Pre-Analysis Plan - Informal Taxation in Development Projects: the Role of Chiefs in Sierra Leone

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Abstract

This paper investigates the relative efficiency of traditional leaders when informally taxing citizens in low-income states and whether this comes at the expense of relatively poor households. I design a field experiment to measure whether citizens engage in costly actions to avoid contributing their labor to a public good. I randomize communities across different methods to select contributors to compare the status quo of chiefs selecting contributors to two alternatives: random lotteries and progressive selection based on household surveys. I use the random selection arm as a benchmark and estimate whether selection by chiefs or progressive selecting are relatively efficient by generating more or less costly behavior from citizens. I also study the heterogenous effects of these treatment arms by household wealth. This allows me to asses if chiefs appear regressive by mostly burdening poor households and whether this can be corrected by a simple policy instrument. (JEL C93, D91, H21, H23, H41, I32, O12, O17)

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I Introduction

Traditional leaders called chiefs are local elites which are highly influential in many countries of sub-Saharan Africa (SSA), particularly in rural areas where national states have little capacity to oversee policies (Michalopoulos and Papaioannou, 2015). Besides managing access to land and conflict resolution, chiefs also play a key role coordinating public good provision. Either when communities need provide their own public goods or when external funds for development become available, chiefs organize communities to fund these projects (Baldwin, 2015; van den Boogaard and Santoro, 2023). This means collecting contributions in the form of labor, money or goods needed by the community.(van den Boogaard and Santoro, 2023). As a result, traditional leaders informally tax citizens by distributing the costs of these public goods (Olken and Singhal, 2011).

Previous work around this governance institution points to the existence of a tradeoff when chiefs informally tax citizens. On the negative side, household surveys suggests the chieftaincy tends to be regressive as the poorest households contribute proportionally more to local public goods (Olken and Singhal, 2011; Walker, 2018; van den Boogaard *et al.*, 2019). This is also in line with a broader literature suggesting the chieftaincy is a form of elite capture that historically has burdened the young and poor, and works in detriment of public goods (Peters and Richards, 2011; Acemoglu *et al.*, 2014). On top of this, there are even concerns of chiefs being corrupt, nepotistic, or simply poor managers (Beekman *et al.*, 2014; Basurto *et al.*, 2020; Casey *et al.*, 2023). All of these underscores the role potential pitfall of chiefs coordinating public good provision.

Nonetheless, other researchers point towards the benefits of customary governance and how it can contribute to development policy. They highlight how chiefs are tightly embedded in their communities and have higher levels of approval than political leaders (Baldwin, 2015). This allows them to have local information which is useful to tax or allocate subsidies (Basurto *et al.*, 2020; Balan *et al.*, 2022). This puts chiefs in a good position to solve collective action problems and mobilize resources for development programs (Baldwin and Raffler, 2019; Bulte *et al.*, 2018).

In this project, I propose a field experiment to study this problem and provide better empirical evidence about the claim that chiefs are relatively efficient when promoting cooperation at the expense of burdening mostly poorest households. The experiment takes place in rural Sierra Leone and it is designed to measure if citizens engage in costly behavior to avoid being selected to work for a local public good [1]. This captures the efficiency of chiefs as it reveals how private

[1] The approach to measuring costly actions when individuals face redistributive pressure in order to infer implied tax rates is inspired by the literature on kin or social taxation (Jakiela and Ozier, 2016; Boltz *et al.*, 2019; Carranza *et al.*, 2022).

incentives lead to useful community resources being "burned" due to redistribution. This approach also allows me to test if these private costs are larger among the poorest households to focus on the distributional implications of chiefs selecting contributors.

To properly measure the extent to which citizens in this context engage in costly actions to avoid a public good, I frame this experiment as an instance of a development program where chiefs can informally tax citizen's labor. The program offers simple jobs to people in rural areas across multiple communities over a span of two days per community. I introduce a real public good problem by advertising that among people working on the second day, some will be selected as community workers instead of working for themselves. These community workers do the same job as others but their earnings are be donated by the program to their local clinic. As a result, I can measure whether people act as if they are impatient and incur in private costs to shift their work towards the first day of the program[2]. In the experiment this takes the form of participants being willing to accept a wage-cut to work earlier and possibly avoid being selected.

I study how chiefs informally tax citizens around development projects by implementing different methods to select community workers across communities. In some communities, I delegate the task of selecting community workers to town chiefs. This represents the status quo approach followed by many development projects. I randomly assign other communities into two alternative selection methods: (i) random selection or (ii) progressive selection. The former method provides a benchmark where selection is transparent. The latter is inspired by Proxy-Means-Tests (PMTs) used to target subsidies in similar contexts and can be used to ensure that very poor households do not end up bearing disproportionate costs of funding local public goods.

The main analysis of this experiment compares the prevalence of costly actions to avoid contributions across selection methods. First, I use the random selection as a benchmark to asses the treatment effect of being assigned to either selection by chiefs or progressive selection. This speaks to whether these methods are relatively efficient or inefficient. The random selection arm provides a clean benchmark as I leverage within-community variation to cleanly estimate the elasticity of costly actions to avoid contributions to changes in the true likelihood of selection. Secondly, I do a heterogenous effects analysis to study whether multiple measures of participant's household wealth mediate the effect of being assigned to chief selection or progressive selection. This allows me to assess if chiefs mostly burden the poorest households in their communities and whether a PMT-like approach can reverse this pattern.

The controlled nature of this experiment lets me focus on the efficiency and distributional implications of these selection methods that stem from how they select who bears the cost a

[2]This resembles the behavioral response identified by Exley (2016) where participants in an experiment display relatively more risk aversion when risk can be used as an excuse to avoid charitable donations.

public good. To do this I abstract from other dimensions in which chiefs might do better or worse than the other selection methods. In particular, I abstract away from the problem of choosing which public goods to fund and how to enforce contributions. I do this to focus on the role of chief's discretion when selecting who bears the costs public good and observe how communities react to alternatives ways doing this selection.

I proceed by going over the details of the experimental design, focusing on how the jobs program was implemented in all communities, the measurement strategy for the main outcome of the experiment, and how each selection method works. I then describe the empirical strategy, particularly going over regression specifications I estimate with the experimental data and how they connect to precise hypothesis.

II Experimental design

In order to study the efficiency and distributive properties of traditional leaders solving collective action problems, I implement a simple program offering one day jobs to people in 88 communities across 6 districts of rural Sierra Leone. The communities are sample by selecting 44 rural sections across the 6 targeted districts and visiting two communities per section. The locations were sampled by selecting sections with low population density but have a local clinic. Within each section, field teams were given a protocol to select communities which involved avoiding large towns and picking two communities similar to each other. Figure 1 below displays the 44 samples sections.

The key feature of this program is that some participants directly profit from their own effort while others are selected to work for a public good. This allows me to randomize across communities different mechanisms to select who has to bear the costs of funding the public good, one of them being delegating the selection to local chiefs. I proceed by explaining how the program is implemented and what this allows me to measure. I then explain the selection mechanisms randomized across different communities.

II.A The jobs program

The basic idea of the program is to provide one-day jobs to people in each community visited, thus creating an activity where participants are individually rewarded for their effort. The job task is classifying Sierra Leonean names by gender and ethnicity; a task that is framed as useful for a local NGO which is outsourcing it at scale in rural communities.

To create a public good problem, participants are informed that some of them will be selected to "work for their community". In practice, this means that selected participants will do the

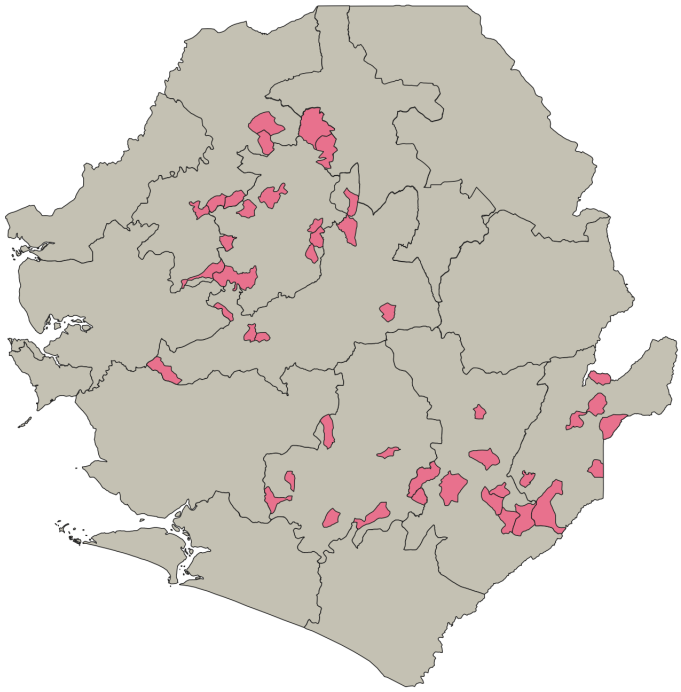

Figure 1: Sampled sections

job as usual, but the majority of their earnings will be automatically donated by the program to a real local public good. This public good is the clinic or health center serving each community. As a result, selected participants do not profit directly from their effort and the program might become less attractive to them.

In order to capture each participant's willingness to be part of the public good problem, I implement the jobs program over the course of two days in each community and inform participants the selection of clinic workers only takes place on the second day. This is a key feature of the experimental design as it implies that participants who want to avoid being selected should prefer to work on the first day of the program. This is explained graphically in Figure 2. By implementing this two-day design I can then eliciting participants preferences over which day to work on upon recruitment and learn which participants are willing to potentially be selected and which ones want to avoid contributions. This will be the main outcome of the experiment, which is explained in detail in the next subsection.

II.B Main outcome of the experiment

The elicitation participant's preferences over which day to work allows me to capture whether people engage in costly actions to avoid contributions to a public good. To measure this I use a Multiple Price List (MPL) to let elicit how big of a wage-cut are participants willing to accept in

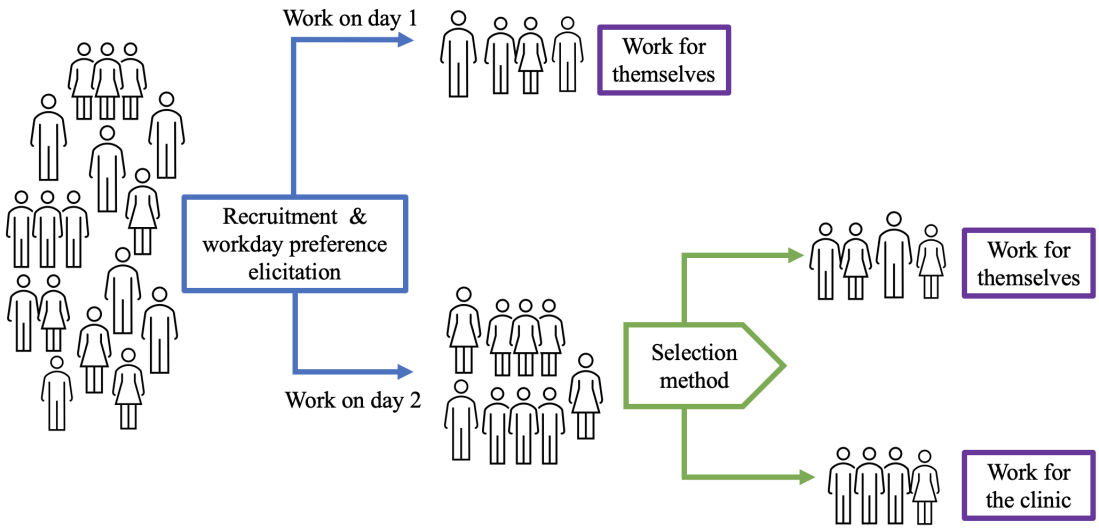

Figure 2: Two-day design of the experiment for each community

order to work on the first day[3]. These decisions are made after recruitment and knowing how selection of workers in each community will work. Participants know that their choices are used to decide if they work on the first or second day the program, which makes their choices incentive compatible.

This elicited wage-cut captures both impatience over the job earnings and participant's willingness incur in a cost to avoid being selected. Importantly, the experiment includes a treatment arm where some participants can never be selected in order to isolate the impatience component of this outcome. Then, the experimental variation I generate from implementing different selection methods across communities allows me to properly infer if participants take on private costs to avoid contributions.

The focus of this experiment on measuring costly actions to avoid contributions stems from multiple reasons. First, engaging in costly behavior to avoid public good contribution directly speaks to the inefficiencies of solving a collective action problem. In this experiment, this takes the form of communities not getting all the resources made available to them due to individual incentives.

Moreover, measuring costly actions to avoid contributions improves upon previous work on informal taxation by cleverly parsing out the coercive nature of public good contributions. This happens because incentives in the experiment are such that anyone who voluntarily wants to help the clinic should not accept wage-cuts to work earlier. Methods like household surveys do not correctly account for voluntary giving and might overestimate the burden of informal

[3]Participants making multiple decisions of the form "do you prefer working for $X today or $Y tomorrow" for different values of X and a fixed value of Y, where $X \leq Y$.

taxation and how it is distributed. This experiment then provides a novel measurement strategy in the literature of informal taxation.

Finally, the two-day design allows participants to mask their decision to avoid the public good under other reasons that might lead them to prefer working on the first day. This is an important feature this experimental design as usual questions about contributing to public goods and particularly when they involve the role of traditional leaders might suffer from social desirability bias. Community members might want NGOs to continue funding them and as a result have incentives to present themselves as pro-social and their chiefs as benevolent leaders. Allowing respondents to mask their contribution decision and expectations about leaders in their work-day decisions should help to elicit less biased behavior.

II.C Selection methods

For this experiment I randomize communities into three possible selection methods. These randomization is done stratifying at the district level for the 6 districts where the program is implemented. In all communities, being selected or not have the same implications. People selected to work for the clinic will complete the job as everyone else, but a high share (90%) of the money they generate will be given by the program to their local clinic. Participants do not operate as intermediaries and the labor tax is fully enforced[4]. On the other hand, participants who are not selected get to keep all of their experimental income.

The three selection methods below are explained in details to all participants when they are recruited just before eliciting the wage-cut participants would be willing to accept to work one day earlier in the program as explained above. However, as some participants will work on the first day in each community and avoid being selected, these selection methods are only implemented with participants working on the second day the program visits each community.

Random Selection: This treatment arm serves as a benchmark for the experiment as it uses a simple transparent lottery to decide whether each participant working on the second day is selected to work for the clinic or not. I randomize participants within these communities into three different lotteries to determine their selection: 0% chance of selection, 25% chance of selection, and 50% chance of selection.

This lottery randomization allows me to use individual-level variation to estimate how participants react to different likelihoods of being selected in an environment without any discretion or any bias in the selection process. The fact that some participants are never selected (0% chance arm) allows me to measure the wage-cuts participants would accept only driven by

[4]Enforcement of contributions is an important dimension this experiment abstracts away from, particularly since chiefs have a clear advantage on this dimension I implement perfect enforcement to focus on the inherent redistribution tension of informal taxation schemes.

impatience. The other two lotteries allow me to estimate how increasing the chances of selection mechanically drive up the wage-cuts participants are willing to accept. This helps me benchmark the extent to which people engage in costly actions to avoid contributions for a transparent and unbiased mechanism of selection.

Chiefs Selects: In communities assigned to this selection method, I will ask village chiefs at the end of the first day or work in each community to select who they believe should work for the clinic. This also involves explaining to the chief the nature of the program, particularly how some people will work and keep their earnings while others work to help the community by funding the local clinic. Chiefs will select clinic workers by choosing half of the people from the list of all participants in the program. However, as some people might have chosen to work on the first day, only people available to work on the second day and selected by the chief will work for the clinic.

I interpret this method as the status quo method used in rural communities to decide who bears the costs of funding or providing local public goods, which can be thought as an informal tax on rural citizens (Olken and Singhal, 2011). By comparing participants willingness to engage in costly actions to avoid contributions when chiefs selects versus the benchmark of random selection, I can test if chiefs are relatively efficient at solving collective action problems and whether the poorest households bear particularly high costs of informal taxation by chiefs.

Progressive Selection: Participants in communities where I implement progressive selection are told that the program will use survey questions about their living conditions to target participants from wealthier households to work for the clinic. Importantly all the demographic questions used to implement this progressive selection are collected during recruitment before explaining the jobs program. To to this, the recruitment survey uses multiple questions standard to household surveys for rural areas to calculate a an index of wealth; much in the spirit of Proxy-Means Tests (PMT) targeting. Field teams will have access to these index and will select half of workers available on the second day based on this wealth index.

The motivation to implement this selection method stems from its connection to policy instruments like the PMT to target subsidies. This treatment arm allows me to test this progressive method of selecting beneficiaries in a situation when the tension between winners and losers of the selection process is more salient. With usual subsidies, communities might perceive them as benefiting targeted households while the rest stay the same. In this experiment, this selection method makes more salient that in principle everyone was benefiting from the jobs, but the wealthier households are asked to redistribute. Thus, this arm allows me to study how do communities react to progressive approaches to redistribution based on household surveys in settings, particularly in a context where is hard to measure people's wealth and surveys only provide a noisy proxy.

Randomization: The three selection methods described above are randomized at the commu-

nity level in this experiment. As mentioned before, the sample was obtained by sampling 44 sections and then visiting two communities with each section. Approximately one third of the communities were assigned to each method. Within the random selection arm, approximately 40% of respondents face zero chances of selection and the remainder are equally split between the 25% and 50% lotteries.

III Empirical strategy

I analysis this experiment in the following order. I begin by describing participant's behavior under the random selection arm as it provides a natural benchmark for citizens willingness to engage with this experimental public good. This arm also introduces individual-level variation useful to characterize how the main experimental outcome varies with controlled changes in the selection method. I then analyze the effect of delegating the selection of clinic workers to chiefs and the effect of implementing a progressive selection method. Finally, I explore how heterogenous are the effects of including chiefs or implementing progressive selection along the wealth dimension.

III.A Random selection

The random selection treatment arm provides a useful starting point to analyzing this experiment as it uses simple and transparent lotteries to decide who works for the clinic. In this arm, I introduce individual-level random variation in terms of the exact lottery participants are exposed when selecting clinic workers. Participants can be assigned to either 0, 25%, or 50% chances of selection. This variation allows me to study how elastic is participant's willingness to incur in private costs to avoid the public good to changes in the likelihood being selected.

I restrict the sample to communities in random selection and estimate the regression below, where Y_{ic} is the largest wage-cut participant i in community c is willing to accept in order to work earlier avoiding selection. I estimate two coefficients, one for the effect of being selected with 25% probability and another for the effect of being selected with 50% probability. This means the control group are participants who can never be selected, thus their only motivation to work earlier is being impatient. The regression controls for community level fixed effects.

$$Y_{ic} = \mu_c + \theta_1 Prob25_i + \theta_2 Prob50_i + \varepsilon_{ic}$$

These regression serves two purposes. First, it allows me to test the hypothesis that the experiment does capture the desired behavior, which is participant's willingness to incur in private costs to essentially escape a tax on their labor. Thus I can test if $\theta_1 > 0$ and $\theta_2 > 0$, and moreover

that $\theta_2 > \theta_1$. The magnitude of these coefficients is also important, as it benchmarks how elastic are participants to increases in the chances of selection in a controlled but relatively fictitious scenario.

III.B Efficiency results

I then leverage the community level randomization to compare the efficiency of each selection method on aggregate. This means compare them in terms of the prevalence of costly actions to avoid contributions captured by accepting wage-cuts to work earlier in the experiment. The main specification used to study the relative efficiency of selection methods again focuses on the wage-cut accepted by each participant as main outcome. This regression now relies on variation across communities within the same section to estimate the effect of delegating selection to chiefs, captured by β_1, and the effect of implementing a progressive selection method, captured by β_2.

$$Y_{ics} = \mu_s + \beta_1 Chief_c + \beta_2 Progressive_c + \varepsilon_{ics}$$

This regression allows me to test two hypothesis. The first is that on average chiefs are relatively efficient leaders solving collective action problems and thus generate less costly action by citizens to avoid selection. This is stressed by previous work on the role chiefs play in local development policy in many areas of SSA. Evidence in favor of this hypothesis can be captured by $\beta_1 < 0$. The second hypothesis to test is that implementing a progressive selection method incurs in efficiency costs relative to a random selection. This hypothesis can be true if relatively wealthy people are less willing to contribute to public goods or simply because participants do not trust redistribution mechanisms that imperfectly capture wealth in this context. This is captured by $\beta_2 > 0$.

To complement aggregate results, I explore mechanisms which might explain how these selection methods differ. I do this by running the same specification with secondary outcomes. The additional outcomes I capture through surveys are: expectations of effort put when working for the clinic which proxies conditional cooperation, perceptions of how fair is each selection method before selection is done, and perceptions about how effective is each method in generating compliance with working for the clinic.

III.C Distributional implications

I finally explore the distributional properties of each selection mechanism in the experiment. This particularly focuses on comparing the chief and progressive treatment arms to the random arm in terms of how costly actions to avoid contributions are distributed along the wealth

dimension. The overall goal of this section is to test if there is evidence of chiefs being regressive in this experiment and whether a simple policy tool can revert that regressiveness.

To answer this question I simply check for heterogenous treatment effects of the chiefs and progressive arms along the wealth dimension using two variables: (a) an index of household's material wealth based on survey questions[5], and (b) average rankings of wellbeing and living conditions asked to participants about others in their community. Importantly, the first index is very similar to what is used in the field experiment to select clinic workers in the progressive arm.

Thus, the regression to estimate uses a given measure of wealth demeaned to leverage within community variation W_{ics} and estimates:

$$Y_{ics} = \mu_s + \lambda W_{ics} + +\beta_1 Chief_c + \beta_2 Progressive_c + \gamma_1 W_{ics} \cdot Chief_c + \gamma_2 W_{ics} \cdot Progressive_c + \varepsilon_{ics}$$

The main hypothesis I test in this section is whether chiefs are relatively regressive, which means that poorer respondents are more likely to engage in costly action to avoid contributions relatively to random selection. It is thus possible that even in the random selection arm the poorest participants are more likely to avoid the public good, as this will be captured by $\lambda < 0$. But the hypothesis of chiefs being regressive in the experiment implies that $\gamma_1 < 0$. On top of this, I test if the progressive arm achieves its goal, making poorer households less worried about selection and shifting that concern to richer participants. This is captured by $\gamma_2 > 0$.

I test these hypothesis for each measure of wealth, which allows me to understand the distributional implications of each selection method under both perspectives. This allows me to study if chiefs are regressive when using survey measures of wealth, but not necesarilly when using participants perceptions. I additionally check whether the former heterogeneity analysis is not driven by other possible sources of heterogeneity like age, gender, closeness to the chiefs.

III.D Additional analysis

To complement the experimental analysis, I also analyze who the chiefs select in the experiment as a descriptive analysis of what chiefs do in the experiment. This adds to the previous results based on participant's behavior as they are driven by perceptions about being selected. As result, I am able to observe if participant's beliefs about the likelihood of being selected by their chief are actually accurate. I also show which demographic characteristics are related to being selected by the chief. Importantly, this experiment only provides an instance of how

[5]The index standardizes and adds multiple variables that proxy for wealth in rural areas. The survey questions used for the index are: items owned by household, landownership, animal ownership, materials of dwelling, rooms in dwelling per person in household, and ability of household to cope with shocks.

chiefs select. Thus, particular choices might not be reflective of their preferences but aggregate patters can be analyzed about the chieftaincy as a whole. A possible caveat with this results is that the selection by chiefs is done in a relatively controlled environment which might differ from usual ways in which chiefs distribute the burden of providing public goods.

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A Simple Model

Let's consider the baseline situation of an agent that has to allocate work between two periods according to the following problem:

- Effort on the first period e_1 translates to consumption $c_1 = e_1$
- Effort on the second period e_2 has a premium w, so $c_2 = we_2$
- Agent has an instantaneous utility function $u(c)$ and discount factor β

Thus the agent solves:

$$\max \quad u(e_1) + \beta u(we_2) \quad s.t. \quad e_1 + e_2 = 1$$

This has solution implicitly given by:

$$\frac{u'(e_1^*)}{u'(we_2^*)} = \beta w_2$$

What this implies is that the allocation of effort is completely determined by the impatience of the agent β and the curvature of their utility function u'. As a result, differences in behavior in the control treatment arm are associated to differences in these underlying behavioral parameters.

Selfish agent and a public good

Now let's consider what happens when an agent that does not internalize the benefits of a public good faces a selection mechanism that with likelihood p selects them to work for the public good. When selected agents stop earning in the second period for themselves.

With this modification the agent solves:

$$\max \quad u(e_1) + \beta(1-p)u(we_2) \quad s.t. \quad e_1 + e_2 = 1$$

This has solution implicitly given by:

$$\frac{u'(e_1^*)}{u'(we_2^*)} = \beta(1-p)w$$

Here we can see that the possibility of being selected simply decreases the effective discount factor in this problem. As a result, in this experiment the likelihood of being selected to contribute maps one-to-one to an increase in revealed impatience.

Agents that value the public good

When agents internalize the value of the public good the prediction of increased revealed impatience with the introduction of the public good is not always true. Now imagine the agent values the marginal contribution of their effort to the public good in period 2 by α.

Now the agent solves:

$$\max \quad u(e_1) + \beta\left[(1-p)u(we_2) + p\alpha e_2\right] \quad s.t. \quad e_1 + e_2 = 1$$

This has solution implicitly given by:

$$u'(e_1^*) = \beta\left(p\alpha + (1-p)wu'(we_2^*)\right)$$

This modification implies that prosocial agent can act more patiently with the introduction of a public good and its selection mechanism for a large enough value of α. Thus, the experiment can also reveal whether agents are vary prosocial if they react to the possibility of being selected by being more patient. More generally this mechanism can dampen the observed increase in impatience when a public good is introduced in the experiment.

Takeaways from the model

Given the results above, I want to highlight three important points that stem from this analysis and that are useful to interpret the experimental results, particularly when discussing heterogeneity by wealth groups (low, mid, high).

1. Differences in behavior across participants in the control arms reflect differences in the underlying behavioral parameters that affect the baseline condition (e.i. discount factor and curvature of utility).

2. Differences in how participants react to the random selection mechanism are additionally informative of the value participants assign to the public good. Since the random selection mechanisms imposes the same probability of selection p_i to every participant, heterogeneity in participant's responses is associated to their impatience, curvature, and importantly their valuation of the public good.

3. The two points above make clear why the random selection mechanism is useful even though it is not policy relevant. It allows me to uncover underlying heterogeneities that are important to uncover before studying whether the chiefs or a progressive mechanism have heterogeneous effects in this context.