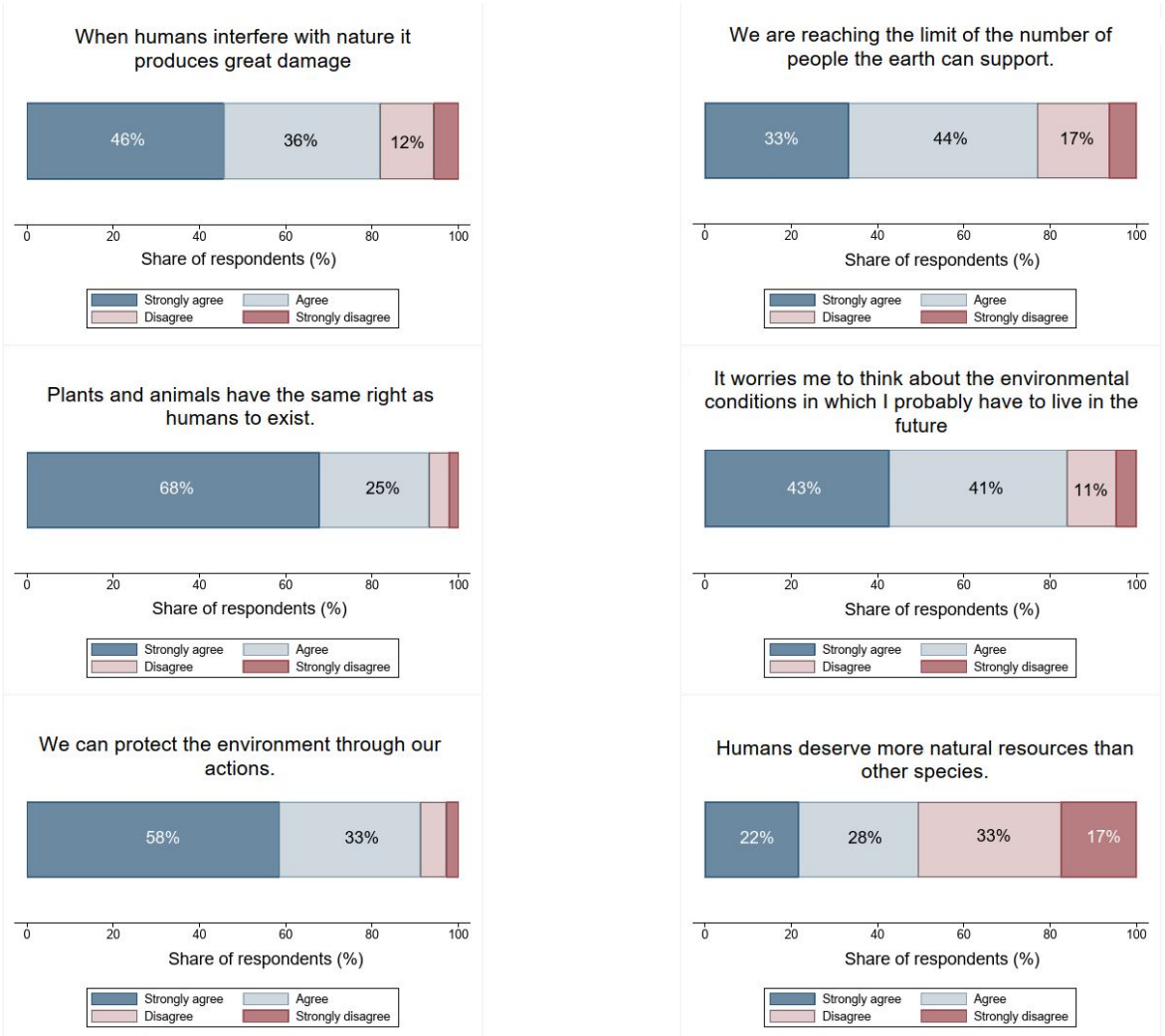
Environmental Beliefs

The objective of this section to measure the fundamental worldview that an individual shares about the environment and the human relationship with it. The focus is on gauging the opinions on human actions and consequences, human domination over nature and future consequences.

Broadly, majority of the respondents in the sample exhibit a concern towards the environment (figure 1.14). 82% of the respondent are in agreement (i.e. they say strongly agree or agree) that when humans interfere with nature it produces great damage and

77% agrees that we are reaching the limit of the number of people the earth can support. Likewise, support is high for plants and animals having the same rights as humans to exist (93%). Most of the respondents (84%) state that they worry about the environmental conditions in which they probably have to live in the future while 92% believes that they can protect the environment through our actions. However, 50% of the respondents do say that humans deserve more natural resources than other species.

Figure 1.14: Environment attitudes survey: Beliefs about the environment



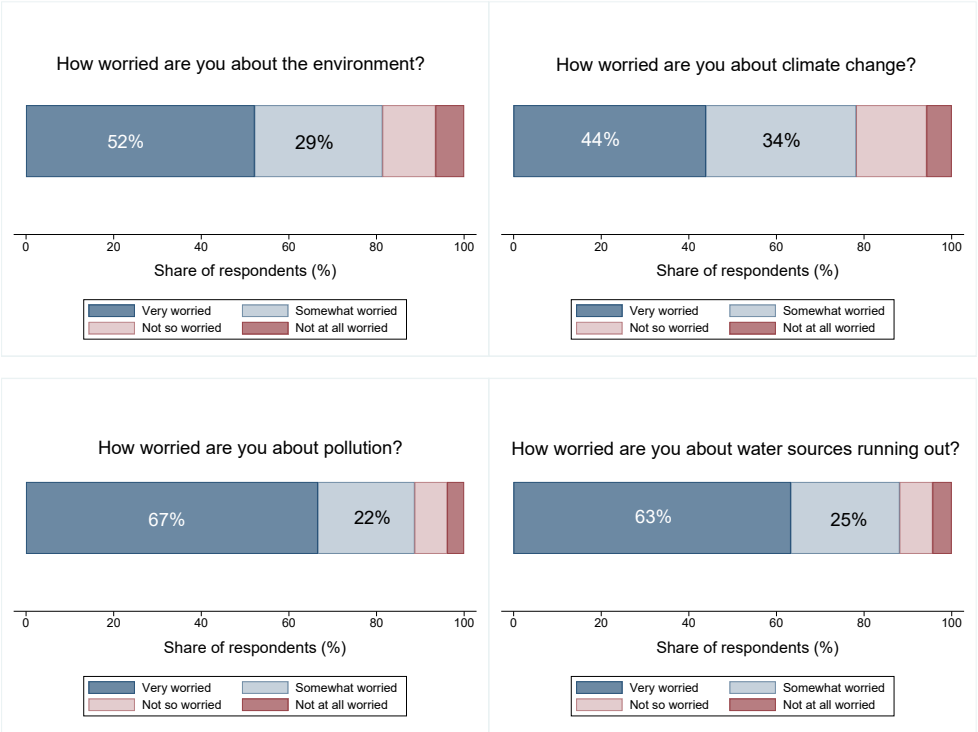
Note: The graph shows the degree to which students agree with the given statements.

Environmental Attitudes

Figure 1.15 describes how concerned the respondents are about (i) the environment, (ii) climate change, (iii) pollution, and (iv) water sources running out. Most of the students

respond either with 'very worried' or 'somewhat worried' to all four cases indicating a concern about the environment. In case of the environment 52% of the students are very worried and 29% are somewhat worried. On climate change 44% are very worried and 34% are somewhat worried. Pollution causes the most concern among the respondents with 67% very worried and 22% somewhat worried. In case of water resources running out 63% are very worried and 25% are somewhat worried. We also asked the students whether they think that right now they should act to improve the quality of the environment around you. 93% of the respondents reply yes, indicating very high awareness levels about the need to act to improve the environmental quality and the importance of doing it themselves.

Figure 1.15: Environment attitudes survey: Concern towards the environment



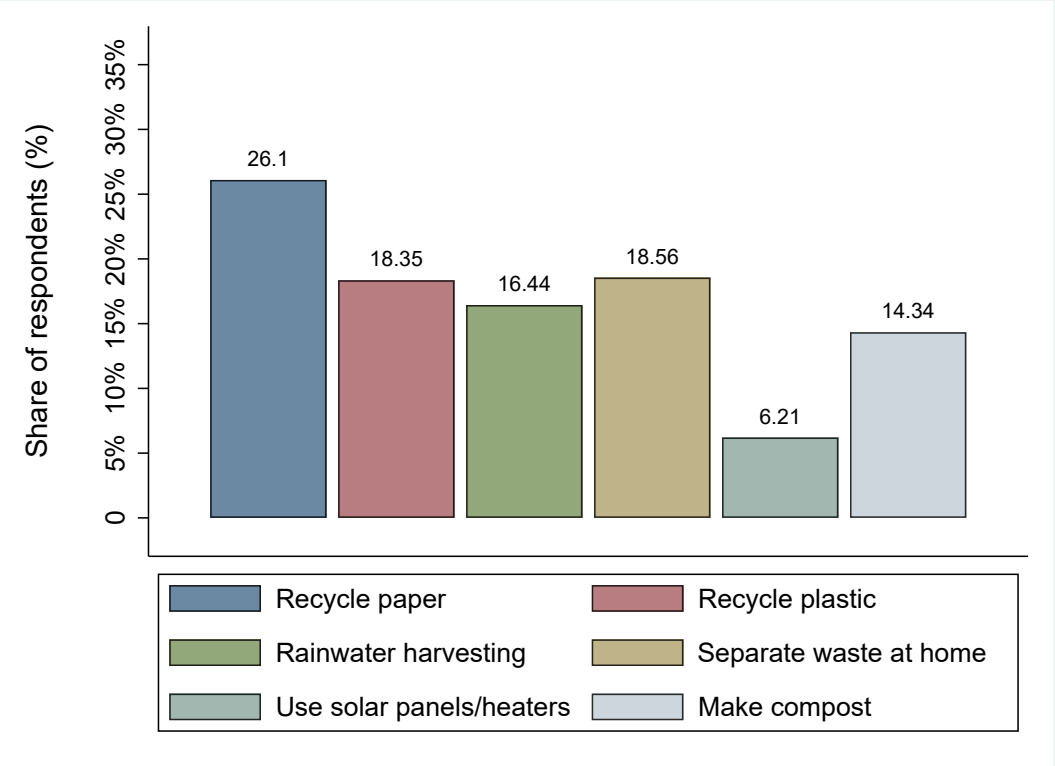
Note: The graph represents how concerned the respondents are about the environment, climate change, pollution, and water sources running out.

Environmental Behaviours

We now look at the environmental activities done at home. This is merely indicative of the different activities that the individual student does without saying anything about

whether they have any decision power to do or not do them as their parents or other members of the household could be the decision makers. As figure 1.16 shows most commonly done activities are recycling paper (26.10% of respondents do this) and separating recyclable waste at home (18.56%) and recycling plastic waste (18.35%).

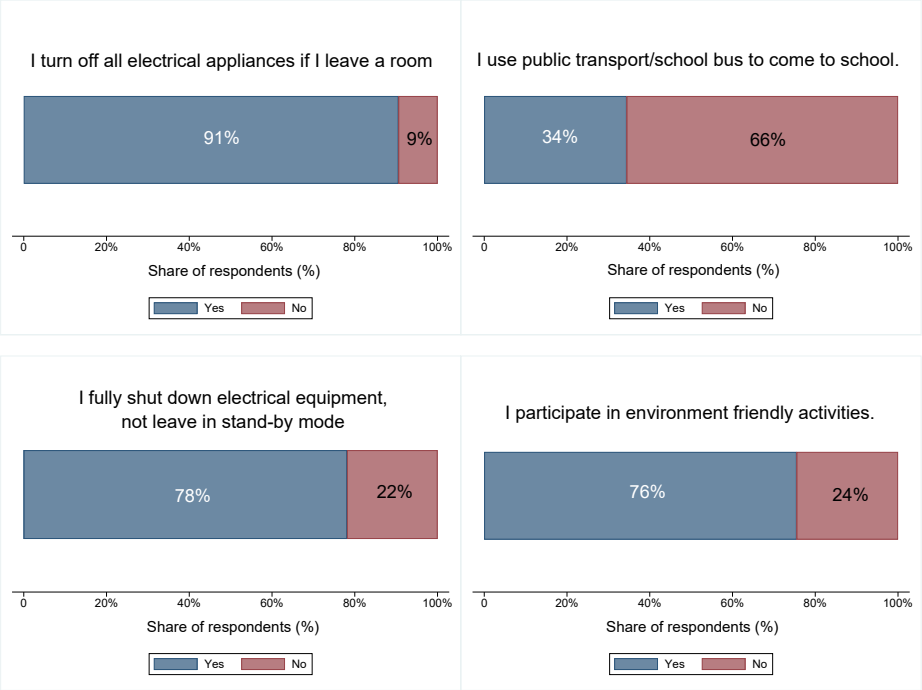
Figure 1.16: Environment activities done at home



Note: The graph shows the share of students engaged in each of the listed environment activities.

Figure 1.17 shows the response rates to some specific everyday activities. 91% of the respondents state that they turn off all electrical appliances while leaving room. Only 34% uses public or shared transport. This item needs to be interpreted with more nuance, as using public transport is also an issue of safety and environmental concerns are not usually the priority when deciding the mode of transportation. 78% of the respondents always shut down electrical equipment and 76% state that they participate in environment friendly activities.

Figure 1.17: Environment attitudes survey: Self reported activities



Note: The graph shows the share of respondents who engage in each of the listed activities.

Socio-demographic features

Among the respondents 1,567 students identify as female. Girls score on average 2.2 percentage points higher. We also collect data on household income and higher income is also correlated with higher pro-environment score. A part of this is driven by students from richer households engaging in more environmental actions at home, but is not entirely explained by it. Students with higher household income also exhibit more pro-environmentality in beliefs and attitudes consistent with existing literature.

1.7.5 Appendix B3 - Environment norm elicitation questionnaire

Questions on self-behaviour:	
1. Do you dispose garbage in a public place?	Yes No
2. Do you turn off all electrical appliances if you leave a room?	Yes No
3. Do you recycle plastic wastes?	Yes No
4. Do you use disposable plastic cups and plates?	Yes No

Questions on peer behaviour: According to you, how many of your classmates do the following:	
5. Throw garbage in a public place.	Almost all of my classmates Some of my classmates Not a lot of my classmates None of my classmates
6. Leave lights and fan on when they leave the room	Almost all of my classmates Some of my classmates Not a lot of my classmates None of my classmates
7. Recycle waste	Almost all of my classmates Some of my classmates Not a lot of my classmates None of my classmates
8. Use plastic cups/plates	Almost all of my classmates Some of my classmates Not a lot of my classmates None of my classmates

1.7.6 Appendix B4 - Social desirability score elicitation

I use the following questions based on the questionnaire developed by Crowne and Marlowe (1960) and Reynolds (1982) to compute the social desirability score for every student. For each question, students state whether they agree or disagree. The score is computed by adding up the socially desirable answers. A higher score indicates that the respondent is more likely to give socially desirable responses.

1. I am always polite, even to people who are disagreeable
2. I sometimes feel angry when I don't get the things I want.
3. I am always willing to admit it when I make a mistake
4. I was jealous of the good fortune of others in the past
5. No matter who I am talking to, I am always a good listener

Chapter 2

Why do we vote? Evidence on expressive voting.

2.1 Introduction

Why do people vote? Traditional theories of voting do not predict the turnout that we see in elections. Downs (1957) in his seminal contribution argued that a *rational* individual will abstain from voting because of the very low chance that her vote will change the outcome of the election. Given that the probability of an individual vote changing the outcome is very low and cost of voting is non-zero, why do we see the turnout that we see? The answer is that voters have reasons other than 'changing the outcome' (the instrumental motive) to go to the polls. The act of voting is meaningful in itself to individuals irrespective of the outcome of the election and their role in bringing about the said outcome. This type of voting behaviour is called expressive voting (Brennan and Buchanan (1984), Brennan and Hamlin (1998), Hillman (2010)).

This paper provides an overview of the different sources of expressive voting motives and quantifies their relative importance. We also measure how these expressive motives to vote are correlated with other dimensions of political expressiveness. The paper presents the results of a survey done using Amazon Mechanical Turk during April 2019. We classify respondents into expressive and non-expressive voters based on whether they say they will vote even if they know that they cannot change the election outcome. We then ask the expressive voters why they vote.

Respondents state that they value being part of the democratic process and it is one of the major reasons that take them to polls. Many respondents also state that they cannot complain about the elected candidates or the state of the government if they did not go to the polls themselves. Among racial minorities, a frequently expressed sentiment is that voting is a hard earned right that was denied to earlier generations. This is stated as one of the reasons that guides them to vote. The results also shed light into how these preferences relate to other expressive behaviours and possible political and non-political activities. Expressive voting is positively and significantly correlated to other dimensions of expressive behaviours like participating in protests, donating to political parties, and even posting political opinion online.

There is extensive literature on why individuals turn out to vote despite the low chances of affecting the election outcome. Most of it relates to the intrinsic value that the act of voting holds, separate from the outcome of voting. The most frequently highlighted reason is that voting is civic duty (Riker and Ordeshook (1968)). In public narratives, participating in the democratic process is the duty of a 'good citizen' and most individuals receive a positive utility from being one. Buchanan (1954) introduced the significance of a non-standard rational to voting, a line of reasoning leading to the theories of expressive voting, where individuals derive utility by expressing their preference (Tullock (1971), Fiorina (1976) Brennan and Buchanan (1984)).

Individuals often vote because it is the desired social norm and they receive a positive utility by signaling this to themselves and others. Gerber et al. (2008) ran large scale field experiments to find a significant increase in voter turnout when the voters received mails that promised to publicize their turnout to neighbors. Along similar lines, DellaVigna et al. (2016) finds evidence for social image concerns that take individuals to the polls. These concerns stem from individuals taking pride in telling others that they voted or feeling shame in telling others that they did not. Voting is often a way to signal one's values and identity to one self even in the absence of a social group (Hillman (2010)). Bryan et al. (2011) finds that using linguistic cues that emphasize self-perceptions increased interest in registering to vote. Additionally theories on procedural utility proposed by Frey et al. (2004) suggests that voters derive utility not

only from the outcome of their actions, but also in performing the action. Participation in elections could be valuable in itself because it gives utility from a feeling of self-determination and influence. People also turn out to partake in election events, festivities and celebration, as an outing, and to be part of the community according to Addonizio et al. (2007). This goes hand in hand to the way elections are covered in media drawing parallels to a competition or a sports event.

Once voters are at the polling booth, they still have to choose between the different options on the ballot. Expressing gratitude or dissatisfaction to a particular candidate can aid the decision between the different options available (Fiorina (1976), Brennan and Buchanan (1984)). Other reasons such as joy of supporting the winning team, bandwagon effects, underdog effects, protest vote, etc., have been identified as reasons to choose between the available options on the ballot (Simon (1954)).

Expressive voting is often presented in contrast to instrumental voting where a voter votes to bring about a particular outcome. Brennan and Lomasky (1997) introduced the low cost theory of expressive voting where individuals trade off the instrumental and expressive motives. In this theory, the expressive motives become relevant when the instrumental reasons to vote start to wane due to low probability of being pivotal in the election outcome. Tyran (2004) presents an overview of evidence for low cost theories of expressive voting from laboratory experiments. One of the challenges in disentangling expressive and instrumental motives is that they coincide with each other, more often than not. Johnson et al. (1975), for example, argued that expressiveness is not the opposite of instrumentality but a separate independent dimension.

Voting is one of the main manifestations of political expressiveness but often is not the only one. Van Stekelenburg and Klandermans (2013) look at why people participate in protests, which is another form of political expressiveness albeit with possibly higher costs. Self and social image considerations and ideological reasons are significant in leading people to protests. A sense of efficacy and belief in causing change contributes to protest participation. Other dimensions include signing petitions, putting up lawn signs, and donating to political parties. Copeland and Laband (2002) find positive correlation between donating to the US Federal Election Commission and the propensity to vote.

The widespread use of social media offers another low cost option of posting political opinions online. Each of these vary in their costs and have different end goals, which are not necessarily aimed at getting the political party/candidate you support to win. However, each of these are potentially correlated with voting in general, and expressive voting in particular.

This paper contributes to the literature by building a comprehensive portfolio of the expressive voting motives and quantifying their relative importance. The paper also provides evidence on how expressive voting correlates with various measures of political expressiveness and civic responsibility. The rest of the paper is organized as follows: the next section covers the survey design, section 2.3 presents the results and section 2.4 concludes.

2.2 Survey Design

Participants The data for the study was collected using an internet survey of a sample of 2,000 individuals. The survey was administered using Amazon Mechanical Turk during April 2019 and the participants were compensated at a flat rate for participation. All the respondents were from the US. The questionnaire was designed and implemented using Qualtrics. The study was approved by the Ethics committee of the Department of Economics, at the University of Munich in 2018.

Questionnaire The survey questionnaire was organized into the following three groups to capture the factors that affect expressive voting behaviour.

1. Expressive voting motives
2. Political expressiveness
3. Demography and individual political preferences

Expressive voting motives Most voters are driven by a desire to change the election results whereas some turn out because they over-estimate their probability of changing the outcome. To distinguish these voters from those who turn out due to expressive reasons, we ask the respondents if they will go to vote if the anticipated election result is

very clear and that they know their vote will not change the outcome. The respondents who say 'yes' to the above question are classified as expressive voters. The respondents who say "maybe" or "no" are classified as non-expressive voters. The main exploratory analysis focuses on the different motivations individuals have in voting when they know that their individual votes do not change the outcome. Existing literature has made excellent progress in identifying many motives to vote expressively. We include the most significant ones in subsequent follow up questions to understand the different relative importance of one motivation over the others. We also added an open-ended question in the end where respondents can tell us their reason to go to the polls.

Going to the polls is often characterized as a responsibility of a 'good citizen'. Individuals try to project themselves as 'good citizens' to themselves and to others albeit to varying degrees. While being a good citizen involves voting, it is not the only activity that falls under it. Interpretations of civic duty also involve following rules and laws and paying taxes (Frey (1997a), Frey (1997b), Orviska and Hudson (2003)). We aim to use the variation in the degree to which individuals value other expressions of being a good citizen. We collect data on respondents attitudes towards paying taxes, following traffic rules, and other dimensions of civic duty.

Political expressiveness Brennan and Lomasky (1997) famously compared voting to cheering for a sports team. Voting in this context is an expression of support. Political expressive behaviours are not limited to voting alone. Taking to the streets to protest or strike or sharing political opinions on social media fall under the larger umbrella of expressive behaviour. We identified a list of such activities that vary in costs that are correlated with voting behaviour. However, we remain agnostic on the direction of relationship between these actions and voting. The list includes donations to any political parties, participation in strike, protest, march, or demonstrations, writing / calling / getting in touch with elected representatives / public officials, signing a petition, posting / sharing a political opinion on Facebook / Twitter / other social media platform and boycotting or buying a product for ethical reasons.

Memberships in social or political groups as well as organizational affiliations are also indicative of expressive behaviours. We collect data on membership in different kinds

of groups or associations including political parties, trade unions, and professional or religious affiliation.

Demography and individual political preferences The control variables collected in this survey include age, race, gender, education, income, orientation in left-right political spectrum, whether individuals identified as Republican or Democrat and whether they were registered with either of the parties. The survey also included questions on whether the individuals agreed with the statements 'going to vote is a lot of effort' and 'citizens have the right *not* to vote'. We also asked how strongly they held their ethical views and if they knew whether their parents voted (and if they did, for which political party/candidate they voted). The full survey questionnaire can be found in the appendix.

2.3 Results

The survey was conducted on Amazon Mechanical Turk and was answered by 2000 individuals in the United States. The respondents received a small flat payment for their time. 49% of the respondents identified as women and 84% as white. Table 2.1 presents the descriptive statistics.

Table 2.1: Descriptive Statistics

Variables		
Gender	N	Percentage
Female	987	48.93
Male	1,025	50.82
Other	5	0.25
Age	Mean	SD
	42	12.33
Race	N	Percentage
White	1,684	83.49
African American	129	6.4
Asian American	112	5.5
Others	92	4.61
Political identification	N	Percentage
Democrat	898	44.52
Independent	542	26.87
Republican	492	24.39
No preference	49	2.43
Other	36	1.78

Notes: Table based on 2,000 survey respondents.

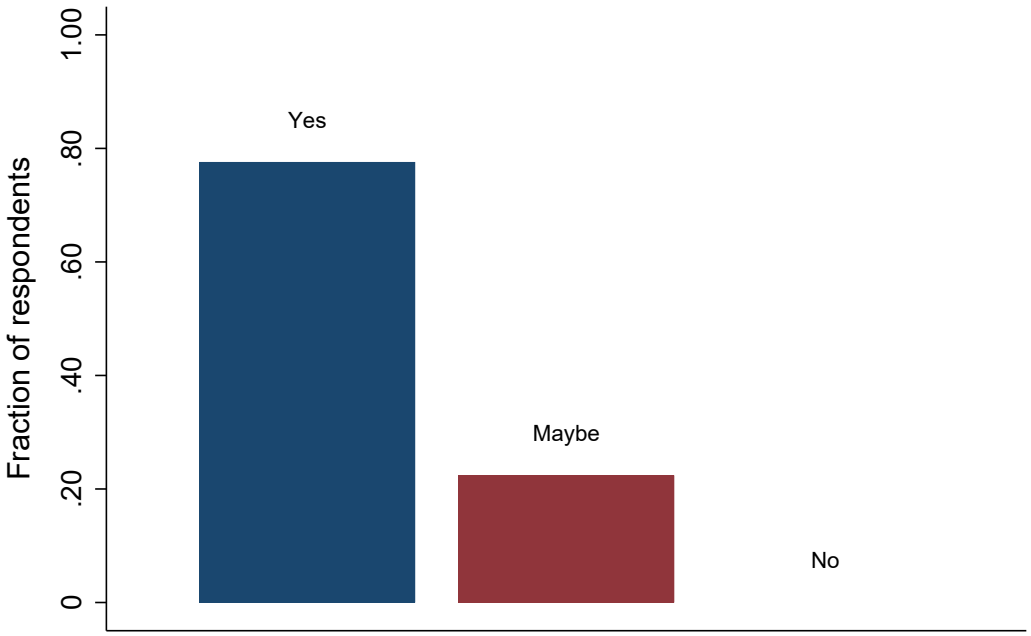
2.3.1 Main expressive voting motives

Our analysis focuses mainly on those individuals who state that they would vote even if they knew for sure that their vote will not change the outcome. Subject who vote 'yes' to the following question are considered as expressive voters for the rest of the analysis.

Suppose the anticipated electoral outcome is very clear and you expect that your vote will not be decisive in that outcome. Would you still go to vote?

Figure 2.2 presents the result. 78% of the respondents are expressive voters and 22% respond with 'maybe'. None of the respondents say 'no' to this question despite the survey being anonymous. This points to strong social norms and expectations regarding turning out to vote. Of course, this is different to the actual turnout as it is costlier than clicking a button. However, rather than the percentage of people who state they would turn out, we focus on the different expressive motives and their relative importance in the minds of those who vote despite being non-pivotal in the outcome.

Figure 2.1: Share of respondents who vote expressively

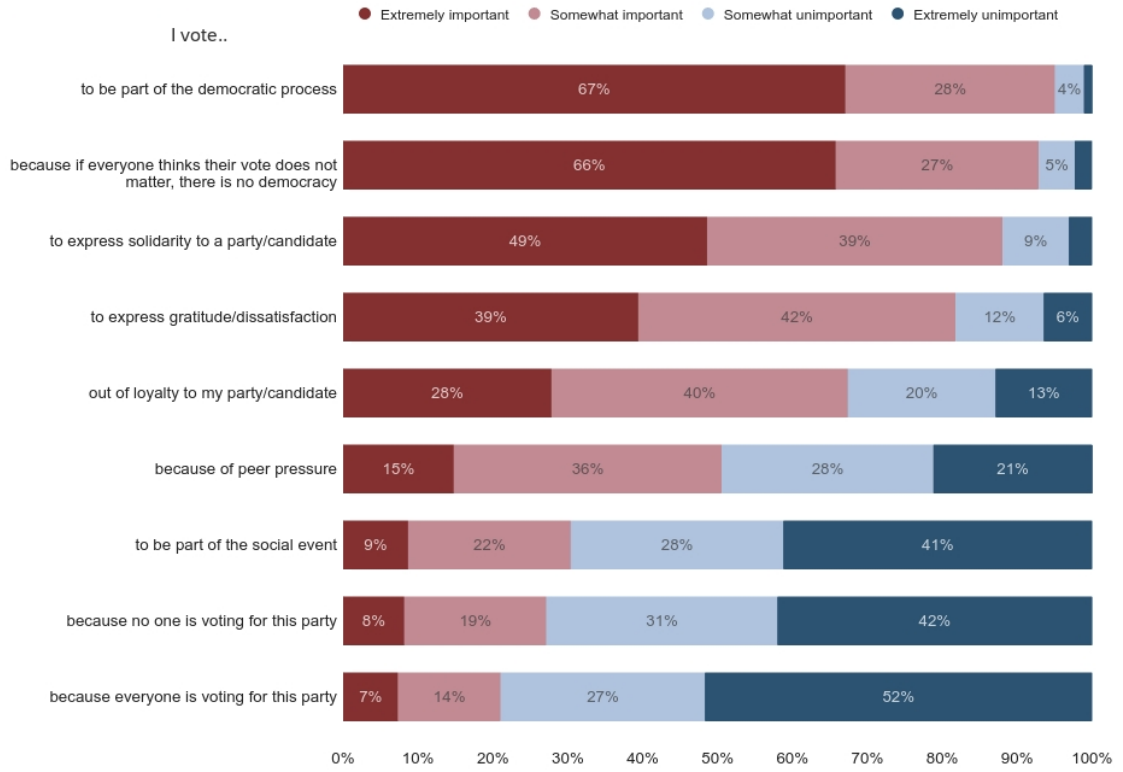


Note: The figure shows the share of respondents who state they would vote even if they cannot change the outcome. 78% of the respondents state that they would vote, 22% state 'maybe' and none of the respondents state that they would not vote.

Next we turn to identifying the relative importance of various expressive motives. We ask the follow up questions to those respondents who state they would vote despite not being able to change the outcome. Respondents answer on a four point Likert scale how important the below reasons are for them in their decision to go to the polls. The order in which these reasons were presented to the respondents were randomized (here they are displayed in the order in which it appears in figure 2.2.

1. I vote because I would like to be part of the democratic process.
2. I know that my single vote is very unlikely to make a difference. But if everyone thinks like this and does not vote, it would be the end of democracy.
3. I vote to express my solidarity to the policy positions of the particular party/ candidate.
4. I want to use my vote to express gratitude for good performance or to express dissatisfaction for bad performance of the incumbent.
5. I see voting as an act of loyalty to my party/ candidate and gives me satisfaction to vote for my party/candidate.
6. After the elections I talk to my friends and colleagues about the elections and whether I voted.
7. Voting is similar to a social event and I want to be part of the event. It is fun to go out and vote.
8. I wanted to vote because I feel that no one is voting for this particular party/ candidate.
9. I wanted to vote because I feel that everyone is voting for this particular party/ candidate.

Figure 2.2: Expressive voting motives and their relative importance



Note: The figure shows the share of respondents who considers each of the motives as important or unimportant. Largest number of respondents consider being part of the democratic process important, followed by the belief that if everyone stayed away from election there would be no democracy.

The results are presented in figure 2.2. 67% of the respondents turn out to vote because they find being part of the democratic process extremely important and 28% find it somewhat important. This evidence is in line with the procedural utility arguments that claim that individuals receive utility from participating in the act of voting irrespective of the outcome Frey et al. (2004). The theory suggests that individuals care not just about the outcomes but also the procedures that lead to said outcomes. There is a non-instrumental benefit to people from going to the polls that is beyond the instrumental benefit of deciding the winner.

The next motive that most of the respondents consider important is the belief that 'if everyone thinks their vote does not matter and abstain, there is no democracy'. 66% of the respondents consider this reasoning as extremely important in their decision to turn out and 27% consider this somewhat important. This kind of rationale also signals to the idea of voting as a group responsibility. The situation is likened to group of individuals (here an electorate of voters) trying to jointly do an activity (here elect a representative) and the individual decision is whether to join the group or not, as mentioned in Maskivker (2019).

The third reasoning that most people consider important is expressing solidarity to a party or candidate. 49% and 39% of the respondents consider this extremely important and somewhat important respectively. This is followed by expressing gratitude for good performance or to express dissatisfaction for bad performance of the incumbent (39% and 42% saying extremely important and somewhat important respectively) and viewing voting as an act of loyalty to a party/ candidate (28% saying extremely important and 40% saying somewhat important).

Most respondents in our survey do not claim peer pressure as a reason for turning out to vote. Similarly voting for the underdog or jumping on the bandwagon of a popular candidate are also stated as unimportant.

We also gave the respondents an option to type in any other reasons that are important in taking them to the polls in addition to the ones we specifically ask for. This was an open ended question. We use text analysis to study the responses to this question. Figure

2.3 represents a word cloud with the most frequently words that appear in the answers of the respondents.

Figure 2.3: Word cloud: Text analysis of the open-ended responses

Note: Visualization of the most frequently used words of the respondents on why they vote even when the chances of changing the outcome is very low. Larger the size of the word, the more people mentioned it in their responses.

Unsurprisingly, the most frequently occurring word is '*duty*'. Voting as a paramount civic duty features prominently in the literature since Riker and Ordeshook (1968). The word '*citizen*' and '*civic*' are the next frequently used, mostly in combination with '*duty*'. '*Complain*' is a word that is fifth most frequently used. '*You cannot complain if you did not vote*' is stated as a reason that takes people to the polls. A similar sentiment was shared by the former President of the United States Barack Obama in his speech at the Democratic National Convention in 2016 as "*don't boo, vote*". Individuals often find the need to legitimize stating political opinions and criticisms of existing elected leaders by the act of going to the polls.

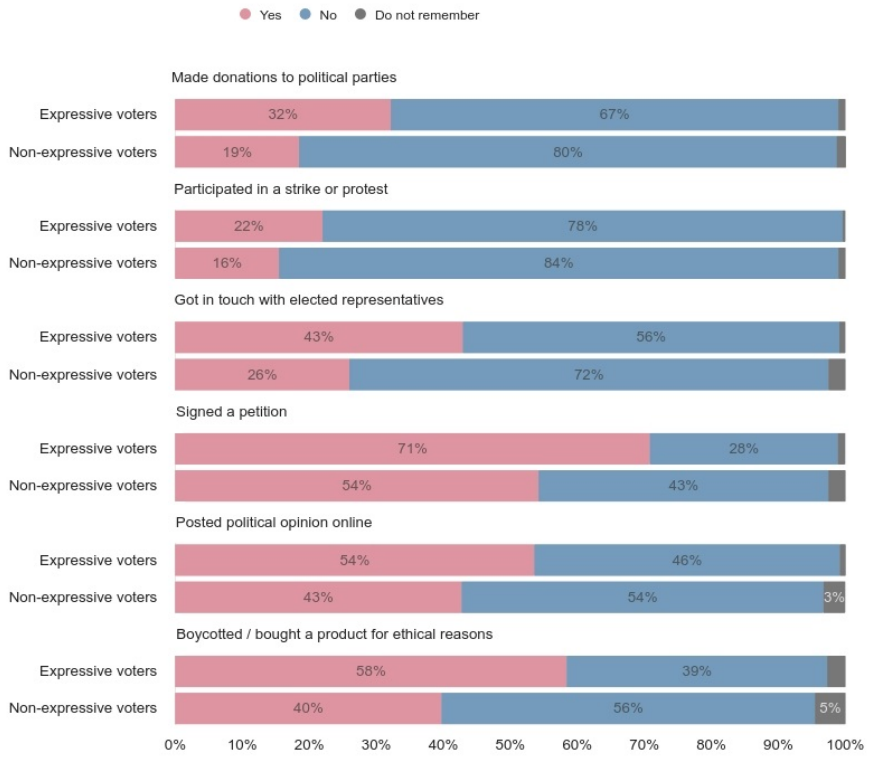
Another word that comes up most frequently is '*fought*'. This is in the context of '*others have fought for this right of mine*'. The word '*die*' also comes up in similar context (e.g., '*many people died for my right to vote*'), so does the word '*privilege*'. Among African American respondents the words '*die*' and '*ancestors*' are the most frequently used words. The context in which the latter appear is '*my ancestors fought for me to have this right*' or '*my ancestors did not have this right*'. It is interesting to note that these two words feature even before the word '*duty*'. For women, the most frequently used words in order are: '*duty*', '*citizen*', '*fought*', '*complain*', and '*civic*'.

2.3.2 Expressive voting and other expressive behaviours

Figure 2.4 shows the differences in expressive behaviours between those who vote expressively and those who do not. Consider the top set of the bar graph, that shows donations to political parties. The top bar indicates those who vote expressively and the bottom bar indicates those who do not. 32% of expressive voters say they have donated to political parties compared to 19% of those who do not vote expressively. This pattern is repeated across different other expressive behaviours - those who vote expressively are more likely to engage in other expressive behaviour compared to those who do not vote expressively.

In case of participation in a strike, protest, march, or demonstration, 22% of expressive voters and 16% of non-expressive voters say they have participated in at least one strike, protest, march, or demonstration in the past. Additionally, 54% of expressive voters say they have made a political post in online social media compared to 43% of non-expressive voters; 71% of expressive voters say they have signed a petition in the past compared to 54% of non-expressive voters; 43% of expressive voters say they got in touch with their elected representatives over phone call, email, post, or directly, compared to 26% of non-expressive voters; and 55% expressive voters say they boycotted or bought a product for ethical reasons compared to 40% of non-expressive voters. This shows that voting expressively is positively correlated with other politically expressive behaviours.

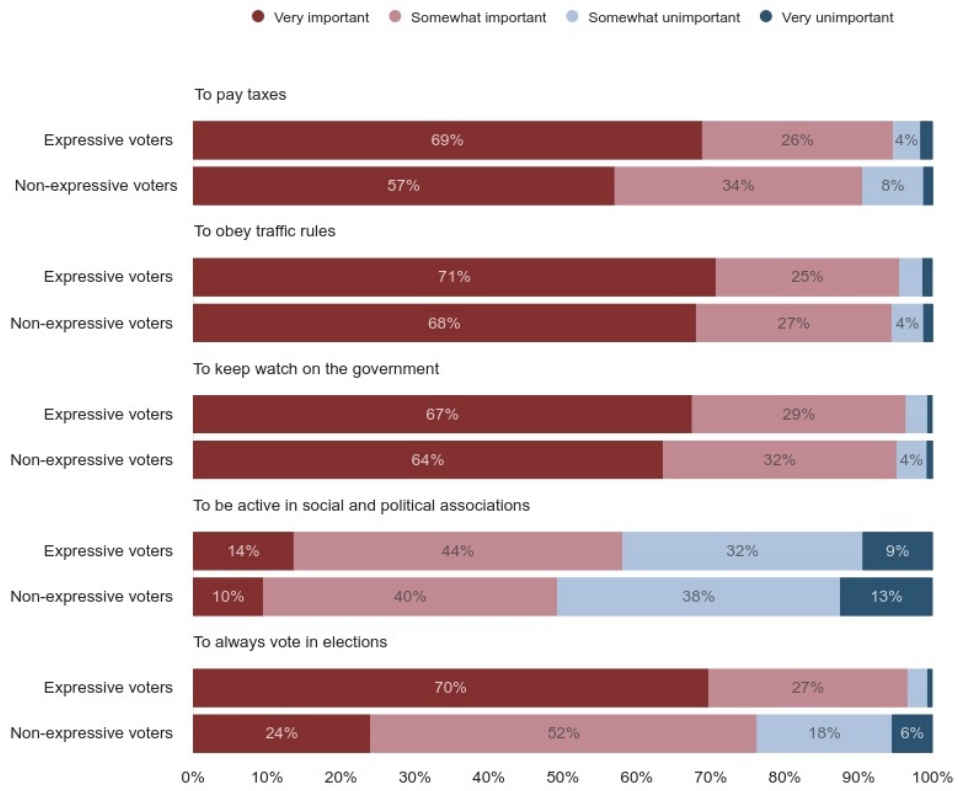
Figure 2.4: Expressive voting and other political expressive behaviours



Note: The graph presents the relationship between expressive voting and other political expressive behaviours. The x-axis shows the share of respondents who engage in each of the activities. Y-axis categorizes them into expressive and non-expressive voters. The figure shows that more expressive voters engage in political expressive behaviours compared to non-expressive voters.

Expressive and non-expressive voters also differ on the questions relating to being a 'good citizen'. Figure 2.5 represents the results. When it comes to paying taxes 69% of expressive voters consider it very important compared to 57% of non-expressive voters. In case of obeying traffic rules the difference is not significant between expressive voters and non-expressive voters. 71% of expressive voters consider it very important to obey traffic rules, when a very similar 68% of the non-expressive voters think so too. More expressive voters than non-expressive voters find it important to keep a close watch on the actions of the government (67% vs 64%) and being active in social and political associations (14% vs 10%). 70% of expressive voters consider it very important to always vote in elections compared to 24% of non-expressive voters.

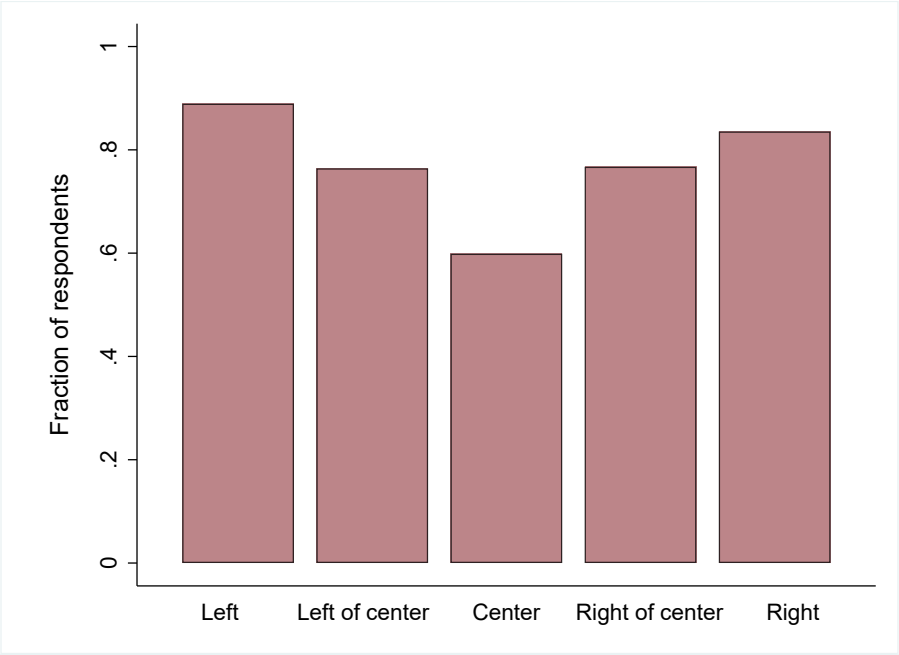
Figure 2.5: Expressive voting and other dimensions of being a good citizen



Note: The graph presents the relationship between expressive voting and other dimensions of being a good citizen. The x-axis shows the share of respondents. Y-axis categorizes them into expressive and non-expressive voters. The figure shows that more expressive voters also tend to consider it very important to pay taxes, to obey traffic rules, and other dimensions of perceived good citizenship.

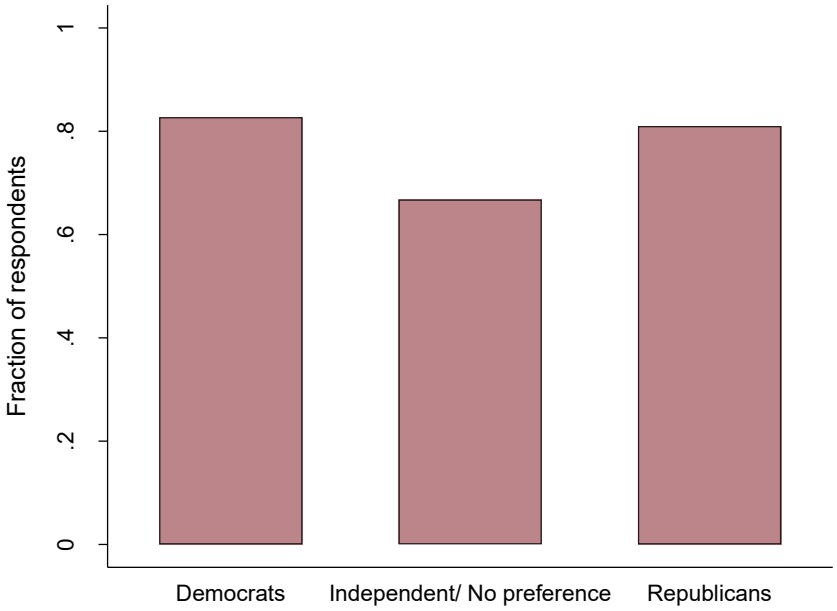
Analysing the correlations between expressive voting and the stated political orientation in the left - right spectrum, we see that respondents who place themselves in the left or right of the political spectrum are more likely to state that they vote expressively than those respondents who place themselves at the center of the spectrum (figure 2.6). A similar pattern is seen in party affiliation, where respondents who are affiliated with the Democratic or Republican party state that they vote expressively than those who are not affiliated with either of the parties (figure 2.7).

Figure 2.6: Expressive voting and political orientation



Note: The figure presents the fraction of expressive voters conditional on the respondent's stated political orientation in the left - right spectrum.

Figure 2.7: Expressive voting and party affiliation



Note: The figure presents the fraction of expressive voters conditional on the respondent's stated party affiliation.

2.3.3 Expressive voting and demographic features

Extensive research into voting patterns over decades have shown that individuals with more years of formal education are more likely to vote. Similar patterns are seen in the case of incomes, with wealthier people voting at higher rates. Individuals are also more likely to vote as they get older. An overview of the existing research on demographic characteristics and voter turnout can be found in Harder and Krosnick (2008).

The evidence for expressive voting also mirrors these patterns. Table 2.2 presents the relationship between answering 'yes' to voting even when the vote will not be decisive in the outcome and different demographic characteristics. Those belonging to racial minorities are significantly less likely to vote expressively (11 percentage points). Being female does not have a significant effect. Those with higher incomes and education levels are more likely to vote expressively (1.39 percentage points and 1.70 percentage points, respectively). Age is also positively and significantly related to voting expressively (.37 percentage points)

Table 2.2: Expressive voting and demographic characteristics

	Expressive voting
Racial minority	-0.109***
	(0.0286)
Gender = female	-0.0110
	(0.0196)
Income	0.0139***
	(0.00339)
Education	0.0170**
	(0.00764)
Age	0.00376***
	(0.000788)
Constant	-6.817***
	(1.561)
No. of Obs.	1787
R-Squared	0.0384

The dependent variable expressive voting takes the value 1 if the respondent votes even when they know that their vote will not be decisive. It takes the value 0 otherwise. Racial minority variable takes value 0 if the respondent is white and 1 if non-white. Gender takes value 1 if respondent is female. Income is an ordinal variable which takes values 1 to 12 (1 if annual household income is less that 10,000 USD and 12 if it is more than 150,000 USD). Education is an ordinal variable which takes value 1 if respondent has less than a high school degree, and higher values for higher degrees.

Linear Probability Model. Standard errors in parentheses.

*$p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

2.4 Conclusion

This paper explores the different motives that individuals have to vote even when they know that their vote has very low chance of affecting the election outcome. Most of the motives that come up are interrelated - blurring boundaries between each, making it hard to categorize each of them into different water tight compartments. However, our data show that respondents value the mere participation in elections irrespective of the outcome. They are also guided by their duty as citizens to turn out to vote. Most respondents also subscribe to the belief that if everyone thinks that their vote does not matter, there will be no democracy. Voters also turn out to vote believing that if they don't vote, they cannot complain about the elected representatives or the state of the government.

Our analysis also shows that there is a positive correlation between expressive voting and other dimensions of expressive political behaviours. Respondents who state to vote even when they cannot change the outcome are also more likely to report having done other politically expressive behaviours like participating in a strike or protest, signing a petition, and posting political opinions online. Results also indicate that individuals who identify as left leaning or right leaning are more likely to state that they would vote expressively compared to those who identify to be in the center. Similarly, respondents who strongly identify with a political party (Democrat or Republican) are more likely to say they vote expressively than those who are not aligned with a party. Our results also find that demographic factors like income, age, and education are positively linked to expressive voting, while being a racial minority is negatively linked.

2.5 Additional Materials

2.5.1 Appendix A - Additional tables

Table 2.3: Expressive voting and other political expressive behaviours

	Expressive voting
Donations to political parties	0.0473*
	(0.0244)
Participate in strikes	-0.00941
	(0.0271)
Write to elected representatives	0.0554**
	(0.0229)
Sign a petition	0.0673***
	(0.0234)
Post political opinion online	0.0196
	(0.0212)
Boycott products due to ethical reasons	0.0736***
	(0.0221)
Constant	0.655***
	(0.0197)
No. of Obs.	1672
R-Squared	0.0419

The dependent variable expressive voting takes the value 1 if the respondent states that they will vote even when they know that their vote will not be decisive. It takes the value 0 otherwise. Each of the explanatory variables take value 1 if the respondents state that they have done the activity in the past.

Linear Probability Model. Standard errors in parentheses.

*$p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

2.5.2 Appendix B - Survey on expressive voting

Welcome to this survey! This study should take you around 10 minutes to complete, and you will receive an incentive for your participation. Your participation in this research is voluntary. You have the right to withdraw at any point during the study, for any reason. By clicking the button below, you acknowledge that your participation in the study is voluntary, you are above 18 years of age, and that you are aware that you may choose to terminate your participation in the study at any time and for any reason. I consent, begin the survey.

1. To what extent would you say you are interested in politics?	Extremely interested Very interested Moderately interested Slightly interested Not interested at all

2. Where would you place yourself in the left-right political spectrum?	Left Left of Center Center Right of Center Right None of these

3. Did you take part in any of the following activities in the past?

3.1 Donated money to any political parties	Yes No Do not remember
3.2 Strike, protest, march, or demonstration	Yes No Do not remember
3.3 Written / called/ spoken / got in touch with your elected representative/ public official	Yes No Do not remember
3.4 Made a political post on Facebook / Twitter / other social media platform	Yes No Do not remember
3.5 Boycotted or bought a product for ethical reasons	Yes No Do not remember
3.6 Any other action aimed at influencing rules, laws, or politics. If so, what action?	

4. People sometimes belong to different kinds of groups or associations. For each type of group, please indicate whether you : [Belong and actively participate / belong but do not actively participate / used to belong but do not any more / have never belonged]

4.1 A political party	Belong and actively participate Belong but do not actively participate Used to belong but do not any more Have never belonged to it
4.2 A trade union, or business association	Belong and actively participate Belong but do not actively participate Used to belong but do not any more Have never belonged to it
4.3 A church or other religious organization	Belong and actively participate Belong but do not actively participate Used to belong but do not any more Have never belonged to it
4.4 A sports, leisure, or cultural group	Belong and actively participate Belong but do not actively participate Used to belong but do not any more Have never belonged to it
4.5 Another voluntary association:	

5. How much do you agree to the statement:	
5.1 I vote because I would like to influence the electoral outcome.	Strongly agree Somewhat agree Somewhat agree Strongly disagree

6. Suppose the anticipated electoral outcome is very clear and you expect that your vote will not be decisive in that outcome. Would you still go to vote?	Yes No Maybe

7. If you answered the previous question with 'Yes' or with 'Maybe', we would like to learn more about your motivation to vote. Below are some motives you may have to vote and please tell us whether the particular motive would be: [Extremely important / Somewhat important / Somewhat unimportant / Extremely unimportant]	
7.1 I know that my single vote is very unlikely to make a difference. But if everyone thinks like this and does not vote, it would be the end of democracy.	Extremely important Somewhat important Somewhat unimportant Extremely unimportant
7.2 I want to use my vote to express gratitude for good performance or to express dissatisfaction for bad performance of the incumbent.	Extremely important Somewhat important Somewhat unimportant Extremely unimportant
7.3 After the elections I talk to my friends and colleagues about the elections and whether I voted.	Extremely important Somewhat important Somewhat unimportant Extremely unimportant

7.4 I see voting as an act of loyalty to my party/ candidate and gives me satisfaction to vote for my party/candidate.	Extremely important Somewhat important Somewhat unimportant Extremely unimportant
7.5 I wanted to vote because I feel that everyone is voting for this particular party/ candidate.	Extremely important Somewhat important Somewhat unimportant Extremely unimportant
7.6 I wanted to vote because I feel that no one is voting for this particular party/ candidate.	Extremely important Somewhat important Somewhat unimportant Extremely unimportant
7.7 Select Somewhat important if you are reading this question.	Extremely important Somewhat important Somewhat unimportant Extremely unimportant
7.8 Voting is similar to a social event and I want to be part of the event. It is fun to go out and vote.	Extremely important Somewhat important Somewhat unimportant Extremely unimportant
7.9 I vote because I would like to be part of the democratic process.	Extremely important Somewhat important Somewhat unimportant Extremely unimportant
7.10 I vote to express my solidarity to the policy positions of the particular party/ candidate.	Extremely important Somewhat important Somewhat unimportant Extremely unimportant
7.11 Other reasons	

8. Please tell us whether you agree or disagree with the following statements

8.1 Citizens have the right not to vote.	Agree Disagree
8.2 Going to vote is a lot of effort.	Agree Disagree
8.3 It is my responsibility as a citizen to vote in election	Agree Disagree
8.4 I learnt in school that it is my responsibility as a citizen to vote in elections.	Agree Disagree

9. When you get together with your friends, relatives, or colleagues, how often do you discuss politics?	Always Most of the time Sometimes Never

10. There are different opinions as to what it takes to be a good citizen. For you personally, please indicate on a scale of very important to very unimportant, how important is it:

10.1 To pay taxes.	Very important Somewhat important Somewhat unimportant Very unimportant
10.2 To always vote in elections.	Very important Somewhat important Somewhat unimportant Very unimportant
10.3 To keep a watch on the actions of the government.	Very important Somewhat important Somewhat unimportant Very unimportant
10.4 To obey traffic rules.	Very important Somewhat important Somewhat unimportant Very unimportant
10.5 To be active in social or political associations.	Very important Somewhat important Somewhat unimportant Very unimportant

11. How strongly do you hold your ethical views?	Very strongly Somewhat strongly Not so strongly

12.1 Think back to when you were growing up. Do you know if your mother / father/ guardian voted?	Yes, they voted No, they did not vote I do not know
12.2 Do you know which candidate/ political party they (mother/ father/ guardian) voted for? Please mention the candidate/ political party if you know. If not, please say no.	

13. What is the highest level of school you have completed or the highest degree you have received?	Less than high school degree High school graduate Some college but no degree Associate degree in college (2-year) Bachelor's degree in college (4-year) Master's degree Doctoral degree Professional degree (JD, MD)
14. What is your gender?	Female Male Other
15. What is your year of birth?	
16. Choose one or more races that you consider yourself to be:	White Black or African American American Indian or Alaska Native Asian Hispanic Native Hawaiian or Pacific Islander Other

17. Please indicate the option that includes your entire household income in 2018 before taxes.	Less than $10,000 $10,000 to $19,999 $20,000 to $29,999 $30,000 to $39,999 $40,000 to $49,999 $50,000 to $59,999 $60,000 to $69,999 $70,000 to $79,999 $80,000 to $89,999 $90,000 to $99,999 $100,000 to $149,999 $150,000 or more
18. Which statement best describes your current employment status?	Working (paid employee) Working (self-employed) Not working (temporary layoff) Not working (looking for work) Not working (retired) Not working (disabled) Not working (other) Prefer not to answer
19. Did you vote in the last election?	Yes No
20. What political party are you registered with, if any?	Republican Democrat Independent Other No preference

Chapter 3

Sanctioning, selection, and pivotality in voting - Theory and experimental results.

This chapter is based on joint work with Kai A. Konrad.[1]

3.1 Introduction

In democratic regimes voters delegate the decision rights on the choice of public goods and the power to redistribute to political agents. This principal-agent relationship is not perfect. The agents are endowed with legislative or executive powers. Ideally, the political agents act on behalf of the voters. But they might abuse this power to extract rents for their own benefits, use funds to work on their legacy to history or fund prestige projects that give little benefits to the voters.

One possible way to discipline elected representatives and to prevent these types of extractive behavior is the voter's power over the decision to re-elect these representatives on the basis of their actions in office. In seminal contributions, Barro (1973) and Ferejohn (1986) showed how elections may serve to discipline office-holders, and how voters can sanction politicians in an equilibrium that respects sequential rationality.[2]

[1]This chapter is based on the article 'Sanctioning, selection and pivotality in voting - Theory and experimental results' published in 2019 in *Constitutional Political Economy*, Volume 30, p. 330-357.

[2]Seabright (1996), Kessing (2010), and Fearon (2011) are applications of sanctioning models with pure moral hazard in different contexts. However, due to the alleged robustness concerns, much of the accountability literature turned to a study of a selection model of voting and now focuses on issues

This retrospective voting hypothesis led to considerable empirical research since the pioneering work by Kramer (1971). The seminal contribution by Fiorina (1978) drew attention to retrospective voting on the basis of voters' personal economic condition. More recent surveys or original contributions offering literature surveys are Lewis-Beck and Stegmaier (2000), Alt et al. (2011) and Kayser and Peress (2012). It establishes a role for retrospective behavior by which economic performance and well-being of the individual voter matter in her voting decisions. Voters punish incumbents at the ballot box if they are economically worse off.

This sanctioning mechanism might become inoperative if voters have forward looking concerns - like selecting the best candidate who maximizes future benefits. Voters might view elections as a tool to select the best candidate for the office. Considering past actions of the incumbent sunk, if at an election voters anticipate that one of the available candidates (say, the incumbent) offers higher future payoffs, there is an incentive to select that candidate. This forward looking selection motive will dominate and render the retrospective sanctioning threat empty, when voters are sequentially rational. The choice of whether to re-elect an elected representative takes place at the end of the office period. Rent-seeking or appropriation that took place during the office period is sunk at that point of time. Assuming that feelings of revenge etc. are absent, voters should be forward looking. Time consistent voting behavior implies that they might even re-elect such an incumbent, if the alternative is to elect a competitor who does not behave differently or is even worse. Fearon (1999) made this point very forcefully. Besley (2006), Woon (2012), and Ashworth (2012) also take up this argument.

This brings us to two questions. Can the threat of not being re-elected, induce accountable behavior of an incumbent in an equilibrium when voters are fully rational and have forward looking concerns? Empirically, does this threat result in accountable behavior? Here, accountable behavior is defined as incumbent acting in the interest of

of adverse selection: it studies how to identify and select the more competent or ideologically more appealing candidate if a candidate's true type is private information. This literature is orthogonal to our research question and is too large to be adequately surveyed here. It includes important contributions by Fearon (1999), Ashworth (2005), Ashworth and Bueno de Mesquita (2008), Besley (2006), Besley and Smart (2007), Snyder Jr and Ting (2008), and Fox and Shotts (2009).

the voters and not appropriating the resources for herself. In the paper, we contribute to these two questions. We reconsider the relationship between sanctioning and selection from a theory perspective as well as using a laboratory experiment. We assume a two period voting game with one incumbent office-holder, one challenger politician and many voters. In the first period, the incumbent can take a decision to extract rent or to act in the interest of voters. This is followed by the voting stage. We assume that all voters prefer the incumbent to get re-elected. This preference is taken as exogenous and we call this a selection incentive in favor of the incumbent or an incumbency advantage.[3] It is independent of the incumbent's actions or performance in office and the incumbent's actions and their consequences are sunk at the election stage.[4] In a short theory analysis we identify a perfect Bayesian equilibrium with sanctioning of the incumbent even if all voters have uniform and strong selection preferences and prefers that the incumbent us re-elected. The main departure from the literature that brings this equilibrium into existence is the consideration of pivotality beliefs that become important if the electorate consists of more than one voter and applies majoritarian voting. The voters' selection motive dominates any sanctioning role of elections if voters have strict preferences for one candidate over the other, but this applies only for those voters who think that they can influence the majoritarian electoral outcome, i.e., those voters who believe they are pivotal.

We identify an asymmetric equilibrium that has an interesting structure. The electorate is homogeneous ex-ante, but becomes endogenously divided by the incumbent into a majority group that is favored by the incumbent and a minority group that is treated unfavorably. The majority that is favored receives positive benefits from the incumbent's actions and the minority that is unfavored receives nothing. The favored majority constitutes the group of voters who eventually supports and re-elects the

[3]Modeling incumbency advantage in this way that every voter benefits from the incumbent getting re-elected is not new in the literature. For example, Buchanan and Congleton (1994) have a setting where re-election of the incumbent gives the entire constituency a benefit as senior, experienced representatives are better at their legislative tasks than junior ones.

[4]An incumbency bias has empirical support. For empirical analysis and discussion see, for example, Gelman and King (1990), Erikson et al. (2015), and Fowler and Hall (2014).

incumbent. In this equilibrium each of the favored voters is pivotal in the election outcome. The minority group is excluded from the distribution of benefits. They still prefer that the incumbent is re-elected, but in the equilibrium none of these voters has real voting power. Each of the members in the minority group is non-pivotal in the equilibrium. The mistreated voters choose to vote against the incumbent. This is optimal for them, but is a weakly dominated strategy.[5] To an outside observer, the treatment of voters by the politician and the resulting voting behavior may appear to be reciprocal behavior. It appears as if mutual favoritism between a majority subgroup of the electorate and the incumbent guides the players' behavior. However, this apparent 'reciprocity' is only spurious.

The elimination of weakly dominated strategies as well as trembling are plausible refinement concepts and the fact that the equilibrium would be a victim of such refinement concepts seemingly makes it less compelling. However, rather than following such refinement concepts we take an experimental route and check whether and to what extent laboratory subjects' behavior is in line with the predictions of such an equilibrium. This leads to the second part of the paper, where we report a voting experiment that we conducted. We find a considerable diversity of behavior. Incumbents who behave more accountably are rewarded by re-election more frequently than less accountable ones. This holds with and without a selection motive being present, but a selection motive generally leads to less accountable behavior, and to a larger re-election probability of the incumbent for given levels of accountability.

We find that voting behavior is influenced by the level of accountability of the incumbents and the selection incentive. Voters' belief about the likelihood of their vote being pivotal in the election outcome (henceforth pivotality beliefs) is influenced by whether they were part of the majority that was favored by the incumbent or not. However, we do not observe stronger selection effects on the voters who believe to be pivotal. On the side of politician behavior, some incumbents choose behavior that is in

[5]There is a large literature on expressive aspects of voting (Brennan and Buchanan (1984), Hillman (2010), Brennan and Lomasky (1997), and Brennan and Hamlin (1998)) where the non-pivotal voters use their vote not to change the outcome of the election, but use their vote to express their support or dissatisfaction. If we allow for expressive preferences, this result would get stronger.

line with the equilibrium that favors a majority and the voting behavior in these cases is qualitatively in line with the predictions made by the equilibrium as well.

Our experiment is related to work by Collier et al. (1987). They find evidence in the laboratory for voters using a reward-punishment model to induce politicians to act in their interests. Woon (2012) also sheds a favorable light on retrospective voting. The paper uses an incomplete information voting experiment where politicians vary in types and the voters try to match them to a probabilistic state of the world. The paper observes that voters rely on a retrospective voting behavior.

Feltovich and Giovannoni (2015) also test retrospective and prospective voting motives (sanctioning and selection respectively) in the laboratory. In their experiment, the incumbents can appropriate from a given budget, with the remaining amount distributed equally among the voters. The amount voters receive serves as the main focus of the retrospective voters. They then allow (non-binding) campaign promises from the candidates to induce prospective voting concerns. They find that candidates who promise less appropriation are elected more often indicating prospective voting. Voters also punish those candidates who break their campaign promises, indicating that retrospective voting gives credibility to campaign promises/prospective voting. They also show that voting in line with selection motive requires sophistication from the side of the voters to evaluate the quality of the candidate and her suitability to the office in the form of credibility of campaign promise. Often retrospective voting is the simpler alternative to this cognitively demanding task.

In our experiment we simplify the voters' task by making the selection incentive as straightforward as possible. We induce a preference for the incumbent through design by giving a higher payoff to all the voters if the incumbent is re-elected. We also deviate from many of the past experiments by introducing majority voting. A single voter may or may not be pivotal in the election outcome in our setting and our analysis focuses on this dimension.

Our analysis is also related to the literature on vote buying. Dal Bo (2007) allows for sophisticated vote-buying strategies by a single candidate. A related mechanism is at

work in Dahm et al. (2014) in a different context. Both approaches use the fact that there is a redundancy of votes for reaching a simple majority and that voters can be influenced by reward mechanisms. Implicitly they give the incumbent politician the right to make contingent price offers for their votes. What the incumbent pays may not only depend on the voter's choice but also on the aggregate electoral outcome. This type of sophisticated vote-buying requires an ability to commit on the side of the candidate. We do not assume such commitment. A further literature gives politicians commitment power to make credible promises about their behavior once they are elected. They also give both the incumbent and a challenger active roles. Seminal papers are by Myerson (1993) and Lizzeri and Persico (2001). This type of commitment is absent in the Barro-Ferejohn framework which we rely on and this lack of commitment is at the center of the moral hazard problem.

Our game is also mildly related to the ultimatum game literature, particularly the one with multiple responders. An early paper on this is Kagel and Wolfe (2001). These games are also about distributional offers to which a group of players reacts. This strand of literature focuses on identifying the extent to which fairness models explain the decisions made in ultimatum games with multiple respondents. Diermeier et al. (2006) tests if the theories of self-interest, egalitarianism or inequality aversion can explain the behavior in ultimatum games with two responders and reports that the results are inconsistent with predictions of these three models. Fischer and Güth (2012) use three party ultimatum games where the proposer can exclude one of the other players from getting a share of the pie. They do not find evidence to support that this exclusion changes the behavior of the responder and the non excluded responder.

There are also some important differences between these games and our voting context. First, the accountability game and the ultimatum game have different structures. In our framework the allocation choice that is made by the incumbent politician is not subject to acceptance or rejection by the set of voters: it is implemented in any case. Second, voters make decisions that might lead to re-election of the incumbent or vote her out of office. Again, this is not a problem of division of a given pool of resources between them. Thirdly, in our setting all voters have similar roles - we do not ex-ante differentiate the

electorate. A fourth conceptual difference is the context. We consciously frame our game as a voting game. In such a game incumbents and voters are quite different subjects. Moreover, politicians stay politicians and voter stay voters throughout all rounds. This makes an egalitarian norm between them less salient than in the ultimatum game.

In the next section we reconsider the standard sanctioning/selection model with both moral hazard and candidate heterogeneity. Section 3.3 presents the hypotheses, section 3.4 presents the experimental set-up, section 3.5 presents results from the experiment and section 3.6 concludes.

3.2 A simple voting framework

Our voting framework with an accountability problem has two periods, $t = 1$ and $t = 2$. The set of players consists of a politician who reigns in period 1 and a set N of voters $i = 1, ..., (2n - 1)$. Politicians and candidates are labeled as female ('she') and voters are male ('he') in what follows. In the first stage the incumbent politician has a budget of given size $m = 1$. She chooses non-negative period-1 transfers $x_1, ..., x_{2n-1}$ to the voters. The sum of these transfers cannot exceed the budget m. She keeps the remainder $y = 1 - \Sigma_{i \in N} x_i$ for herself. In the second stage voters cast their votes. All voters vote. Each voter chooses between two politicians: the incumbent and a challenger (a player with no active role and decision options). They vote simultaneously and the majority rule applies: the politician who receives at least n votes wins.

Payoffs of active players are as follows. The incumbent keeps the amount y of the budget and this is the payoff if the incumbent is not re-elected. She has an additional benefit $b > 1$ and therefore a total payoff of $y + b$ if and only if she wins at least n votes. This benefit b may be thought of as office rents from being re-elected. The sum of these constitute the incumbent's payoff. Voters value their transfer x_i. A benefit $\theta \geq 0$ is added if the incumbent is re-elected. We address two cases: The voter might be indifferent about whether the incumbent is re-elected ($\theta = 0$), as in the analysis by Ferejohn (1986). Or the voter prefers the incumbent and attributes $\theta > 0$ to her re-election as in Fearon (1999).[6]

[6]A similar analysis could be carried out for an incumbency disadvantage ($\theta < 0$). We focus on the case $\theta > 0$ to capture forces acting in opposite directions: an incumbency advantage, that makes the

Like all other aspects in this model, the size of the incumbency advantage θ is common knowledge. Voter i's payoff is the sum of the transfer x_i and the benefit θ in case of re-election of the incumbent.

Let us consider the choice of a voter as a function of $(y, x_1, ..., x_{2n-1})$. Define $\hat{p}_i$ as voter i's probability belief that i's vote is pivotal, i.e., the probability which i attributes to the event that exactly $n-1$ of all other voters j vote for the incumbent and all the other $n-1$ voters vote for the challenger. A voter i who maximizes his payoff and attributes a positive probability $\hat{p}_i > 0$ to being a pivotal voter strictly prefers to vote for the incumbent if $\theta > 0$ and is indifferent if $\theta = 0$. A voter who attributes a zero probability $\hat{p}_i = 0$ to being pivotal is precisely indifferent about whether to vote for or against the incumbent.

This allows us to recover the results of Ferejohn (1986) and of Fearon (1999). If there is only one single voter, this voter is pivotal with probability 1. Accordingly, this voter will always vote for the incumbent if $\theta > 0$ (Fearon). If $\theta = 0$, then the voter is indifferent about whom to vote for and may choose any tie-breaking rule. In particular, the voter may choose to vote for the incumbent if and only if $y = 0$, i.e., if the incumbent shows full accountability. If the incumbent, for some reason, anticipates this tie-breaking rule, then the incumbent will choose $y = 0$ and will be re-elected (Ferejohn). For a larger but uneven number of voters pivotality (and voters' beliefs about it) becomes an issue. By choice of a suitable tie-breaking rule it is possible to establish that any choice of $y \in [0, m]$ and a majority of votes for the incumbent can emerge as a perfect Bayesian equilibrium, irrespective of the size θ of the incumbency advantage.

Intuitively, for any budget allocation choice a voting subgame exists for which a super-majority (at least $n+1$ of voters) vote for the incumbent. This holds because, if a set with at least n voters votes for the incumbent, then any of the voters outside this set is not pivotal and therefore indifferent about whom to vote for. This voter may well vote

voter want the incumbent (irrespective of the action of the incumbent) to be re-elected and the need for accountability, that requires that an incumbent who diverted part of the budget for private use is voted out of office. Moreover, the case with an incumbency advantage received much empirical support (see footnote 4 for references).

for the incumbent as well. A particular value of y can, for instance, be supported by tie-breaking choices of indifferent voters such that this is the largest y for which non-pivotal (and hence indifferent) voters reelect the incumbent: the incumbent is reelected with a super-majority if the amount kept by her is smaller or equal to this y.[7] The multiplicity of equilibrium has been used by Ferejohn (1986) to support a high degree of accountability as an equilibrium by making the voter's equilibrium choice in case of the voter's indifference a function of the budget allocation choice.

The behavior of voters who are non-pivotal (and hence indifferent) might be conditioned on the publicly observed degree of accountability of the incumbent. It may be interesting to consider the case in which any voter i can condition his behavior only on the amount of transfer x_i which he received. We can characterize the following perfect Bayesian equilibrium in this case:

Proposition 1 Suppose the incumbent has a strictly positive incumbency advantage. If $n > 1$, then a perfect Bayesian equilibrium exists that is described by favoritism as follows. The politician chooses to allocate $x_j = 1/n$ to precisely n voters. Each voter j believes that he is pivotal with probability 1 if he received $x_j = 1/n$, and each voter believes that he is non-pivotal if $x_j \neq 1/n$. Only the voters who believe that they are pivotal vote for the incumbent.

The proof is in the appendix. The equilibrium that is characterized in Proposition 1 has some interesting properties. The voters who received transfers vote for the incumbent and voters who did not receive transfers vote against the incumbent. They behave as if they reward or punish the incumbent, depending on having been treated well or poorly. In fact, this electoral outcome is not driven by such desires to reward or punish, or to

[7] As has been pointed out in the introduction, the equilibria with $y > 0$ do not survive a refinement that eliminates weakly dominated strategies, and this may be support of the argument that selection incentives dominate sanctioning. One should note that even for a strict incumbency advantage ($\theta > 0$) an equilibrium for which an incumbent is not re-elected need not be very sensitive to perturbations. Suppose that the expectation is that $2n - 2$ other players vote against the incumbent as well. In this case, this voting behavior remains optimal, even if up to $n - 2$ of these other voters deviate from their equilibrium behavior.

reciprocate favors. It is just a possible equilibrium outcome of forward looking voters. All voters are sequentially rational and narrowly selfish.

Proposition 1 makes suggestions about how beliefs are formed in the equilibrium. The voters who received transfers are pivotal and voters who received nothing are not pivotal. When we move to the experimental section we also provide a behavioural story on how these beliefs are formed. To the extent that pivotality is interpreted ex-post as a measure of political connectedness or influence, it seems as though the ones who are politically connected are the ones who receive transfers. The voters who do not receive transfers are not among the selectorate. They are also in a minority. They are excluded and deprived of political influence. The equilibrium appears as if there is a majority of voters who establish an ingroup, and a minority of voters who form the outgroup. But ex-ante there is no heterogeneity among voters here, there is no such element of 'connectedness' here and no differences in connectedness. The ingroup-outgroup interpretation with reciprocity between the incumbent and her selectorate and the apparent causality are purely spurious.

3.3 Hypotheses

Theory considerations showed that there is a large set of equilibrium outcomes. Refinement concepts tell us that some of these equilibria might be more plausible than others from a theory point of view. However, an at least equally relevant question is what voters really do. We first concentrate on predictions about the voting subgames, which support the following hypotheses about the qualitative behavior in the laboratory.

H1: Selection hypothesis *For any given allocation choices of the incumbents, the voters are more inclined to vote for the incumbent if the incumbent has an incumbency advantage.*

This hypothesis is a mild version of Fearon's selection dominance argument. The strict version of this hypothesis is the claim that sanctioning always dominates the voting incentives. If all voters prefer a candidate, they all vote for him. Laboratory results are

typically less deterministic, so the Selection Hypothesis catches the essence of the theory claim about selection in a qualitative form.

H2: Retrospective voting hypothesis *(i) If the incumbent has no incumbency advantage, voters are more inclined to vote for the incumbent if the incumbent behaved more accountably. (ii) For any given incumbency advantage, voters are more inclined to vote for the incumbent if the incumbent behaved more accountably.*

This hypothesis is formulated on the basis of the original considerations by Barro (1973) and by Ferejohn (1986) and reflects the idea of retrospective voting. The weak part of the hypothesis (i.e., part (i)) refers to Ferejohn's result that a sanctioning equilibrium exists if the voters are indifferent about who is in power in the future. The strong part of the hypothesis (i.e., part (ii)) suggests that this result is also true if one allows for an incumbency advantage of a given size.

Voters' payoff from voting for the incumbent is higher if the incumbency advantage is higher, and if the voter attributes a higher probability to being pivotal in the election. A voter's belief about own pivotality probability and incumbency advantage, hence, interact positively and a higher pivotality belief should therefore make the incumbency advantage more salient and more influential for the voting decision. This leads to the pivotality hypothesis.

H3: Pivotality hypothesis *The influence of incumbency advantage on voter behavior is stronger if a voter considers it more likely that he is pivotal.*

We can test this hypothesis using the stated beliefs of voters about whether they think it is more likely or not that their vote is decisive.

In the experiment we will give the incumbent choice alternatives in which all voters are treated equally and alternatives in which the incumbent can favor a majority of voters, to the detriment of a minority of voters. In line with the equilibrium behavior that is characterized in Proposition 1, we would expect behavior along the following lines:

H4: Favored majorities hypothesis *Voters who belong to the favored majority expect to have a higher probability of being pivotal than voters in a less favored minority. Moreover, the voters in the favored majority are more likely to vote for the incumbent.*

Next we turn to incumbents' choices. The multiplicity of equilibria in the voting subgame does not give the incumbent very clear guidance, and one would therefore expect to see a wide range of possible accountability choices. However, taking the above probabilistic hypotheses by heart, they imply that an incumbent may consider it more likely to be re-elected if she has an incumbency advantage. Moreover, for a given incumbency advantage, the incumbent may consider it more likely to be re-elected if she behaves more accountably. This is also the clear prediction from Fearon's claim that selection considerations dominate, as sanctioning is only time consistent if the voter is indifferent. Hence, we expect behavior in line with the following

H5: Decreasing accountability hypothesis *The incumbent behaves less accountably if she has an incumbency advantage.*

Endowed with these hypotheses we now describe the experimental setting.

3.4 Experimental setting

The experiment was conducted among the students of a large German university in the months of October and November, 2016. The program was coded in z-Tree (Fischbacher (2007)) and the subjects were invited through ORSEE (Greiner (2015)). A between-subjects design was used, i.e., each subject participated in only one treatment. The instructions for the subjects were handed out to them on paper. In addition, they had to watch a video in which the instructions were read to them aloud by the same person and in an unchanged environment for the two treatments.[8] Participants were informed of the anonymity of their decisions and that they were not allowed to communicate with each

[8]The recordings of these instructions are available here:
https://www.tax.mpg.de/de/publikationen/instructions_incumbency_advantage.html
https://www.tax.mpg.de/de/publikationen/instructions_no_incumbency_advantage.html

other. The subjects also had to undergo mock questions to check their comprehension of the instructions and the rules of the experiment before proceeding.

Participants were informed that they are part of an interaction resembling a political process.[9] Subjects interacted in groups of five in each treatment. Each group consisted of one incumbent politician, one challenger politician and three voters. In each group, two of the subjects were randomly assigned the role of politician (as incumbent or challenger) and three of the subjects were assigned the role of voter. Subjects were informed of their roles and kept their respective roles throughout the experiment, i.e. a subject in the role of a politician remained in that role throughout the experiment.

The voting game consisted of two stages.

Stage 1: The incumbent politician has a budget $m = 120$ taler[10] at her disposal. The incumbent has one decision to make - to allocate this budget between herself and the three voters in one of five possible ways as listed in Table 3.1.[11]

Of these, option 1 [120;(0,0,0)] is where the incumbent retains the whole 120 taler and distributes nothing to the three voters (the first number in the vector corresponds to the amount the incumbent keeps for herself and the following three numbers are the amounts transfered to each of the voters). This is a case of no accountability of the incumbent office-holder. Option 2 [30;(30,30,30)] and option 4 [60;(30,30,0)] are options of partial accountability, as the incumbent keeps a smaller or larger share of the budget for herself. Option 3 [0;(60,60,0)] and option 5 [0;(40,40,40)] are options that are in conformity with full accountability, as the incumbent distributes the whole budget to the voters. The five options differ with respect to accountability, but also with respect to symmetry/asymmetry of treatment of voters. Note that options 1, 2 and 5 treat all voters perfectly equally both from an ex-ante point of view as well as from the ex-post

[9] We introduce a non-neutral setting because we want subjects to bring their political behavior and beliefs on to the laboratory. Additionally this only affects the accountability part of the experiment which applies to both the treatment and control and is orthogonal to our treatment variation of the incumbency advantage.

[10] Taler = Experimental Currency Unit. Conversion: 20 taler = 1 EUR.

[11] In the experiment we reversed the order in which the five options were listed on the screen in half of the sessions to control for order effects.

Table 3.1: Budget allocation vector

Allocation Option	Incumbent retains	Share of voter 1	Share of voter 2	Share of voter 3
Option 1 [120;(0,0,0)]	120 taler	0 taler	0 taler	0 taler
Option 2 [30;(30,30,30)]	30 taler	30 taler	30 taler	30 taler
Option 3 [0;(60,60,0)]	0 taler	60 taler	60 taler	0 taler
Option 4 [60;(30,30,0)]	60 taler	30 taler	30 taler	0 taler
Option 5 [0;(40,40,40)]	0 taler	40 taler	40 taler	40 taler

Note: the first number in the vector corresponds to the amount the incumbent keeps for herself and the following three numbers are the amounts transfered to each of the voters. For e.g., in [120;(0,0,0)], 120 is the amount the incumbent keeps and each of the voter receives 0.

allocation. Options 3 and 4 describe distributions that allocate different amounts of the budget to different voters. If the incumbent chooses one of the asymmetric options, the computer determines which of the voters receive positive amounts and which voter gets zero. Hence, from an ex-ante point of view, the incumbent treats all voters equally. But from an ex-post point of view, the voters are treated differently, as two voters receive considerable amounts and one voter receives nothing. As anonymity applies and the incumbent does not know the identity of voters 1, 2 and 3, these asymmetric outcomes are implemented by a random mechanism.

Stage 2: After the incumbent has made the allocation decision, the voting decision follows. The voters make voting choices. These are possibly a function of the allocation choices made by the incumbent. The voters have to decide to either vote for the incumbent or for the challenger. However, to elicit more observations, we use the strategy method for the voting process. Voters have to vote for the incumbent or challenger under each realizable state of the world. Due to the asymmetry in the amounts voters receive for

two of the five allocation options, the five allocation choices of the incumbent translate into seven cases describing the possible situations of an individual voter. These different situations are listed in Table 3.2.

Table 3.2: Voters' choices

Cases	Voting preferences
Own-receipt is 0 taler, the other two voters receive 0 taler each, and the incumbent keeps 120 taler.	Incumbent/Challenger
Own-receipt is 0 taler, the other two voters receive 30 taler each, and the incumbent keeps 60 taler.	Incumbent/Challenger
Own-receipt is 0 taler, the other two voters receive 60 taler each, and the incumbent keeps 0 taler.	Incumbent/Challenger
Own-receipt is 30 taler, one other voter receives 30 taler, another voter receives 0 taler, and the incumbent keeps 60 taler.	Incumbent/Challenger
Own-receipt is 30 taler, the other two voters receive 30 taler each, and the incumbent keeps 30 taler	Incumbent/Challenger
Own-receipt is 40 taler, the other two voters receive 40 taler each, and the incumbent keeps 0 taler	Incumbent/Challenger
Own-receipt is 60 taler, one other voter receives 60 taler, another voter receives 0 taler, and the incumbent keeps 0 taler	Incumbent/Challenger

When using the strategy method the voters' choices are not observed by the politician at the point of making her choice, and the conditional choices made by the voters are then

applied to the actual choice made by the incumbent. This procedure is, hence, equivalent to a strict sequentiality in decision making in which the allocation choice is followed by the voting choices. The votes that result are tallied and the winner is announced. The winner of the election receives $b = 140$ taler (this amount exceeds the initial budget $m = 120$ taler).

After the voting choices have been made we elicit the beliefs of voters on how pivotal their votes were in each of the seven voting choices they made. Voters are asked if they believed that it was more or less likely that their vote *tipped* the outcome in the election. *"Tipping"* here means that had the voter voted differently, the majority outcome of the election would have been different. With three voters, a voter's vote tips the outcome of the election only if one of the remaining two voters votes for the incumbent and the other votes for the challenger. In a way the pivotality belief of a voter shows what he thinks about the voting pattern of the other two voters. This completes the set of decisions to be made.

Each subject participates in only one session and plays the game of budget allocation followed by voting decisions eight times in this session. To avoid quasi-repeated games effects, the participants were randomly re-matched. While voters remained voters and politicians remained politicians, random re-matching made sure that a voter-subject voted on a different incumbent in each round, and that the set of co-voters also changed.[12] Among politician-subjects the role as incumbent or challenger was randomly chosen in each round.

At the end of each round, subjects are informed of the allocation vector chosen by the incumbent, the winner of the election, the number of votes received by the winner and their own earnings in taler.

Treatments: The two treatments we study are identical along all dimensions except whether the incumbent politician has an incumbency advantage in the election or not.

[12]For this purpose the participants were invited in groups of 20 (15 in some sessions in which less than 20 participants showed up). Re-matching occurred among this larger set. For this the participants were partitioned in four subgroups of 2 politicians and 3 voters, and this partitioning was changed in each round.

This difference is simply in the monetary benefits of each voter if the incumbent is re-elected or not.

In the baseline treatment, voters have the same exogenous monetary benefit irrespective of whether the incumbent or the challenger is elected. More precisely, each voter receives 20 taler once the election is completed, and irrespective of whether the incumbent or the challenger is elected. The incumbency advantage is $\theta = 0$ taler. This baseline treatment is henceforth referred to as the No Incumbency Advantage treatment (**NIA**).

The second treatment is referred to as the Incumbency Advantage treatment (**IA**). The treatment follows precisely the very same rules as the baseline treatment. However, each of the voters receives 20 taler if the challenger of stage 1 gets elected and 30 taler if the incumbent gets re-elected. Hence, the incumbency advantage is $\theta = 10$ taler. In this treatment voters have a larger monetary benefit if the incumbent is re-elected.

The experiment also included post-experiment tests. These comprised standard tests of social and risk preferences (Murphy et al. (2011); Dohmen et al. (2011)) and a questionnaire on the Dark Triad. It assesses the participant's strength of narcissism, Machiavellianism, and psychopathy, three types of personality traits that were identified in psychology (see Jones and Paulhus (2014)). Furthermore a set of control questions on demographic information and past political activity were asked.

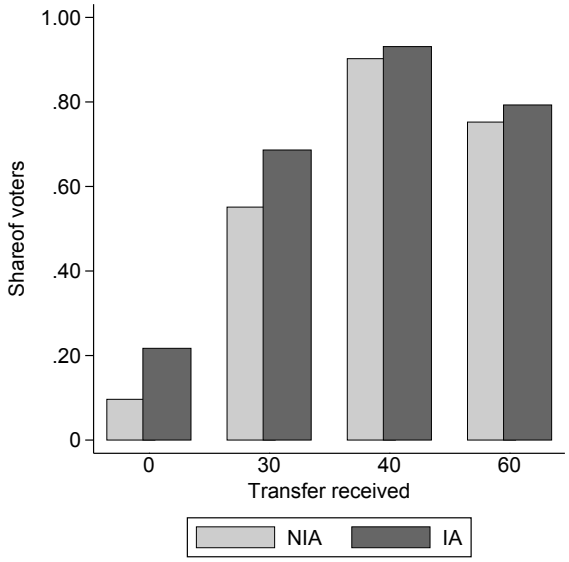
3.5 Data and results

We conducted 9 sessions in each treatment with a total number of 345 subjects (175 in NIA and 170 in IA). Around 61% of the subjects had past political experience and had voted in at least one election in the past. Of the 345 students 172 (roughly half) identified as female. Three rounds from the main experiment and one of the post-experiment tests were randomly chosen for payment. Additionally, there was a show up fee of 6 euros. The experiment lasted 90 minutes and the average payoff was 22 euros. We now turn to the various hypotheses.

3.5.1 Selection vs. retrospection

First we address the hypothesis on *selection*. A first result is that voters are more likely to vote for the incumbent when there is a selection incentive (in IA) than when there isn't (in NIA), conditional on the transfers received. Figure 3.1 provides descriptive evidence. The four pairs of columns show the shares of voters who voted for the incumbent for each of the transfer amount received. Light grey bars represent the NIA treatment (left column) and the dark grey bars represent the IA treatment (right column). For all four possible levels of own receipts, voters are significantly more inclined to vote for the incumbent in IA than NIA (tests of equality of means done using Wilcoxon rank sum tests, $p < 0.001$). The difference between the treatments are larger for own receipts of 0 and 30 taler and the gap closes down for own receipts of 40 and 60 taler.

Figure 3.1: Voting for the incumbent for each transfer received



Note: Given the different possible budget allocation choices, a voter can receive zero, 30, 40 or 60 taler. The four pairs of columns show the shares of voters who voted for the incumbent for each of these receipts, with observations from the NIA treatment in light grey (left column) and observations from the IA in dark grey (right column). For all four possible levels of own receipts, voters are more inclined to vote for the incumbent in IA than NIA.

Table 3.3: Effects of selection incentive, own receipts and level of accountability on voting for the incumbent

	Dependent Variable - Vote for the incumbent		
	(1)	(2)	(3)
IA	0.116***	0.114***	0.114***
	(0.0246)	(0.0238)	(0.0238)
Own Receipt	0.0129***	0.0129***	0.0116***
	(0.000457)	(0.000457)	(0.000515)
Baseline: No accountability			
Partial accountability			0.130***
			(0.0168)
Full accountability			0.168***
			(0.0218)
Constant	0.140***	0.0141	-0.0788
	(0.0148)	(0.0803)	(0.0696)
Controls	No	Yes	Yes
No. of Obs.	11592	11592	11592
R-Squared	0.331	0.337	0.347

Note: Dependent variable takes value 1 if the vote is for the incumbent and 0 if the vote is for the challenger. IA is a dummy variable that equals 1 if there is an incumbency advantage ($\theta > 0$) and 0 if there isn't ($\theta = 0$). Variable Own Receipt is the amount the voter receives. Partial accountability variable takes 1 when the incumbent makes a non zero transfer to the voters but retains a part of the budget and 0 otherwise. Full accountability variable takes 1 when the incumbent transfers the entire budget to the voters and 0 otherwise. They are both compared to the baseline of No accountability. The controls include experimental rounds, gender and participation in a past election. Ordinary least squares (OLS). Standard errors are clustered at the individual level. Robust standard errors in parentheses.

*$p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 3.3 provides the regression analysis where the dependent variable, 'vote for the incumbent', is binary and takes value 1 if the vote is for the incumbent and 0 if it is for the challenger. Here, we report the results from an OLS regression for ease of

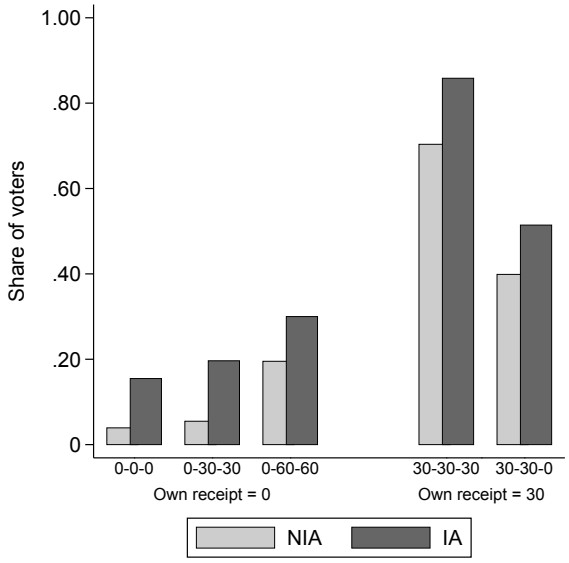
interpretation but they are in line with the results from probit regression (marginal effects are reported in the online appendix). We use standard errors clustered at the individual level.[13] Column (1) indicates a significant treatment effect - voters are more likely to vote for the incumbent when there is an incumbency advantage, that is, voters have a selection incentive irrespective. This is true controlling for the transfers received by the voters. As predicted by the theory on the dominant role of selection incentives, even the quantitatively small selection incentive that is caused by the incumbency advantage has a clear treatment effect that has the predicted sign and is significant. We summarize this result as the selection result.

Selection result *For any given allocation choice of the incumbents, the voters are more likely to vote for the incumbent when there is an incumbency advantage.*

Next we turn to the hypothesis on *retrospective voting*. Column (1) of Table 3.3 shows that a voter's probability of voting for the incumbent rises with the transfer amount received by this voter. Column (2) repeats the same estimation with controls. Column (3) adds accountability levels to the regression. We define full accountability as when the incumbent does not keep any of the budget and distributes everything. Partial accountability is when the incumbent keeps a part of the budget for herself and transfers the rest to all or some of the voters. A case of no accountability is when the incumbent panders all of the budget for herself. From the table 3.3, other things being equal, compared to no accountability, partial accountability of the incumbent increases the probability of voters voting for the incumbent by 13 percentage points and full accountability raises it by 16.8 percentage points. Voters who get 0 taler are more likely to vote for the challenger than the incumbent (Figure 3.1). However, as the own receipts increase from 0 to 30 taler, voters are more likely to vote for the incumbent in both treatments. This holds for own transfers of 40 and 60 taler although the probability of voting for the incumbent is the highest when the transfers are 40 taler in both the treatments.

[13]We cluster standard errors at the individual level to account for subjects making the voting decision in multiple rounds. We also cluster at the experimental session level as an additional conservative estimation. The results are not qualitatively different and we report them in the appendix.

Figure 3.2: Voting for the incumbent for each transfer received - Details



Note: The first number in the string of numbers (for e.g., 0 in 0-30-30) corresponds to the taler received by the voter making the decision where as the next two correspond to the amounts received by the other two voters. The bars show the share of voters voting for the incumbent for their corresponding own receipts.

A closer look at the voters who receive 0 taler reveals that in addition to own receipts, the voters pay attention to the amount received by the other two voters and how accountable the incumbent was in stage 1 (Figure 3.2, first three sets of bars). In the no accountability case of option 1 [120;(0,0,0)] the voters who receive 0 taler overwhelmingly vote for the challenger in both treatments (only 3.93% of the voters vote for the incumbent in NIA and 15.48% in IA). In the partial accountability case of option 4 [60;(30,30,0)] 5.48% of the voters who receive 0 taler vote for the incumbent in NIA and 19.64% in IA. In the full accountability case of option 3 [0;(60,60,0)] this increases to 19.52% in NIA and 30% in IA, indicating that more voters are willing to vote for the incumbent when the incumbent was fully accountable than when she was not, irrespective of their own receipt.

A similar pattern can be observed for voters who receive 30 taler (Figure 3.2, last two sets of bars). In the partial accountability case of option 2 [30;(30,30,30)], 70.36% of the voters who receive 30 taler vote for the incumbent in NIA and that increases to

85.83% in IA. However, in the lower accountability situation of option 4 [60;(30,30,0)] the percentage of voters voting for the incumbent is lower in both treatments (39.88% in NIA and 51.43% in IA).

Retrospective voting result *In both treatments, voters are more likely to vote for the incumbents when incumbents behave more accountably.*

So far the results can be seen as qualitatively in line with both a mild version of the selection hypothesis of Fearon (1999) and a mild version of the retrospective voting hypothesis of Ferejohn (1986). Both types of considerations are seemingly relevant for the voting decision and none of them dominates the other in a strict sense.

3.5.2 Pivotality

The theory analysis in Section 3.2 highlighted pivotality beliefs of voters and their potential key role for voting behavior. Beliefs about pivotality should be an element in voters' decision making in the context of majority voting. The argument that the selection motive should dominate all other considerations becomes less compelling when voters' pivotality is endogenous. Voting in line with the selection motive has a selection benefit only if the voter is pivotal. As seen by Propositions 1, this consideration opened up for a wealth of different voting behaviors that can be seen as equilibrium behavior, where some of these behaviors may be seen as more plausible than others from a theory perspective of equilibrium refinement.

These considerations led to the *Pivotality hypothesis* as well as the *Favored majorities hypothesis*. We now turn to the data analysis on these hypotheses.

Before we relate voters' pivotality beliefs with their electoral choices, we consider these pivotality beliefs and their distribution. A voter also needs to form beliefs about other voters' electoral choices to evaluate their own pivotal probability in the election outcome. For a theory of this belief formation, one can draw on what psychologists call the theory of social projection (see, e.g., Marks and Miller (1987)): a voter forms an own belief and projects this way of belief formation onto the other voters. Voters might believe that their own ways of how they form their beliefs is no different from how most of the other

voters form their beliefs. A voter is pivotal in our context if exactly half of the remaining voters vote for incumbent and the other half vote for the challenger.

If a voter A is confronted with two other voters B and C who receive identical transfers this may induce the belief that it is more likely that they make the same decision; hence A is unlikely to be pivotal. If B and C are treated differently - say B receives transfers from the incumbent and not C, it appears as less likely that they make identical electoral decisions; hence, A is more likely to be pivotal.For the budget allocations that attribute positive and identical amounts to two of the voters and zero to a third voter, in the equilibrium the voter who receives zero anticipates that he is not pivotal - and also observes that the two other voters receive identical amounts. Instead, each of the voters who receives a positive amount anticipates that he is pivotal - and also observes that the other two voters do not receive identical amounts.

This leads us to a prediction about voters' pivotality beliefs as a function of the transfers x_{voter1}, x_{voter2} and x_{voter3} which is expressed in the Table 3.4. The table also provides the overview of voters' stated pivotality beliefs. It shows that the stated pivotality beliefs are, in fact, correlated with the predictions emerging from these considerations. The correlation between the stated pivotality beliefs and actual pivotality is also positive (Spearman's correlation coefficient is 0.1338 with $p < 0.001$ from 8,273 observations.[14])

According to this line of thought, we would expect the likelihood that all voters vote identically is higher for symmetric allocations than for the asymmetric allocations. If all voters vote identically, we define the outcome to be a super-majority. A super-majority for the incumbent is when the incumbent receives all three votes and a super-majority for the challenger is when the challenger receives all three votes. The outcomes in symmetric allocations of option 1 [120;(0,0,0)], option 2 [30;(30,30,30)] and option 5 [0;(40,40,40)] would be super-majorities and the asymmetric allocations of option 3 [0;(60,60,0)] and option 4 [60;(30,30,0)] would not be super-majorities.

This can indeed be observed in the data. We can see that 75% of the cases option 1 [120;(0,0,0)] is chosen result in a super-majority for the challenger, while 52% of cases

[14]Since the data series is binary we also report a Tetrachoric correlation coefficient of 0.2158 with $p < 0.001$.

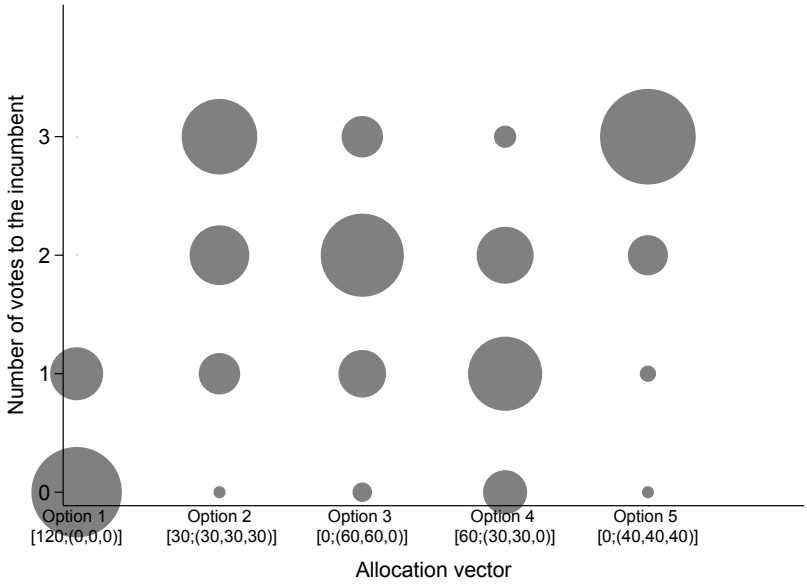
Table 3.4: Overview of pivotality beliefs

Cases	Predicted pivotality	% of voters believing to be pivotal
(**0**,0,0)	Non-Pivotal	21
(**0**,30,30)	Non-Pivotal	36
(**0**,60,60)	Non-Pivotal	30
(**30**,30,0)	Pivotal	73
(**30**,30,30)	Non-Pivotal	36
(**40**,40,40)	Non-Pivotal	32
(**60**,60,0)	Pivotal	80

Note: Bold number refers to own receipt of the voter. The predicted pivotality refers to whether the voter (who receives the amount in bold) is expected to be pivotal or not, assuming social projection. The third column indicates the percentage of voters who receive the amount in bold who believe that they are pivotal in the election outcome. Note that the pivotality beliefs correlate with the predicted pivotality.

in option 2 [30;(30,30,30)] and 84% of cases in option 5 [0;(40,40,40)] result in a super-majority for the incumbent. Figure 3.3 graphically represents this.

Figure 3.3: Allocation vectors and super-majorities



Note: The y-axis indicates the number of votes accruing to the incumbent. Thus, a number of 0 votes accruing to the incumbent indicates a super-majority for the challenger and a number of 3 votes accruing to the incumbent indicates a super-majority to the incumbent. The size of the circles indicates in each allocation vector what share of cases resulted in each number of votes. The three symmetric allocations of option 1 [120;(0,0,0)], option 2 [30;(30,30,30)] and option 5 [0;(40,40,40)] result mostly in super-majorities (for the challenger in the former and for the incumbent in the latter two cases). The asymmetric allocations of option 3 [0;(60,60,0)] and 4 [60;(30,30,0)] do not result in super-majorities as the major share of cases result in either two votes for the incumbent or two votes for the challenger.

Next we compare voting for the incumbent as a function of own pivotality beliefs, for the two treatments. We hypothesize that the effect of the incumbency advantage is stronger if the voter believes that he is pivotal. Table 3.5 looks at this analysis. Simply believing to be pivotal does not affect voting behavior. Being in the incumbency advantage treatment increases the decision to vote for the incumbent by 11.4 percentage points (Column (6)). However, the interaction between IA treatment and belief = pivotal is not significant as indicated in Column (8). This result does not change qualitatively even if we control for the transfers received by the voters and use a slightly different specification (Table 3.6).

Table 3.5: Effects of pivotality beliefs on voting for the incumbent

	Dependent Variable - Vote for the incumbent							
	NIA		IA		All			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
belief = pivotal	0.0176	0.0121	0.0188	0.00954	0.0168	0.0110	0.0212	0.0181
	(0.0253)	(0.0248)	(0.0351)	(0.0330)	(0.0211)	(0.0207)	(0.0259)	(0.0261)
IA					0.116***	0.114***	0.120***	0.120***
					(0.0246)	(0.0238)	(0.0276)	(0.0267)
IA * belief = pivotal							-0.00921	-0.0147
							(0.0388)	(0.0379)
Controls	No	Yes	No	Yes	No	Yes	No	Yes
Constant	0.0353**	-0.0129	0.156***	-0.0350	0.0378**	-0.0797	0.0357**	-0.0835
	(0.0137)	(0.0729)	(0.0342)	(0.118)	(0.0160)	(0.0693)	(0.0164)	(0.0685)
No. of Obs.	5880	5880	5712	5712	11592	11592	11592	11592
R-Squared	0.437	0.441	0.394	0.405	0.422	0.428	0.422	0.428

Note: Dependent variable takes value 1 if the vote is for the incumbent and 0 if the vote is for the challenger. belief = pivotal is a dummy variable that takes value 1 if the voter believes that he is pivotal in the election outcome and 0 otherwise. IA is a dummy variable that equals 1 if there is an incumbency advantage ($\theta > 0$) and 0 if there isn't ($\theta = 0$). The controls include experimental rounds, gender, participation in a past election and social preferences. Ordinary Least Squares (OLS). Standard errors are clustered at the individual level. Robust standard errors in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 3.6: Effects of pivotality beliefs on voting for the incumbent for each of the strategy cases

	Dependent Variable - Vote for the incumbent						
	Strategy cases						
	(**0**,0,0)	(**0**,30,30)	(**0**,60,60)	(**30**,30,30)	(**30**,30,0)	(**40**,40,40)	(**60**,60,0)
IA	0.0977***	0.176***	0.108*	0.132***	0.255***	0.0569**	-0.0333
	(0.0358)	(0.0423)	(0.0586)	(0.0412)	(0.0863)	(0.0259)	(0.107)
belief = pivotal	0.0452	0.0625*	0.0448	-0.266***	0.323***	-0.0538	-0.0279
	(0.0284)	(0.0337)	(0.0625)	(0.0603)	(0.0543)	(0.0452)	(0.0692)
IA * belief = pivotal	0.0924	-0.0885	-0.00441	0.120	-0.203**	0.00522	0.118
	(0.0915)	(0.0683)	(0.0945)	(0.0782)	(0.0998)	(0.0510)	(0.111)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-0.0474	-0.104	0.0614	0.833***	0.00987	0.989***	0.341**
	(0.0941)	(0.100)	(0.138)	(0.116)	(0.149)	(0.0729)	(0.156)
No. of Obs.	1656	1656	1656	1656	1656	1656	1656
R-Squared	0.0693	0.0656	0.0425	0.143	0.0987	0.0250	0.0540

Note: Dependent variable takes value 1 if the vote is for incumbent and 0 if the vote is for the challenger. belief = pivotal is a dummy variable that takes value 1 if the voter believes that he is pivotal in the election outcome and 0 otherwise. IA is a dummy variable that equals 1 if there is an incumbency advantage ($\theta > 0$) and 0 if there isn't ($\theta = 0$). The table shows interactions of treatment and pivotality belief on the decision to vote for the incumbent. The regression analysis is done separately for each of the seven strategy cases that result from the allocation vectors. The controls include experimental rounds, gender, participation in a past election and social preferences. Ordinary Least Squares (OLS). Standard errors are clustered at the individual level. Robust standard errors in parentheses. (In the controls experimental round effects are significant at the 5% level with a co-efficient of -0.0036.)

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Pivotality result: *Voters who believe they are pivotal are not more likely to vote for the incumbent when there is a selection incentive.*

To look at why we do not find evidence for this hypothesis, we look at how the beliefs are formed. While voters' pivotality beliefs and actual pivotality are correlated in the data, we also have a hypothesis on how beliefs depend on the allocation vector chosen by the incumbent and voters' own share of the transfers received. The favored majorities hypothesis states that voters who belong to the favored majority expect to have a higher

probability of being pivotal than voters in the less favored minority. We test this by looking at the effect of being the recipient of the non-zero amounts in option 3 [0;(60,60,0)] and option 4 [60;(30,30,0)] on the pivotality belief. The voters who receive 60 taler in option 3 and 30 taler in option 4 belong to the favored majority and the voters who receive 0 taler in these options are in the less favored minority.

Table 3.7: Effects of being in the favored majority on pivotality beliefs

	Dependent Variable - Pivotality belief			
	(1)	(2)	(3)	(4)
Favored Majority	0.437***	0.437***	0.379***	0.315***
	(0.0288)	(0.0288)	(0.0376)	(0.0398)
IA		0.0183	-0.0400	-0.0332
		(0.0303)	(0.0461)	(0.0464)
Favored Majority * IA			0.117**	0.117**
			(0.0572)	(0.0572)
Controls	No	No	No	Yes
Constant	0.329***	0.320***	0.349***	0.294***
	(0.0231)	(0.0280)	(0.0319)	(0.0906)
No. of Obs.	6624	6624	6624	6624
R-Squared	0.192	0.193	0.196	0.206

Note: Dependent variable takes value 1 if the voter beliefs that he is pivotal and 0 otherwise. Favored majority is a dummy variable that takes value 1 if the voter belongs to a majority that is favored by the incumbent. This implies that the voter received a positive amount in an asymmetric allocation vector chosen by the incumbent, i.e., either 30 taler in option 4 [60;(30,30,0)] or 60 taler in option 3 [0;(60,60,0)]. IA is a dummy variable that equals 1 if there is an incumbency advantage ($\theta > 0$) and 0 if there isn't ($\theta = 0$). Ordinary Least Squares (OLS). Standard errors are clustered at the individual level. Robust standard errors in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 3.7 reports these results. Pivotality beliefs are affected by whether the voter is in the favored majority or not (Column (1)). Being in the favored majority increases the probability of a voter believing to be pivotal by 43.7 percentage points.

Favored majorities result *Voters receiving a positive transfer and thus belonging to the favored majority are more likely to expect to be pivotal than voters who are in the less favored minority.*

Pivotality beliefs are not affected by the treatment manipulation, i.e., whether there is an incumbency advantage or not (Column (2)). However, the interaction term between the favored majority and the treatment indicator (IA) has a coefficient of 0.117 and is significant at the 5% level. This indicates that voters in the favored majority in the IA treatment are 11.7 percentage points more likely to believe to be pivotal. This implies that beliefs are not entirely independent of the treatment manipulation. This could be a potential reason why we do not observe selection incentive being stronger on voters who believe to be pivotal. The selection incentive and pivotality beliefs interact in our data.

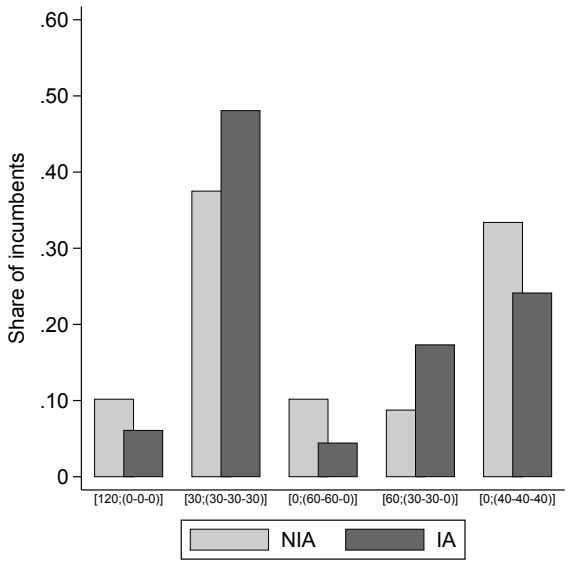
3.5.3 Incumbents and accountability

We now turn to the decisions made by incumbents. Given that voters react differently in the two treatments to the allocation choices made by the politician, one might expect that the incumbent behavior also differs in the two treatments.

Evidence for the decreasing accountability hypothesis is obtained by looking at the average transfers observed in the two treatments. The transfers chosen by the incumbents averaged 91 taler in NIA and 88 taler in IA. The transfers are statistically different in the two treatments (Wilcoxon rank-sum test: $p < 0.001$).

Though the transfers in IA are lower than NIA, roughly three quarters of the budget is allocated to the voters by the incumbent in IA. The incumbents appear to take the retrospective voting into account even when there is a selection incentive.

Figure 3.4: Allocation vectors chosen by the incumbent



Note: The figure shows percentage of incumbents choosing each of the allocation vectors. Percentage of incumbents choosing partial accountability options of [30;(30,30,30)] and [60;(30,30,0)] is higher in IA than in NIA and the percentage of incumbents choosing the full accountability options of [0;(60,60,0)] and [0;(40,40,40)] is lower in IA than in NIA.

There are also differences in the allocation vectors chosen by the incumbent as indicated by Figure 3.4. Interestingly, both of the full accountability options see a drop in the IA treatment compared to the NIA treatment. There is a corresponding increase in the partial accountability options in the IA treatment compared to the NIA treatment. The fall in full accountability options is not seen to co-exist with a rise in the no accountability option of [120;(0,0,0)], but rather with a rise in the partial accountability options. This implies that even in the presence of a selection incentive, some accountability is retained.

It is also important to note that 45% of incumbents transfer the entire budget to the voters when there is no incumbency advantage in an attempt to win them over. In comparison only 28% of incumbents transfer the entire budget when there is an incumbency advantage. This indicates that the subjects in IA seem to understand that they have a large leeway to allocate a part of the budget to themselves.

Table 3.8: Expected payoff of incumbents

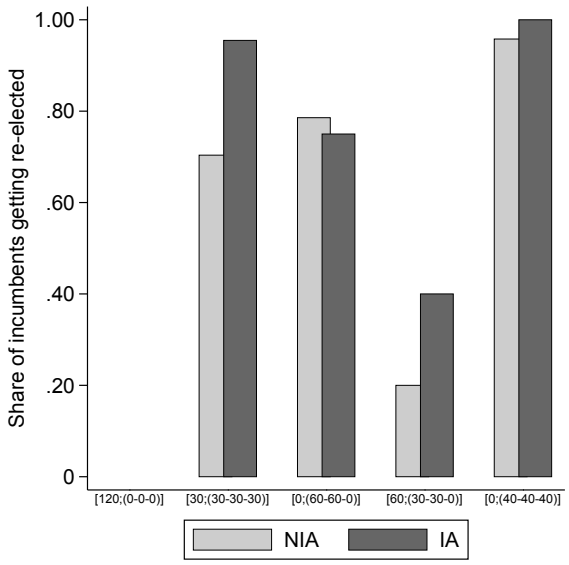
	NIA		IA	
Allocation vector	Expected payoff	% of incumbents	Expected payoff	% of incumbents
[120;(0,0,0)]	120.63	10.18	129.02	6.08
[30;(30,30,30)]	**140.39**	**37.50**	**162.37**	**48.07**
[0;(60,60,0)]	89.44	10.18	101.80	4.42
[60;(30,30,0)]	85.94	8.75	110.77	17.31
[0;(40,40,40)]	136.26	33.39	138.09	24.13

Note: Expected payoff is in taler and is calculated using voting choices observed during the experiment.

Voters' behavior is not deterministic, but the results revealed some patterns. Incumbents who observe these patterns might choose budget allocations that maximize their payoffs given these patterns. In fact, calculating the ex-post expected earnings from choosing each allocation vector using the voting probabilities indicates that incumbents are able to exploit this pattern. Table 3.8 displays the expected payoffs of the incumbents for each allocation vector calculated using the re-election probabilities from the data. It shows that incumbents choose the budget allocations that give them a higher expected payoff with a higher probability.

Decreasing Accountability Result *When there is an incumbency advantage the incumbent behaves less accountably compared to the case of no incumbency advantage. However, some degree of accountability is retained even when there is a selection incentive.*

Figure 3.5: Re-election of incumbents



Note: The figure shows what share of incumbents choosing each of the allocation vector, gets re-elected.

Figure 3.5 indicates the re-election probabilities of the incumbents for each allocation vector they choose. It differs for the two treatments. In NIA treatment, the highest probability of re-election is for the allocation vector [0;(40,40,40)]. Here the incumbent distributes the entire budget to the voters and hence is a case of full accountability. The second highest probability is for allocation vector [0;(60,60,0)], again an option of full accountability. The partial accountability options of [30;(30,30,30)] and [60;(30,30,0)] are preferred in this order after the former two.

In case of IA, the incumbents have the highest probability of getting re-elected when the allocation vector is [0;(40,40,40)]. Incumbents choosing the vector [30;(30,30,30)] has the next highest probability of re-election. This is followed by allocation vectors [0;(60,60,0)] and [60;(30,30,0)].

Incumbents deciding to appropriate the entire budget of 120 taler do not get re-elected even with the induced incumbency advantage. The difference between the two treatments is seen on the two partial accountability cases of [60;(30,30,0)] and [30;(30,30,30)]. When there is a selection incentive voters are more likely to re-elect the incumbents who are only partially accountable than in the baseline treatment. The re-election probability of an

incumbent choosing [60;(30,30,0)] increases from 20% to 41% as a result of the treatment. For an incumbent choosing [30;(30,30,30)] this increases from 70% to nearly 97%. This indicates that voters do not press for full accountability when there is a selection incentive. On the other hand the selection incentive does not bite to the extent that they are willing to re-elect an incumbent who retains the entire budget. Accountability does not disappear entirely in the presence of a selection motive.

3.6 Conclusion

The incumbent officeholder in a democracy with majoritarian elections might or might not act in the best interest of the voters. An incumbent politician could use the office to extract rents. We assess the quality of majoritarian elections as a disciplining device. More specifically, we consider voting behavior of a set of voters who face an electoral decision of re-electing an incumbent in a framework with and without an incumbency advantage. We investigate if the voters can hold the incumbent officeholder accountable to them in these two settings.

We find that the set of voting equilibria is very large, due to the pivotality issue and the formation of pivotality beliefs. Some of these equilibria are observationally equivalent to behavior that appears to be driven by incumbents' favoritism and by voters' preferences for reciprocity. We confront these theoretical results with evidence obtained from a laboratory experiment. We find qualitative evidence on voting behavior that is broadly in line with a theory suggesting that voters cast their votes prospectively. If voters have a higher future benefit from re-electing the incumbent, this yields a higher re-election probability. An incumbency advantage reduces the power of the voting mechanism to prevent incumbent governments from extracting. But we also find evidence for retrospective voting, where retrospective voting is slightly less pronounced if voting against an incumbent who behaved unaccountably is conflicting with voters' higher future benefit of re-election.

We find that voters' pivotality beliefs are influenced by whether incumbent politicians treat all voters alike, or whether they cultivate a favored majority. Voters in the favored

majority assume they are more likely to be pivotal than the minority voters. These beliefs are correct on average. However, we see that these voters are not significantly more likely to re-elect the incumbent when there is a selection incentive compared to those who believe they are non-pivotal. One potential reason for this could be that the pivotality beliefs are not independent of the treatment variation. Voters in the incumbency advantage treatment are more likely to believe they are pivotal when they belong to the favored majority.

We also see that the behavior of incumbents reflects the observed voting behavior of the voters. Incumbents do not take full advantage if there is a selection incentive in their favor. Rather, the amount of accountability is qualitatively very similar to that of incumbents who do not have an incumbency advantage. We conclude that an exogenously given incumbency advantage makes the incumbent extract somewhat more, but typically not the maximum amount that would be feasible. Voters are able to use retrospective voting as a mechanism to discipline the officeholder. A large share of the incumbents seemingly anticipate correctly that extractive government that takes full advantage is sanctioned by the voters in the equilibrium.

3.7 Additional Materials

3.7.1 Appendix A - Proof for Proposition 1

This appendix offers a proof for Proposition 1. Denote by λ_i whether a voter i votes for the incumbent ($\lambda_i = 1$) or for the challenger ($\lambda_i = 0$). Player i chooses $\lambda_i \in \{0, 1\}$ that maximizes

$$\hat{p}_i(x_i)\lambda_i\theta. \tag{3.1}$$

Consider the following equilibrium candidate set of pivotality beliefs for all voters:

$$\hat{p}_i(x_i) = \begin{cases} 1 & \text{if } x_i = \frac{1}{n} \\ 0 & \text{otherwise} \end{cases} \tag{3.2}$$

If voter i believes that $\hat{p}_i(x_i) > 0$, he votes for the incumbent. If a voter believes that $\hat{p}_i(x_i) = 0$, he may vote for the incumbent or against the incumbent, as i's payoff is independent of i's vote. Let the voters' tie-breaking rule be that $\lambda_i = 1$ in case of indifference if $x_i \geq 1/n$, and $\lambda_i = 0$ otherwise. Given this, the incumbent is re-elected if and only if she gives transfers $x_i = \frac{1}{n}$ for at least n voters. Note that n such transfers just exhaust her budget for $x_i = \frac{1}{n}$, that this leads to n voters who believe that they are pivotal and $n - 1$ voters who think they are not pivotal, and these pivotality beliefs are correct in the candidate equilibrium. Turn to the incumbent's choice. The incumbent anticipates that she is re-elected if and only if she allocates $x_i = 1/n$ to exactly n voters. As $b > 1$ the incumbent prefers to choose $x_i = \frac{1}{n}$ to precisely n voters to any other choice.

3.7.2 Appendix B - Additional tables

Table 3.9: Effects of selection incentive, own receipts and level of accountability on voting for the incumbent (Probit regression)

	Dependent Variable - Vote for the incumbent		
	(1)	(2)	(3)
Treated (=IA)	0.402***	0.114***	0.114***
	(0.0849)	(0.0238)	(0.0238)
Own Receipt	0.0385***	0.0129***	0.0116***
	(0.00190)	(0.000457)	(0.000515)
Baseline: No accountability			
Partial accountability			0.130***
			(0.0168)
Full accountability			0.168***
			(0.0218)
Constant	-1.101***	0.0141	-0.0788
	(0.0615)	(0.0803)	(0.0696)
Controls	No	Yes	Yes
No. of Obs.	11592	11592	11592

Note: Dependent variable takes value 1 if the vote is for the incumbent and 0 if the vote is for the challenger. Treated is a dummy variable that equals 1 if there is an incumbency advantage ($\theta > 0$) and 0 if there isn't ($\theta = 0$). Variable Own Receipt is the amount the voter receives. Partial accountability variable takes 1 when the incumbent makes a non zero transfer to the voters but retains a part of the budget and 0 otherwise. Full accountability variable takes 1 when the incumbent transfers the entire budget to the voters and 0 otherwise. They are both compared to the baseline of No accountability. The controls include experimental rounds, gender, participation in a past election. Marginal effects from Probit regression. Standard errors are clustered at the individual level. Robust standard errors in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 3.10: Effects of selection incentive, own receipts and level of accountability on voting for the incumbent (clustered at the session level)

	Dependent Variable - Vote for the incumbent		
	(1)	(2)	(3)
Treated (=IA)	0.116***	0.114***	0.114***
	(0.0176)	(0.0191)	(0.0191)
Own Receipt	0.0129***	0.0129***	0.0116***
	(0.000347)	(0.000347)	(0.000481)
Baseline: No accountability			
Partial accountability			0.130***
			(0.0150)
Full accountability			0.168***
			(0.0265)
Constant	0.140***	0.0897	-0.00440
	(0.0135)	(0.0802)	(0.0651)
Controls	No	Yes	Yes
No. of Obs.	11592	11592	11592
R-Squared	0.331	0.338	0.347

Note: Dependent variable takes value 1 if the vote is for the incumbent and 0 if the vote is for the challenger. IA is a dummy variable that equals 1 if there is an incumbency advantage ($\theta > 0$) and 0 if there isn't ($\theta = 0$). Variable Own Receipt is the amount the voter receives. Partial accountability variable takes 1 when the incumbent makes a non zero transfer to the voters but retains a part of the budget and 0 otherwise. Full accountability variable takes 1 when the incumbent transfers the entire budget to the voters and 0 otherwise. They are both compared to the baseline of No accountability. The controls include experimental rounds, gender and participation in a past election. Ordinary least squares (OLS). Standard errors are clustered at the session level. Robust standard errors in parentheses.

*$p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

3.7.3 Appendix C - Instructions for the experiment

Welcome to this experiment! Please read the following instructions carefully and completely before you start. A comprehensive understanding of the instructions helps you earn more money.

Your earnings in the experiment will be measured in 'Taler'. Once the experiment is completed, the Taler that you have earned will be converted into cash and paid to you in private. For every 20 Taler you earn, you receive 1 Euro in cash. Additionally, you also receive a show up fee of 6 Euros.

Please note that you are not allowed to communicate with other participants during the course of the experiment. If you do not obey this rule we reserve the right to ask you to leave the room and not pay you the show up fee. If you have any questions or clarifications please raise your hand and we will help you.

The Tasks

You take part in an interaction that resembles a political process with political decision making and voting. You are, with four other participants, randomly assigned to a group of five. In each group there are two politicians - an incumbent and a challenger, and three voters. At the beginning of the experiment you will be assigned to either the role of a politician or the role of the voter.

The political interaction proceeds according to the following rules.

1. Each politician has to decide on how to allocate a budget of 120 taler if s/he is the incumbent politician in the first office period. There are five possible ways in which the budget can be allocated (as indicated in Table 3.1).

These options will appear on the computer screen of each politician.

2. Once the politicians have made their choices, one of the politicians is randomly chosen as the incumbent politician. The option chosen by this politician is implemented. The option chosen by the politician who becomes the challenger is not implemented. Payment to the voters and the incumbent politician in this stage depends on the option

chosen by the incumbent. Irrespective of the options chosen by incumbent, the challenger receives a fixed payment of 25 taler from the laboratory.

3. Consider the voting stage. Each voter knows the size of the budget and the five options from which politicians choose. Each voter knows that s/he receives either 0, 30, 40 or 60 taler. A table appears on voters computer screen and each voter is asked whether s/he gives her vote to the incumbent or to the challenger for each possible transfer. Note that the actual amount to be received by the voter is already determined, but not yet known to the voter. So by answering these questions the voter cannot affect the choice behavior of the politician.

The format for voting is as given in Table 3.2:

4. The voters are asked whether they think that their own vote tipped the outcome in the election. "Tipping" here means that had the voter voted for the other politician, it would have made him (her) the winner. Note that a voters vote tips the outcome of the election only if one of the other voters votes for the incumbent and the other votes for the challenger. Neither the other voters nor the politicians can observe a voters choices.

This completes the set of decisions. The computer now allocates the payments to the voters according to the option chosen by the incumbent politician. If the option chosen by the incumbent politician allocates different amounts to different voters, the computer randomly allocates the amounts to the three voters. Based on these budget allocations, the computer applies the voting decisions of the voters to determine the votes received by the incumbent and challenger. The politician who receives two or three votes wins the election. The other politician who receives zero or one vote loses the election. The politician who is elected receives a payment of 140 taler and can keep this amount for himself (herself). The politician who is not elected receives no further income at this stage.

No Incumbency Advantage treatment: In addition, each voter receives a payment of 20 taler in this stage.

Incumbency Advantage treatment: In addition, each voter receives a payment of 30 taler if the former incumbent obtains at least two votes and a payment of 20 taler if the incumbent receives zero or one vote.

The incumbent, the challenger, and all voters are informed about the option chosen by the incumbent, the winner of the election, the number of votes given to the incumbent and challenger and their own earnings in taler. This ends the round.

The procedure

The main part of the experiment consists of 8 identical and independent rounds. Each round follows the same rules as described above.

Players keep their respective roles as politicians or voters throughout the experiment. The politicians keep their roles as politicians and a random mechanism is used in each round to determine which of them is the incumbent and challenger. The voters continue to be in the role of voters.

The players that interact in a given round are randomly regrouped with other players from one round to the next, and so on for all rounds. This means that you as a participant are typically matched with new, other players in each new round. You will not know who your co-players are in any given round. Any attempt to reveal the identity by a player leads to exclusion from the experiment.

At the end of the experiment, three random rounds will be chosen from the eight rounds. The choices and outcomes in these three rounds, and only these rounds, count for your payment. The results from the other five rounds are irrelevant for payment. However, during the experiment you will not know which three of the eight rounds are relevant for the payment, and which ones are not.

The taler you received or earned in the three payment relevant rounds will be summed up. The amount of taler is converted into Euro (20 taler = one Euro). This determines the payment you receive.

In addition, you receive a participation fee of 6 Euro.

The sum of payments will be made to you in cash when you leave the laboratory. Before the experiment starts, you will be asked to answer a number of questions which appear on your screen. These are about the experiment. They are meant to illustrate the rules and procedures of the experiment by way of examples.

We also request you to answer further questions at the end of the experiment. All the answers you give and all the decisions you make during the experiment will be treated anonymously. No connection can be made between these answers and your name/identity.

We thank you for your participation and wish you success!

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