Public Resources and Accountability: Experimental Evidence

Mariana Alvarado
University of Geneva
mariana.alvarado@unige.ch

Taiwo A. Ahmed
University of Gothenburg
taiwo.ahmed@gu.se

Aksel Sundström
University of Gothenburg
aksel.sundstrom@pol.gu.se

Sverker C. Jagers
University of Gothenburg
sverker.jagers@pol.gu.se

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Abstract

Recent political economy research indicates that the well-known positive relationship between taxation and accountability may be driven not by the source of revenues per se but by something that can be manipulated: citizen's feelings of subjective ownership over the budget. In this paper, we leverage both observational and experimental data to test this mechanism in a real-world policy setting. We field a survey experiment in carefully selected Peruvian districts wherein we manipulate the source of revenues (local taxes vs mining fees), as well as ownership over these revenues, while keeping an important alternative mechanism constant: the size of the budget. We find that it is easier to manipulate ownership over taxes than resource rents, and that low levels of tax awareness hinder ownership over tax revenues. While our treatments have no effect on the level of accountability demands made by respondents, we do find a novel effect on the type of demands that are made, with ownership increasing the demand for particularistic benefits.

Across the developing world, local government revenues typically come from unearned rents, either in the form of resource rents or transfers from higher levels of government. At the same time, local governments tend to exhibit high levels of corruption and low levels of accountability, despite continued efforts to promote citizen participation and bring government closer to the people. These phenomena are all in line with the idea of a fiscal contract, whereby compared to those who do not, citizens who pay taxes demand higher levels of accountability and public goods provision, leading to more positive governance outcomes. Research in this domain has long focused on identifying whether this fiscal contract indeed exists and under what conditions. In this paper, we seek to go one step further and investigate whether and how such a contract can be built, motivating citizens to hold government accountable for the provision of public goods, regardless of the source of revenues.

Ultimately, this is a question about the causal mechanism linking taxation and accountability. While classical work on rentier states and the fiscal contract has extensively investigated the link between the source of revenues and various governance outcomes, its reliance on observational, macro data has hindered its capacity to identify mechanisms. Against this background, we build upon novel experimental research that has sought to zero in on the mechanism linking taxation and citizens' accountability demands by shifting the focus to individual-level data (Paler, 2013; Martin, 2016; De la Cuesta et al., 2022; Weigel, 2020; Sjursen, 2023; Armand et al., 2020). Findings in this research indicate that the positive relationship between taxation and accountability may be driven by something that is not inherent to taxation, but that can be manipulated and constructed even in its absence: a sense of ownership over the public budget.

In this paper, we build on these findings by conducting a survey-based field experiment in rural villages in Peru that benefit from a so-called mining canon, that is, royalties or fees from mining extraction that are transferred to subnational governments. The question we are posing is: do citizens' perceived ownership of government revenues from different sources alter their accountability demands? We motivate our experiment by reporting results from a survey we conducted on a nationally representative sample of Peruvians with the purpose of exploring the relationship between information regarding the source and size of revenues, ownership, and

accountability. These survey results highlight the prevalence of confounding in observational data and the need for an experimental approach. As such, our experiment provides subjects with information regarding their local municipal budget while manipulating both the source of the budget (local taxes vs. mining canon) and the level of ownership over it while keeping budget size constant.

Our design builds on the recent literature in at least four ways. First, it extends the geographic scope of the existing experimental literature to a new setting —Latin America— where resource rents are an important component of public revenues. Previous findings linking ownership with increased accountability have come from lab experiments (Sjursen, 2023; De la Cuesta et al., 2022), which could suffer from low external validity, or from survey and/or field experiments in very specific settings (Ghana, Uganda, Indonesia) (De La Cuesta et al., 2019; De la Cuesta et al., 2022; Paler, 2013). Second, our study presents the first examination of how psychological ownership can develop in the context of a real-world policy by seeking to manipulate the intensive margin of preexisting feelings of ownership. Third, through a careful selection of sites, it measures ownership over resource rents relative to taxation while controlling for an important alternative mechanism: information regarding the size of the budget. As such, it sheds light on the relationship between these two mechanisms. Fourth, it adds nuance to the dependent variable by trying to understand the conditions under which citizens will not only demand *more* accountability, but also the right *type* of accountability. We therefore distinguish between demands for public goods as opposed to particularistic benefits. Finally, it is worth highlighting that our approach enables us to carefully sample a subject pool, rural residents in Peru, whose attitudes and behaviors are seldom the focus of social science research.

We report multiple findings. Recent literature has questioned whether ownership is indeed higher over tax revenues than resource rents in developing countries (De La Cuesta et al., 2019), a question that seems to find support in our observational data. However, once we account for respondents' expectations regarding the size of the budget in our experiment, we find higher levels of ownership over the budget when it comes from local taxes as opposed to mining canon. Prior research has also maintained that ownership is not only malleable but relatively easy

to manipulate (De la Cuesta et al., 2022). Our findings indicate that it may be harder to manipulate than anticipated: our treatments only increased ownership over tax revenues (not mining canon) and by a relatively small amount. We show that one of the reasons for this small effect size is low tax awareness: the fact that respondents are not aware of paying taxes limits their sense of ownership over tax revenues. Consistent with prior findings from experiments seeking to induce accountability, we find no effects of any of our treatments on behavioral or attitudinal measures of accountability. However, we do find that ownership matters for the type of accountability that is demanded: respondents in the tax and ownership treatment were more likely to send particularistic demands as compared to those in the control group. Finally, we find that information about the size of the budget attenuates the effect of our treatments, highlighting the importance of adopting research strategies that allow us to isolate the effect of different mechanisms.

The paper is organized as follows. Section one summarizes the literature and presents our hypotheses. Section two describes our setting, presents observational data informing our experimental design and presents this design. Section three outlines our analytical strategy. Section four presents our findings. Section five includes robustness tests highlighting the role of information and assessing potential alternative mechanisms. Section six discusses our findings and section seven concludes.

1 Literature and Theory

The political economy literature has long found an association between the source of public revenues in a country and its level of accountability. More specifically, it has found that when the state is funded through taxes, governments tend to be more accountable to citizens. In contrast, rentier states are less accountable and more likely to exhibit a number of negative governance outcomes (thus the resource curse). As such, taxation has been found to be correlated with democracy (Ross, 2004), while rents are correlated with authoritarianism, corruption, civil war, patronage, low institutional quality and under-provision of public goods (Ross, 2004, 2015;

Jensen and Wantchekon, 2004; Busse and Gröning, 2013; Gervasoni, 2010), to name a few.

While this association is clear and robust, the reasons behind it are much less certain. This is due to both methodological and conceptual motives. At a methodological level, this literature's reliance on large-N cross-country correlations has made it difficult to assess the causal nature of this relationship and the potential mechanisms underlying it. Moreover, it has led to the accumulation of contradictory findings and growing claims that relationships found on the basis of observational data may be endogenous, spurious, or conditional (Haber and Menaldo, 2011; Ross, 2015). As a result, the last decade has seen the adoption of a number of methodological improvements, including the use of exogenous and/or subnational variation in revenues (Martínez, 2023; Caselli and Michaels, 2013; Monteiro and Ferraz, 2010; Arezki and Brückner, 2011; Gadenne, 2017), the study of conditional effects (Bhavnani and Lupu, 2016) and the examination of micro-level data (McGuirk, 2013) in an attempt to probe mechanisms.

This has allowed researchers to establish that, at least in certain Latin American countries, windfalls[1] cause higher levels of corruption and patronage but have no effect on public goods provision (Caselli and Michaels, 2013; Monteiro and Ferraz, 2010; Martínez, 2023), while taxes do lead to higher levels of public goods (Martínez, 2023; Gadenne, 2017). Nonetheless, mechanisms have not been explicitly tested, making it difficult to determine whether these effects are driven by the source of revenues itself or other factors potentially associated with it, such as their scale or predictability.

Which brings us to the conceptual side of the problem. While it is clear that taxation is the positive pole in this continuum, there is growing consensus that the negative pole is not limited to natural resource rents —as was once believed— but rather constitutes any form of unearned revenue, or rents (Paler, 2013; Gervasoni, 2010; Prichard et al., 2018). The problem is that rents are defined by multiple features and we don't really know which of them matters for accountability demands, and how. Gervasoni (2010) defines rents as revenues accruing to a state that come from an external source, that are not necessarily proportionate to its size and

[1]Throughout this paper we use windfalls to refer to any form of unearned revenue, including resource rents and transfers from higher levels of government, consistent with Gervasoni (2010) and Paler (2013).

that do not depend on broadly taxing the domestic economy.[2] They thus comprise not only natural resource rents but also foreign aid and even transfers from higher levels of government. Crucially, each of these features may be plausibly linked to citizen accountability demands via different mechanisms. For example, their disproportionate size may be linked to the expectations they generate, their external source to their predictability, and the absence of taxation to the link between citizens and the state.

In recent years a small number of experimental studies have sought to advance this literature by shifting the focus from politician to citizen behavior[3] and attempting to isolate the key mechanisms that may be driving observational findings. These works have examined two main mechanisms through which taxation might affect citizens' accountability demands: information and ownership. A third potential mechanism, bargaining, will not be discussed here, as it is based on citizen-leader interactions and thus escapes our focus on the demand side.[4]

The first mechanism —information— focuses on the role of taxation in providing citizens with information that will increase their ability and willingness to monitor the government. This information could refer to the level of government that should be held accountable, the size of the budget, or government's capacity to implement it. Conversely, rents exacerbate government's informational advantage, undermining citizens' capacity to hold it accountable. Evidence regarding this mechanism is consistently positive: providing citizens with information about misuse, state spending capacity and future expected benefits have all been found to increase citizen participation and sanctioning (Paler, 2013; Weigel, 2020; Armand et al., 2020).

The second mechanism —ownership— focuses on how taxation might affect citizens' moti-

[2]Paler (2013) proposes a similar definition: rents are substantial in scale, paid by external actors and accrue directly to government. Ross (2001) provides a similar —if more limited— definition of rents: they are large, paid by foreign actors, accrue directly to the state and only a few are engaged in their generation.

[3]The focus on politician behavior is shared with formal work such as Robinson et al. (2006), Caselli and Cunningham (2009) and Brollo et al. (2013).

[4]This mechanism hinges on the fact that in order to collect taxes, governments must engage with citizens, either coercively or through a voluntary exchange. To the extent that citizens have bargaining power or leverage (as determined by a number of contextual characteristics, including the nature of their assets and the level of state capacity), governments will be forced to respond to the preferences of citizens, leading to higher levels of accountability or responsiveness (Levi, 1989; Ross, 2004; Moore, 2004; Bates and Donald Lien, 1985; Timmons, 2005). In contrast, rents allow governments to exchange "free goods for political quiescence" (Ross, 2001). Evidence in support of this mechanism is mixed (Paler, 2013; Prichard, 2015; Weigel, 2020). See also Herb (2003) for an explanation of why it was only relevant in the medieval period.

vation to hold the government accountable. The basic proposition is that citizens can develop subjective feelings of ownership over the public budget and that these feelings drive their accountability demands. Citizens with strong feelings of ownership expect to benefit from government spending and are more dissatisfied —and willing to take political action— when governments underperform. Ownership is expected to be higher over tax revenues, with these feelings of ownership representing the causal mechanism by which taxation induces greater accountability (De la Cuesta et al., 2022; Martin, 2016).[5] The evidence in support of this mechanism is promising, but mixed. In her field experiment in Indonesian villages, Paler (2013) finds that a tax treatment increases monitoring and argues that this is due to an ownership mechanism, but does not test it directly. De la Cuesta et al. (2022) find in lab-in-the-field experiments in Uganda and Ghana that manipulating ownership leads to increased willingness to sanction leaders for their spending behavior. However, a survey experiment in Uganda finds no significant effects on accountability in the full sample, despite successfully manipulating ownership.[6] The authors conclude that ownership is malleable, and that it may hold the key to reversing the resource curse by motivating accountability pressures. On the other hand, Hoem Sjursen (2018)'s online experiment indicates that in order for accountability pressures to emerge, revenues need to have been both earned by citizens and in their possession, suggesting psychological ownership may not be enough.

These recent studies highlight a key insight: that the positive relationship between taxation and accountability may be driven by something that is not inherent to taxation but that can be manipulated: ownership. On the other hand, the nature of these experiments raises important questions about their external validity. Not only is it typically limited in lab experiments but the fact that several of the existing works study accountability in non-democratic settings (Uganda, DRC, Mozambique) amplifies this concern. More generally, African countries may be particularly hard settings in which to study citizen accountability, given that fewer than 25% of respondents have been found to believe citizens are responsible for monitoring the performance of elected officials and 60% to see the relationship between citizen and government as one not between boss

[5]For an earlier formulation of this mechanism see Persson and Rothstein (2015).

[6]They do find effects of ownership on accountability among low efficacy respondents.

and employee but between child and parent (Gyimah-Boadi, 2015).

In addition, existing experiments testing the ownership mechanism outside the lab are unable to isolate any potential effects of ownership over revenues from their size. Indeed, the only survey experiment that explicitly manipulates ownership consisted of compound treatments which also provided information on the (large) size of aid and oil revenues (De La Cuesta et al., 2019).[7] This is important because evidence indicates that information on the size of the budget, per se, may mobilize citizens by augmenting their expectations (Weigel, 2020; Armand et al., 2020).

All of this substantiates our effort to test whether the ownership mechanism can trigger accountability demands in a different, real-world policy setting, and to attempt to disentangle the roles of the source of revenues, feelings of ownership, and information about the size of the budget. In the experiment presented below, we thus independently manipulate the source of revenues (resource rents vs local taxation) and feelings of ownership, while keeping the size of the budget constant.

The fact that our outcome consists of citizen accountability demands raises two important points. The first is that accountability is notoriously difficult to incite. Indeed, the literature is plagued with experiments seeking to generate citizen monitoring or participation, only to result in null effects (see for example Raffler et al. (ming); Dunning and Gareth Nellis (2019); Olken (2007); Evan S. Lieberman (2014); Brunnschweiler et al. (2021)). While existing results regarding the ownership mechanism are promising, it remains an open question whether it will prove effective outside the lab.

The second point has to do with the fact that prior work has focused on *whether* accountability demands can be generated, but has not paid sufficient attention to the *types* of accountability that may be incited. In fact, citizen participation and accountability demands are generally assumed to be intrinsically beneficial and associated with positive governance outcomes. As a result, prior work has only measured effects on positive forms of accountability. However, some of the above-mentioned features of rents may trigger a voracity effect among citizens (Tornell and Lane, 1999), leading them to hold the government accountable not for the provision of public

[7]The authors do try to isolate the effect of ownership via mediation analysis though.

goods but of particularistic benefits, ultimately strengthening clientelistic practices.

In particular, the fact that rents come from an external source and are thus hard to predict may influence the types of accountability demands made by citizens. Prior research has found that windfalls are associated with increases in patronage and in government spending on particularistic goods that reinforce clientelism (Caselli and Michaels, 2013; Fenton Villar, 2022). This association is usually explained on the basis of leaders' motivation to use extraordinary revenues to secure their continuation in office. However, it is also possible that the presence of rents will affect the types of demands made by citizens. If they perceive rents to be extraordinary or temporary, they may be more concerned with getting their share of the prize —triggering a voracity effect— and thus demand more particularistic transfers. On the other hand, if citizens perceive government revenues as coming from their income taxes —a more predictable and stable source—, they may place more value in the transparency and rationality associated with public goods provision.

This distinction between demanding public goods and particularistic benefits should be of particular relevance in low capacity settings where clientelism may be both easier to produce and more likely to be expected than public goods. In fact, observational research in Latin America highlights this concern, as it has established a positive relationship between windfalls and both contentious forms of participation and patronage (Caselli and Michaels, 2013; Martínez, 2023; Monteiro and Ferraz, 2010; Bhavnani and Lupu, 2016).

In sum, in this paper we test the claim that subjective feelings of ownership over the budget may hold the key to inciting citizen accountability demands, and we explore the novel proposition that the source of revenues may matter for the type of accountability that is demanded.

Our first hypothesis examines a basic precondition for ownership to be the mechanism linking taxation and accountability:

Hypothesis 1 *Feelings of ownership are higher over tax revenues than windfalls.*

Our second hypothesis directly tests the ownership mechanism in the context of a real-world policy promoting ownership over windfall revenues:

Hypothesis 2 *Increasing citizens' feelings of ownership over the budget motivates them to demand higher levels of accountability.*

Our third hypothesis focuses on the relationship between the source of revenues and the type of accountability that may be demanded:

Hypothesis 3 *The source of revenues matters for the type of accountability that is demanded. Windfall revenues are associated with more particularistic demands than taxation.*

These hypotheses will be tested in a survey-in-the-field experiment conducted in carefully selected rural districts in Peru.[8]

2 Setting and Design

Peru is a perfect example of the conditions described in the opening paragraph. Outside of the capital, the bulk of local government revenues comes from unearned rents in the form of either resource rents or transfers from the central government. At the same time, as we will see below, local politics are characterized by high popular perceptions of corruption and low levels of interest in politics, political participation and knowledge of public finances.[9] Furthermore, very low levels of awareness of tax payments and knowledge about who individuals pay taxes to and what for underscore the need to identify new ways to build a fiscal contract that will motivate citizens to hold government accountable.

2.1 Observational patterns

In april of 2019 we conducted an exploratory survey on a nationally representative sample of 1,200 respondents in Peru. The purpose of the survey was to begin probing the relationship between the source of revenues, ownership over and knowledge about the public budget, and

[8] An analysis plan was pre-registered prior to accessing the data and is available in appendix section E.

[9] According to the 2017 Corruption Perceptions Survey, 62% of respondents consider corruption among public officials and bureaucrats to be the main problem facing the country. Moreover, 22% consider local governments to be one of the three most corrupt institutions in the country.

participation at the local level.[10] This survey found that more than half of respondents had little or no interest in politics, 76% had no form of local-level political participation[11] and less than 20% of them were satisfied with their local government's performance. When asked about the size of their local government's budget more than 60% of them were unable to pick one out of four broad categories and when asked whether they pay any taxes only 40% of them said yes.

In this context, a steady expansion in local governments' revenues[12] has motivated civil society organizations to promote citizen participation in general and monitoring of the use of public revenues in particular. However, despite the proliferation of interventions aimed at different publics and using a variety of strategies, effects remain dissatisfying.

In addition to these characteristics, which may be representative of many local governments in the developing world, what is particularly interesting in the case of Peru is that feelings of ownership over resource rents —in the form of the mining canon— have been promoted by an official discourse that presents them as a form of collective compensation for the symbolic and material costs generated by the extraction of non-renewable natural resources.[13] In fact, mining canon is formally intended to allow local communities to share in the benefits of the exploitation of natural resources that belong to all Peruvians.[14] This allows us to use the availability of mining canon as a pre-existing source of subjective ownership over municipal budgets.

Note that we are not assuming that ownership over resource rents is necessarily higher than ownership over local tax revenues, but merely that citizens do feel ownership over these rents, which allows us to experimentally manipulate these feelings without having to create them.

[10]The survey was conducted by the Institute of Peruvian Studies (IEP) and received ethics approval from New York University's IRB.

[11]By political participation we mean voluntary activities (such as neighborhood councils, participatory budgeting or protesting), not voting, which is mandatory.

[12]According to the Ministry of Finance, transfers to local governments more than quintupled between 2004 and 2018, going from 3.6 billion to 20.7 billion soles.

[13]This canon amounts to 50% of mining companies' income tax payments and is distributed among all districts located in regions in which mining activities take place (Peru is divided into 1874 districts embedded in 196 provinces themselves embedded in 26 regions). More specifically, 10% of the mining canon is distributed in equal parts among the districts in which exploitation takes place, 25% is distributed among all districts in the province in which exploitation takes place, and 40% is distributed among all districts in the region in which exploitation takes place, on the basis of population and poverty levels. The remaining 25% go to the regional government. All of these revenues must be spent in the provision of public goods (Ley de Canon 27506).

[14]The 1993 Constitution states that natural resources are the patrimony of the nation (art. 66) and fees are used to ensure constituencies receive an adequate share of the revenues accrued to the state as a result of the exploitation of natural resources in each zone (art. 77).

Indeed, it is an open question in the literature whether citizens in developing countries feel greater ownership over tax revenues than windfalls (De La Cuesta et al., 2019). The reason is twofold: on the one hand low tax compliance and awareness limit ownership over tax revenues and on the other feelings of collective ownership over resource rents or foreign aid may be high.

We can use our survey data to try to shed light on the extent to which Peruvian citizens feel ownership over rents in general and resource rents in particular. The survey asked respondents where they think the funds making up the municipal budget come from, and offered a series of options that we categorize into local revenues (municipal taxes and fees) and rents (transfers from higher levels of government and different forms of canon). We measure ownership using responses to a question asking people to state how much decision-making power citizens should have over how the municipal budget is spent.[15] Regressing ownership on beliefs about the source of revenues (adjusting for some socio-demographics) indicates that, on average, there is no difference in the level of ownership over the public budget between respondents who believe the budget comes from rents and those who believe it comes from local revenues (see table A.1 in the appendix).[16]

Since we are particularly interested in ownership over mining canon we can examine how this subjective ownership varies between districts which receive mining canon and those which do not.[17] An interaction model shows that in districts with mining activity those who think the budget comes from rents do have higher ownership than those who think it comes from local revenues. In districts without mining, there is no difference in the level of ownership between these two groups (see figure A.1 in the appendix).[18]

These results indicate that in areas where minerals are extracted, Peruvians have high ownership over the canon, even higher than over local tax revenues.[19] However, identifying the

[15]Responses were measured on a scale of 1 (no decision-making power) to 5 (complete decision-making power).

[16]Restricting the comparison to respondents who believe the budget comes from canon specifically also yields a null result.

[17]In the Peruvian context canons exist for a variety of natural resources including fishing, hydroenergy, oil, gas and forestry. However, the mining canon is the most well known as it is both the largest in terms of revenue and its use is often the object of social contestation.

[18]Moreover, this positive effect is robust to using different variables that may proxy for awareness of mining canon: the share of the district budget coming from mining canon, and a variable measuring respondent's knowledge regarding the size of the canon (effect is positive among those who are correct, and also among those who overestimate its size).

[19]It is worth noting that while our measure of local revenues includes both municipal taxes and fees (e.g., for parks and public cleaning), there is strong evidence that respondents do not differentiate between the two and

relationship between the source of revenues and ownership using observational data poses an inference problem since beliefs about the source of revenues may be correlated with beliefs about their size. Indeed, in a context of low information in which the media often highlights the large magnitude of the mining canon accruing to subnational governments, it is likely that people who believe the budget comes from canon also believe it is larger than those who believe it comes from local revenues. Our survey data can once again provide some insight. As noted above, 62% of respondents were unable to pick the size of their municipal budget out of four broad categories. However, among those who did pick a category, the modal response (62%) underestimated the size of their municipal budget. We also asked a similar question about the amount of mining canon received by the respondent's district. Here again, 61% were unable to pick one out of four broad categories, but among those who did pick, almost half (49%) overestimated it (and only 31% underestimated it).

These results suggest that there is likely to be a great deal of confounding between the source of revenues and their scale, not only in the facts but also in citizens' perceptions. Since each may affect accountability and citizen engagement through different mechanisms, an observational approach to our research questions (e.g., comparing levels of ownership and accountability across districts that receive canon and those that do not) is unlikely to yield convincing results.

2.2 Experimental Design

We thus adopt an experimental strategy and attempt to disentangle these effects by focusing on districts benefiting from mining canon, and where the amounts of revenue coming from mining canon and municipal taxes are equivalent. These conditions allow us to i) manipulate the intensive margin of preexisting feelings of ownership over mining canon, ii) isolate the effect of ownership and the source of revenues from its size, and iii) compare the effect of ownership over resource rents and tax revenues on accountability demands. The experiment has a 3x2 factorial design with 6 experimental groups as shown in table 1.

conceive of municipal fees as taxes. Indeed, when asked which types of taxes they pay, 26% of the first responses include municipal fees and services, second only after property taxes (43%). Sales and income taxes are only mentioned by 15 and 9% of respondents, respectively.

Table 1: Experimental Groups

		Ownership	
		No	Yes
Source of Revenues	Mining canon	**1. Canon** In recent years the municipality of this district had a budget of around S/. X coming from mining canon. The money generated by these fees should be used to provide goods and services for the benefit of the community.	**2. Canon+Own** In recent years the municipality of this district had a budget of around S/. X coming from mining canon. **This money comes from the exploitation of natural resources in your district and is intended to compensate local people like you for the fact that others extract resources from your community.** The money generated by these fees should be used to provide goods and services for the benefit of the community.
	Local taxes	**3. Tax** In recent years the municipality of this district had a budget of around S/. X coming from local taxes. The money generated by these taxes should be used to provide goods and services for the benefit of the community.	**4. Tax+Own** In recent years the municipality of this district had a budget of around S/.X coming from local taxes. **This money comes from the payment of taxes by villagers like you, such as the property tax, or the taxes you pay when you buy petrol or any product for which you are given a receipt.** The money generated by these taxes should be used to provide goods and services for the benefit of the community.
	Control	**5. Control** In recent years the municipality of this district had a budget of around S/.X coming from different sources. These funds should be used to provide goods and services for the benefit of the community.	**6. Pure control**

By keeping the size of the budget constant across treatment groups 1-5 we make sure that effects are driven by changes in the source of/ownership over revenues and not by people's expectations regarding how large budgets coming from different sources are.[20] The sequence of the experiment is as follows. All respondents start by answering a questionnaire collecting information on their sociodemographics. Respondents in groups 1-5 are then given a common introduction with basic information on what the public budget is and where it comes from, and told that they will receive information about their district's budget. They then receive the informational treatments shown in table 1. With the goal of ensuring that respondents absorb

[20]In the robustness section we use group 6.Pure Control to assess whether and how information about the size of the budget contributes to the treatments.

the treatments, respondents in groups 1-4 were shown illustrations presenting visually the flow of revenues from mining activities/tax payments to the public budget and public good provision.[21]

All respondents then answer a post-treatment survey that includes two quasi-behavioral outcomes, a battery of questions measuring self-reported interest in different forms of monitoring, participation and sanctioning local officials, questions measuring potential mechanisms and moderators (satisfaction with use of the budget, trust in municipal government, corruption perceptions, tax awareness) as well as a manipulation check asking whether they feel that the money in the municipal budget belongs to them in some way.[22]

The two quasi-behavioral outcomes are intended to capture the effect of treatments on respondents' level and type of accountability demands. The first measures the level of public goods accountability by offering respondents the opportunity to sign an official request for the mayor to hold an accountability meeting explaining the use of the budget, with the promise that if the required level of constituent support is reached, the research team will present the demand to the proper authorities (by law, if 20% of constituents sign the request, mayors are obligated to hold these meetings).

The second provides information on both the level and the type of accountability that is demanded. Respondents are offered the opportunity —at a cost equal to 10% of the value of their compensation—[23] to complete a postcard to their mayor indicating i) their level of satisfaction with the use of the budget in their district and ii) how they would like the municipal government to spend those resources (open ended). Postcards were completed immediately and collected by enumerators with the promise to send aggregated results to the mayor.

The survey was implemented by a group of native enumerators from Ipsos Peru on a sample of 1,950 respondents (325 per treatment group) in February 2024. Four districts were selected for enumeration that fulfilled the following conditions: i) revenues from local taxes and mining canon (in absolute numbers) in the 2022 budget were roughly equivalent (to avoid deception); ii) they had mining activity (so that ownership over resource rents is pre-existing); and iii) they had

[21] See illustrations in appendix section C.4.
[22] See table E.6 for a full list of outcomes measured and their intended use.
[23] Participants were paid a compensation of S/.10.

at least 20 communities —the unit at which treatment is applied— with population over 200 (to lower implementation costs). Communities are embedded in districts and are the smallest political unit for which census data is aggregated. Treatments were assigned at the individual level and blocked at the community level, with 13 individuals per treatment condition per community: 78 households were randomly selected by community and assigned to an experimental group, with one adult randomly sampled per household. The final sample consists of 32 communities (72% of them rural), embedded in four districts, ranging from the coast to the Andes highlands (up to 4,700 masl).[24] We believe that this approach has the benefit of generating original data with a sample of subjects who (a) live in areas with the conditions we are interested in and (b) whose attitudes and behaviors are rarely studied.

Since outcomes are measured immediately, spillovers are not of great concern. However, in the cases where a given community is surveyed for multiple days, respondents may already have heard about the survey. To assess whether this affects results, we asked respondents at the start of the survey whether they had heard about it (14% of respondents had).

3 Analysis

We test our hypotheses using difference-in-means tests estimated via the following OLS model:

$$Y_{icr} = \alpha + \beta_1 \mathbf{D}_i + \gamma \mathbf{X}_i + \mu_r + \theta_e + \epsilon_{icr} \tag{1}$$

For respondent i in community c and region r outcomes Y_{icr} represent behavioral or attitudinal measures of accountability. D_i is a vector of dummies identifying the treatment groups (with group 5.Control as the excluded category). $\mathbf{X}_i$ is a vector of individual-level control variables added for precision, consisting of gender, age and literacy. μ_r and θ_e are region and enumerator fixed effects. Robust standard errors are clustered at the community level.[25]

[24] Enumerators were unable to complete their survey quota in some communities, leading to deviations from the original sampling plan. See the Appendix section G.1 for details and for the location of surveyed districts.

[25] We have used region rather than the pre-specified district-level fixed effects because due to deviations from our sampling plan (see appendix section G.1) one of our 4 districts only has 31 respondents. While noisier, results are virtually unchanged using district-level fixed effects.

We are interested in the effect of our treatments on the level and type of accountability that is demanded. Drawing on Paler (2013) we define accountability as a construct whose observable components are (i) monitoring the government (i.e., interest in gaining knowledge), (ii) participating in politics (to communicate preferences to officials) and (iii) sanctioning incumbents (by removing support). In addition to the two quasi-behavioral outcomes described above, we measure these different aspects of accountability by building inverse-covariance weighted (ICW) indexes on the basis of the attitudinal questions asked post-treatment. This allows us to test the general effect of our treatments on accountability without incurring the multiple comparisons problem (Anderson, 2008; Schwab et al., 2020).[26] We construct three indexes: a global index with all of the attitudinal accountability measures, one specifically for monitoring and one for participation.[27]

In order to test hypothesis two then, which focuses on the effect of ownership on the level of accountability demands, we will use as outcomes the three indexes mentioned above, as well as the two quasi-behavioral measures (signing the demand for an accountability meeting and sending a postcard to the mayor).

For hypothesis three, which focuses on the type of accountability that is demanded — distinguishing between public goods and particularistic benefits—, we use the requests made to the mayor in the postcards. These open-ended requests have been coded on a three point scale measuring whether individuals requested public goods that will benefit the whole district (a score of 1), club goods that will benefit their specific community (a score of 2) or private goods that will personally benefit them or their family (a score of 3).[28]

[26]ICW summary indexes combine various indicators of a single latent variable by giving more weight to uncorrelated indicators representing new information. They thus increase efficiency and statistical power and are less noisy than individual variables (Schwab et al., 2020).

[27]See table E.6 for details on the variables used in index construction. The global index includes outcomes 4-10, the monitoring index includes outcomes 4-6 and the participation index includes outcomes 7-10. We only have one question measuring sanctioning so no index is necessary.

[28]In the cases in which multiple requests were made the final score is a simple average. See figure H.5 for a histogram of coded requests.

4 Findings

In light of the fact that one of the contributions of our paper lies in reaching distant populations whose preferences are rarely captured in surveys, we start by describing baseline levels of our main variables among participants in group 6.Pure Control.

Feelings of ownership over the budget are generally —but not exclusively— low. The modal response to the question "When you think about the money that goes into the municipal budget, do you feel that some of that money belongs to you in some way?" is "No, not at all" (35%).[29] Yet, there is a non-negligible subset of respondents (46%) who do feel it belongs to them somewhat (23%) or to a large extent (23%).[30]

In terms of accountability, interest in monitoring is quite high (between 60 and 75% of respondents report interest in different forms of monitoring). Interest in participation is also high, though lower than monitoring (between 56 and 67% of respondents report interest). Similarly, a wide majority is willing to sign to request an accountability meeting (67%). However, only a small group (11%) is willing to pay to send a message to the mayor, despite the fact that only 22% are satisfied with how their district's budget is used. This may be in part due to the fact that trust in the municipal government is also low (38%) and perceptions of corruption are high (48% think all or almost all district councilors are corrupt).

When asked where they think their local district's budget comes from, a majority thinks it comes from taxes (taxes in general, not local taxes) or transfers from higher levels of government (57 and 55% respectively), and a third (33%) think it comes from mining canon.[31]

Finally, it is also interesting to see whether we find correlational evidence of the predicted relationship between ownership and accountability among control group respondents. Even after controlling for an extended set of covariates, we do find a strong positive correlation between subjective ownership and all of the attitudinal measures of accountability. The relationship with the behavioral outcomes is also positive but barely misses significance.[32] We thus replicate, in a

[29] Responses are measured on a 4-point scale: "No, not at all", "Yes, to a small extent", "Yes, to some extent", "Yes, to a large extent".

[30] The key predictor of high ownership in this group is level of education.

[31] Note that these averages mask significant geographic variation.

[32] See figure H.7 for full results.

real-world setting, the finding that subjective feelings of ownership over the budget are correlated with accountability demands.

We now proceed with the systematic tests of our hypotheses, highlighting what we learn from each.

4.1 Ownership is higher over taxes than windfalls

To test our first hypothesis, which states that feelings of ownership are higher over tax revenues than windfalls, we compare ownership levels between groups 1.Canon and 3.Tax (i.e., mining canon vs local taxes, no ownership).[33]

Contrary to the naive observational results reported above, we find that once the size of the budget is kept constant, respondents in these communities do feel higher ownership when they believe the public budget comes from local taxes as opposed to mining canon, as shown in table 2. However, the magnitude of the effect is modest at 11% of a standard deviation (0.13 on a scale from 0 to 3). This finding lends credence to the notion that ownership may be the mechanism behind taxation's positive effects on accountability.

Table 2: Effect of source of revenues on ownership

	DV: Ownership
Group 3.Tax vs 1.Canon	0.134**
	[0.063]
Constant	1.148***
	[0.313]
Observations	623
R-squared	0.081
Region Fixed Effects	Yes
Enumerator Fixed Effects	Yes

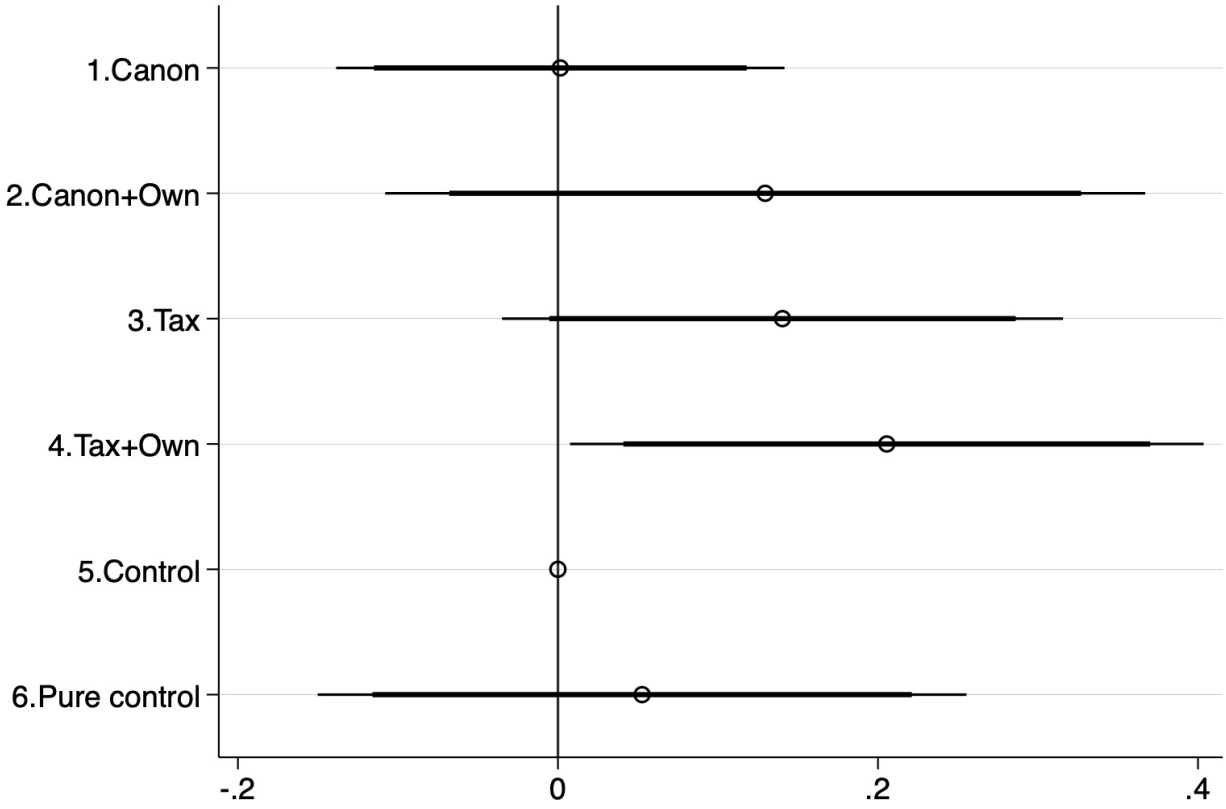
Model includes controls for gender, age and literacy, as well as region and enumerator fixed effects. Standard errors clustered at the community level in brackets.
*** p<0.01, ** p<0.05, * p<0.1

[33]The question used to measure ownership (our manipulation check) asks: "When you think about the money that goes into the municipal budget, do you feel that some of that money belongs to you in some way?" Responses are measured on a 4-point scale: "No, not at all", "Yes, to a small extent", "Yes, to some extent", "Yes, to a large extent".

4.2 Manipulating ownership over windfalls is hard

Were our treatments effective in manipulating feelings of ownership over the budget? As shown in figure 1, ownership treatments in groups 2.Canon+Own and 4.Tax+Own do appear to have increased feelings of ownership relative to groups 1.Canon and 3.Tax. However, the effect of the ownership treatments is only significant —relative to group 5.Control— for group 4, the local taxes + ownership group.

Figure 1: Manipulation check: effect of treatments on ownership



Note: Model includes controls for gender, age and literacy, as well as region and enumerator fixed effects. Standard errors clustered at the community level. Black bars indicate 90 and 95% confidence intervals.

These results confirm prior findings regarding ownership's malleability, but highlight two important caveats. First, even if possible, manipulating ownership is hard, as evidenced by our small treatment effect for group 4.Tax+Own and null effect for group 2.Canon+Own. Indeed, despite the use of both verbal and visual prompts, we only increase ownership among the group

4.Tax+Own respondents by 0.2 points (on a scale of 0-3) with respect to group 5.Control.[34] Second, the fact that we only manage to increase ownership over tax revenues suggests it may be difficult for individuals to develop psychological ownership over monies —such as resource rents— over which they have never had physical ownership. One way of exploring this possibility is to examine whether the effect of treatment 4.Tax+Own varies between respondents depending on whether they see themselves as contributing to local taxes.

Our post-treatment survey measured tax awareness using a question in which enumerators read out the names of the five most common types of taxes (sales tax, income tax, motor vehicle tax, property tax, municipal tax) and asked respondents to choose all those they had paid in the last 12 months. Tax awareness was remarkably low: 42% of the respondents in the control group did not choose any taxes. A further 38% chose only one tax and only 7% chose more than two taxes. Despite low levels of tax compliance (particularly in rural areas), we take these responses to reflect even lower levels of awareness of tax payments. This interpretation is supported by the results of our 2019 survey.[35]

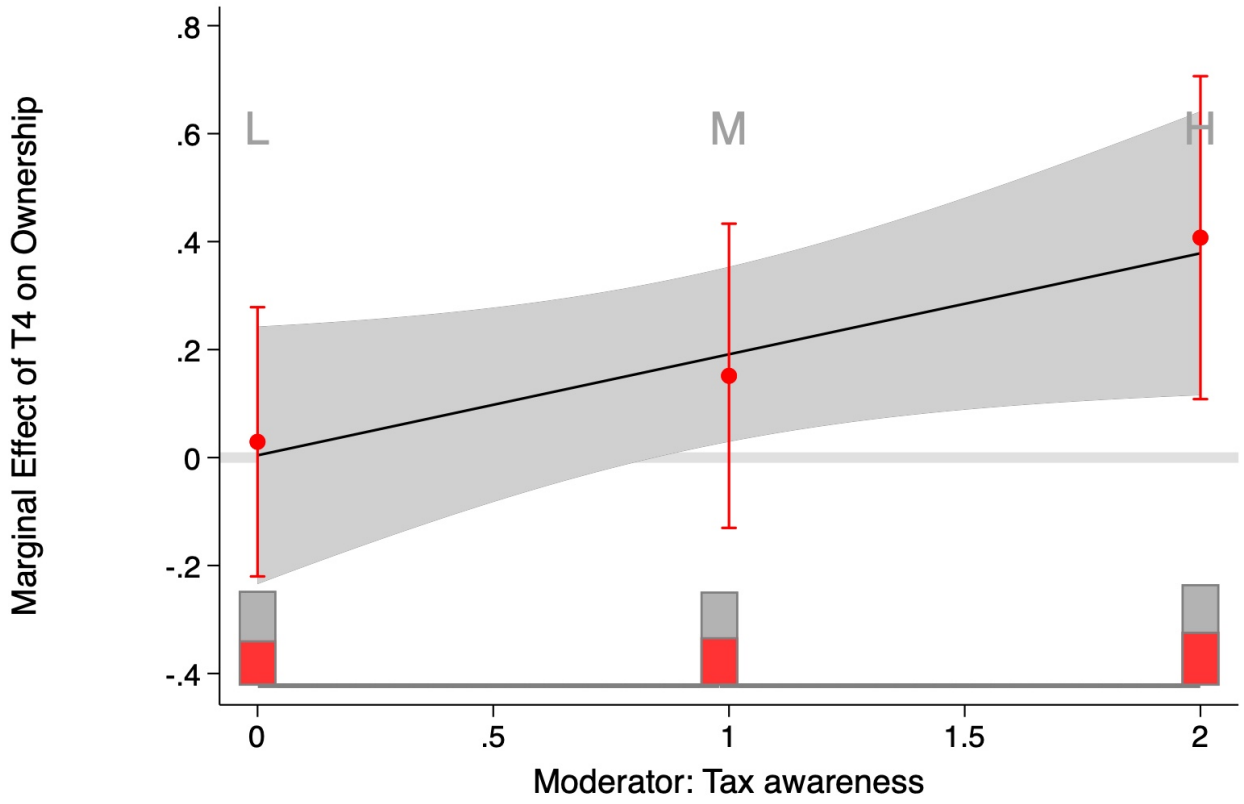
Do the effects of treatment 4.Tax+Own vary by respondent tax awareness? Figure 2 shows that the treatment only increased feelings of ownership over the budget among respondents who had high levels of tax awareness (i.e., they were aware of paying at least 2 taxes).[36] These results have important implications for future research on ownership as they indicate that, at least in some contexts, actual physical ownership may be a prerequisite for ownership treatments to be effective.

[34]This represents an increase of 18% of a standard deviation.

[35]As mentioned above, when asked whether they paid any taxes, 60% of respondents in that nationally representative sample said no. However, when we asked about specific taxes, some of those who had previously said they did not pay any taxes acknowledged paying some of them. Finally, among those who said they did not pay any taxes, significant shares also said they were property owners and employed in the formal sector, suggesting they must in fact pay some taxes.

[36]Tax awareness did not moderate the effect of any of the other treatments. On the other hand, while there is a concern that using tax awareness as a moderator may introduce post-treatment bias, this is unlikely as there is no evidence that awareness was affected by any of the treatments (see figure H.8).

Figure 2: Moderating effect of tax awareness



Note: Model includes controls for gender, age and literacy, as well as region and enumerator fixed effects. Tax awareness variable is capped at two or more taxes. Standard errors clustered at the community level.

4.3 Ownership has no effect on the level of accountability

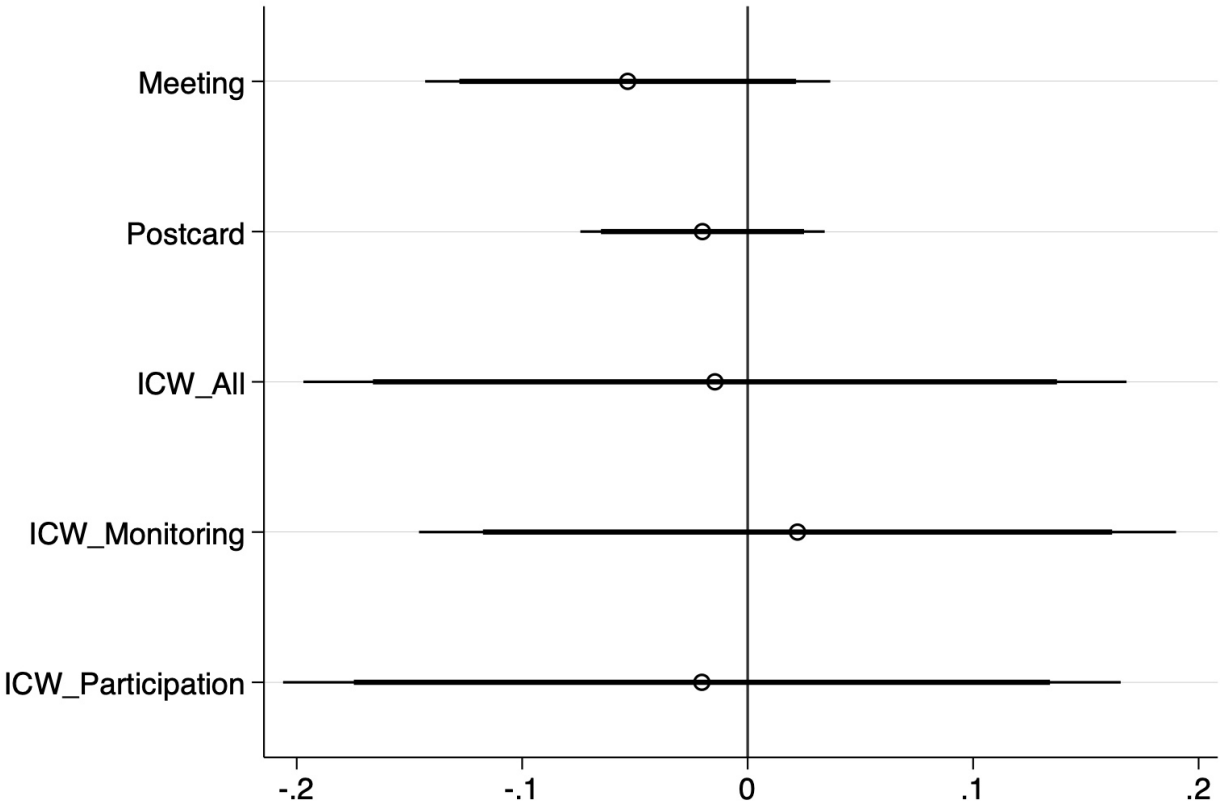
Hypothesis two claims that increased feelings of ownership will motivate citizens to demand more accountability. Given that our treatments only managed to increase ownership among group 4.Tax+Own respondents, we will focus on those.

As we can see in figure 3, we find no effect of treatment 4.Tax+Own on any of our accountability measures. Moreover, all of the coefficients are not only close to 0 but most are negative. To assuage concerns that lack of significance may be due to low power, we have re-estimated effects after pooling different groups (i.e., 2 and 4 or 1, 3 and 5).[37] While some models exhibit much smaller confidence intervals, we never find a positive significant effect. What is more, the

[37] See figure H.9

only significant effect we find (at the 10% level), is negative (on the postcard outcome). This makes us confident that these are true null effects, indicating that ownership did not increase accountability in our sample.

Figure 3: Effect of treatment 4.Tax+Own on accountability



Note: Coefficients from separate regressions. Models include controls for gender, age and literacy, as well as region and enumerator fixed effects. Standard errors clustered at the community level. Black bars indicate 90 and 95% confidence intervals. Reference group is group 5.Control.

Of course, it is still possible that a larger increase in ownership could have a positive effect on accountability demands. Nonetheless, our results are consistent with prior null effects of accountability-inducing treatments.

4.4 Ownership matters for the type of accountability

Hypothesis three shifted the focus from the level of accountability to the type of accountability citizens demand. In particular, it stated that the source of revenues should matter for the

type of accountability that is demanded, with resource rents associated with more private or particularistic demands than taxation.

To test this hypothesis we coded the open-ended requests citizens made to their mayors via the postcard offered by enumerators. Requests have been coded on a 1-3 scale with higher scores reflecting more particularistic demands. As noted above, there was no difference in the probability of sending the postcard across treatment groups, with 12% of respondents (228 individuals) choosing to pay the cost associated with sending the postcard.[38]

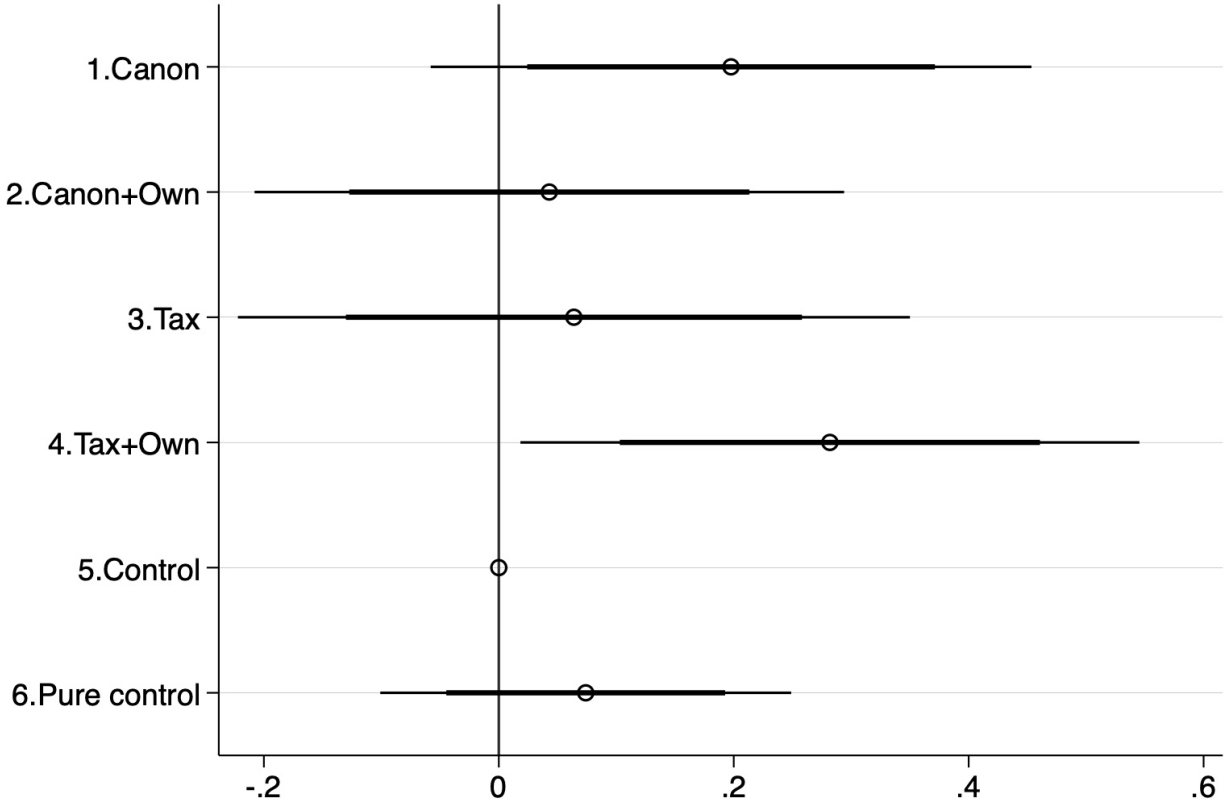
Figure 4 presents average treatment effects on the type of accountability that is demanded. Despite the small number of postcards, we find that treatment 4.Tax+Own had a significant and rather large effect of 0.28 points (or 60% of a standard deviation) on the 1-3 particularism scale.[39] This finding is interesting for multiple reasons. First, even if our treatments did not have an effect on the level of accountability demanded by respondents, it is notable that they did affect the type of accountability demanded. Indeed, this provides the first causal evidence that ownership matters for the types of demands made by citizens. Second, it is also interesting that results run contrary to our expectations. While we expected the source of revenues to be associated with particularism, it turns out that what matters is ownership over those revenues: respondents make more particularistic demands when they feel ownership over local taxes. One potential explanation may be that individual ownership generates the expectation of individual benefits. On the other hand, rents that accrue to the community as a whole may be perceived as having to be spent on behalf of that community. Third, these findings also suggest that the positive relationship that has been found between windfalls and patronage (Caselli and Michaels, 2013; Martínez, 2023; Bhavnani and Lupu, 2016) is driven by leader incentives rather than citizen demands. In any case, future research must delve deeper into the mechanisms behind this link between ownership and particularistic demands.[40]

[38]See figure H.6 for estimated treatment effects on this outcome.

[39]This significant positive effect is robust to excluding the three outliers with a score of 3.

[40]Table H.8 presents the results of the pre-specified difference-in-means test comparing groups 4.Tax+Own and 2.Canon+Own. Consistent with our overall findings, we find that citizens make more particularistic demands when they believe the budget is made up of tax revenues than when they believe it is made up of mining canon. However, these results are only significant at the 10% level and the sample size is quite small (n=65).

Figure 4: Effect of treatments on type of accountability



Note: Outcome is a score ranging from 1 (public goods) to 3 (private goods). Model includes region fixed effects. Standard errors clustered by region. Black bars indicate 90 and 95% confidence intervals.

One final caveat is needed. These results are based on the subset of respondents who decide to pay the cost associated with sending feedback to their mayor. As such, they are likely to be more interested in politics and may not be representative of the full population.[41] Nonetheless, the fact that treatments did not affect the probability of sending the postcard means we identify the effect of treatments on the type of accountability demanded, among the population that is more likely to make demands on their mayor.

[41]Indeed, respondents who send the postcard are more likely to be male, older and have a higher level of education.

5 Robustness checks

In this section we attempt to disentangle the roles of information and ownership, and examine whether relevant alternative mechanisms may explain our findings.

5.1 The role of information

The analyses presented above have used group 5 as the control group against which effects are measured. This ensured that information regarding the size of the budget was kept constant and allowed us to isolate the effect of the source of revenues and ownership. As mentioned above, prior studies have typically used compound treatments that included information both on the source and the size of revenues. Group 6.Pure Control gives us the possibility of exploring how this design choice may affect results.

Starting with the manipulation check, if we use group 6.Pure Control as the reference category effects are generally smaller and none are significant at the 5% level.[42] When it comes to hypothesis two, we replicate the null finding when looking at the general effect of treatment 4.Tax+Own on the level of accountability demands.[43] Finally, for hypothesis three we also find smaller coefficients that no longer reach significance when using group 6.Pure Control as the reference category.[44]

These results indicate that information about the size of the budget does affect our treatments, in this case, attenuating effects. This is probably due to the fact that the budget sizes we used were not that large, thereby limiting the expectations that are key to psychological ownership and accountability (Gottlieb, 2016).[45]

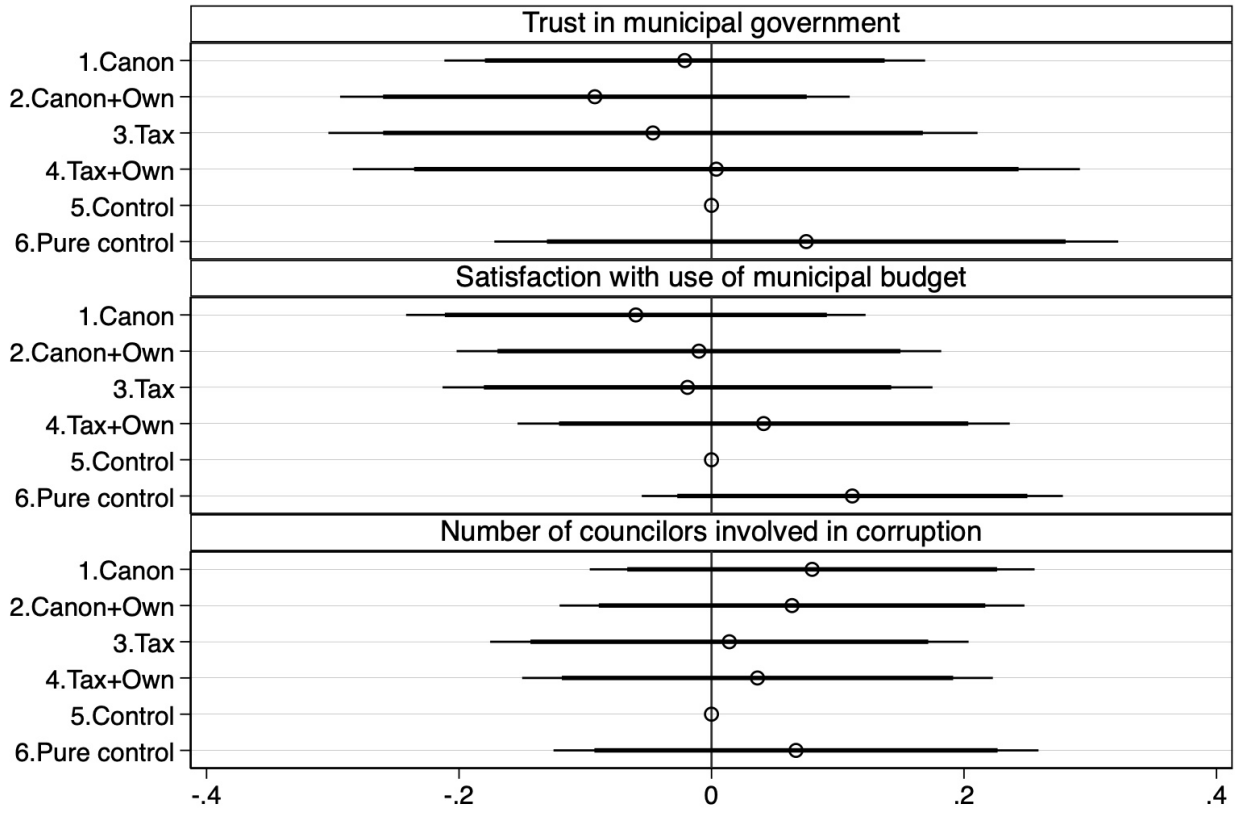
This finding further validates our decision to hold budget size constant across treatments and raises questions over the capacity of treatments that bundle source (or ownership) and size to isolate specific mechanisms.

[42] See figure H.10.
[43] See figure H.11.
[44] See figure H.12.
[45] As noted in appendix G.7 budget sizes used in the different districts as part of the treatments varied between S/.80,000 and S/.2 million. Exploratory analyses did not find heterogeneous treatment effects by budget size.

5.2 Alternative mechanisms

One remaining concern is that our findings regarding the type of accountability that is demanded may be driven by other potential mechanisms, aside from ownership. Indeed, informing people about the size of the budget and highlighting the ways in which it "belongs" to them could shift their perception of the local government, reducing satisfaction with how it uses the budget, lowering trust and increasing perceptions of corruption. All of these alternative mechanisms could potentially explain the changes in the type of demands made by citizens. To assess this possibility, we examine whether our treatments had an effect on these other potential mechanisms. Figure 5 shows that they did not, increasing our confidence that the effects found are driven by changes in subjective feelings of ownership.

Figure 5: Testing alternative mechanisms



Note: Models include controls for gender, age and literacy, as well as region and enumerator fixed effects. Standard errors clustered at the community level.

6 Discussion

The goal of this paper was to examine whether citizens' perceived ownership of government revenues generated from various sources can alter their accountability demands. To that end, we have conducted a survey-based field experiment in Peruvian districts with mining activities. This has allowed us to develop naturalistic treatments and to test our hypotheses in a real-world setting in which resource rents are widespread and ownership over them is preexisting.

Our findings indicate that the relationship between subjective ownership and the source of revenues is confounded by the size of these revenues, as shown by our descriptive survey data. However, once the size of the budget is kept constant, respondents in mining districts are in fact more likely to feel ownership over the public budget when they believe it comes from local taxes as opposed to resource rents. This finding, which is consistent with the endowment effect, and with the potential role of ownership as a causal mechanism linking taxation and accountability, offers support for our hypothesis 1.

When it comes to manipulating ownership, we find that we are only able to experimentally increase subjective ownership over local taxes and not resource rents. Moreover, the moderating role of tax awareness suggests that it may be difficult for individuals to develop psychological ownership over resources over which they have never had physical or legal ownership. This is consistent with Hoem Sjursen (2018)'s finding that in order for respondents to demand accountability over revenues, these revenues must first have been earned through hard work and in their possession. It is possible that these conditions are also a requirement for the development of psychological ownership. The conditions under and types of revenues over which psychological ownership can be generated should be further explored in future research.

Moreover, the role of tax awareness also suggests interesting avenues for future research. Low levels of tax awareness are likely an important obstacle to the development of a fiscal contract, even in relatively high tax-paying enclaves in developing countries. Interventions that can help citizens become aware of their tax payments could thus potentially generate higher accountability.

Although we manage to successfully manipulate ownership, our treatments are unable to generate higher levels of accountability. Indeed, despite efforts to deal with concerns about

statistical power our coefficients on behavioral outcomes and reported interest in monitoring, participation and sanctioning are consistently close to zero and insignificant. This is perhaps unsurprising given how difficult prior research has found it to manipulate accountability and mixed prior results for the ownership mechanism. Nonetheless, the question of whether a larger increase in ownership could have a significant effect on the level of accountability demands, remains open.

Contrary to expectations, we found evidence that the tax and ownership treatments increased demand for particularistic benefits. This may be due to the fact that people expect to benefit from the taxes they pay personally. In any case, this novel finding requires further research to both test its robustness and explore potential mechanisms.

A strength of our experimental design was the possibility of disentangling the effect of budget size and ownership over the budget by leveraging differences between the use of groups 5 and 6 as control. Doing so reveals that information about the size of the budget interacts with our treatments. In our case, it attenuates the effect of ownership. If at least part of the effect of information is increasing in the size of the budget (as would be the case if citizen expectations are correlated with it), the relatively small budget sizes used here may explain this attenuating effect. Future research should examine how the effect of information varies with the size of the budget, and future experiments should make greater efforts to isolate these different mechanisms.

In terms of scope conditions, it is important to underline that while our ultimate goal was to identify mechanisms that can promote the development of a fiscal contract (or something equivalent to it), the success of such an endeavor ultimately depends also on leaders' reactions. Even if citizens can be induced to demand positive forms of accountability, this will only lead to positive governance outcomes if leaders respond with greater transparency and public goods. While one expects this to be the case in a democratic context, it may not necessarily be so. One alternative is that, as suggested by the bargaining mechanism, leaders will only be motivated to respond to accountability demands if they depend on citizens for revenue and the latter can credibly threaten non-compliance. If this were the case, it would support Sala-i Martin and Subramanian (2003)'s argument that windfalls should be distributed directly to citizens and

then taxed (which would have the added benefit of increasing feelings of ownership over them). Another alternative is that, even if citizens demand positive forms of accountability, leaders may respond with more aggressive forms of clientelism, highlighting the importance of the quality of institutions (as argued by Bhavnani and Lupu (2016)). These are all issues to examine in future research.

7 Concluding Remarks

This paper makes important contributions to our understanding of the relationship between the source of revenues and citizen accountability demands. On the one hand, it adds to recent work that seeks to shift the focus from comparing the effects of taxes vs windfalls to determining whether (and how) citizen accountability and engagement can be generated. More importantly, it offers an internally valid test of the ownership mechanism in a real-world policy setting where ownership over resource rents is both pre-existing and salient. Moreover, it sheds light —for the first time— on the relationship between the two main mechanisms that have been proposed: ownership and information. To that end, it presents original data from a sample of respondents living in regions with the precise conditions required and whose attitudes and behavior are rarely researched. Finally, in contrast to the widely held assumption that citizens' participation and accountability demands are intrinsically beneficial and associated with positive governance, it offers a first examination of the relationship between the source of revenues, ownership and the type of accountability demands made by citizens.

This is achieved by conducting a survey-based field experiment in Peruvian districts with mining activities with the goal of increasing feelings of ownership over mining fees and local taxes. Our study adds to a growing body of micro-level experimental studies that examine the relationship between sources of government revenue and accountability (e.g., Paler, 2013; De La Cuesta et al., 2019; Armand et al., 2020; Brunnschweiler et al., 2025). We contribute to this literature by studying whether people would hold their local government accountable on the basis of their perceived ownership over different sources of revenue in a novel setting: Latin

America. We also complement observational research that has established a positive relationship between windfalls and contentious participation and patronage in Latin America (Bhavnani and Lupu, 2016; Caselli and Michaels, 2013; Martínez, 2023; Monteiro and Ferraz, 2010). Thus, by empirically assessing and distinguishing the issues people hold their government accountable for (including demands that run the risk of incentivising clientelism), our study makes significant inroads into the debate on windfalls- and tax-accountability linkages.

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Online Appendix

Public Resources and Accountability:

Experimental Evidence

Part

Table of Contents

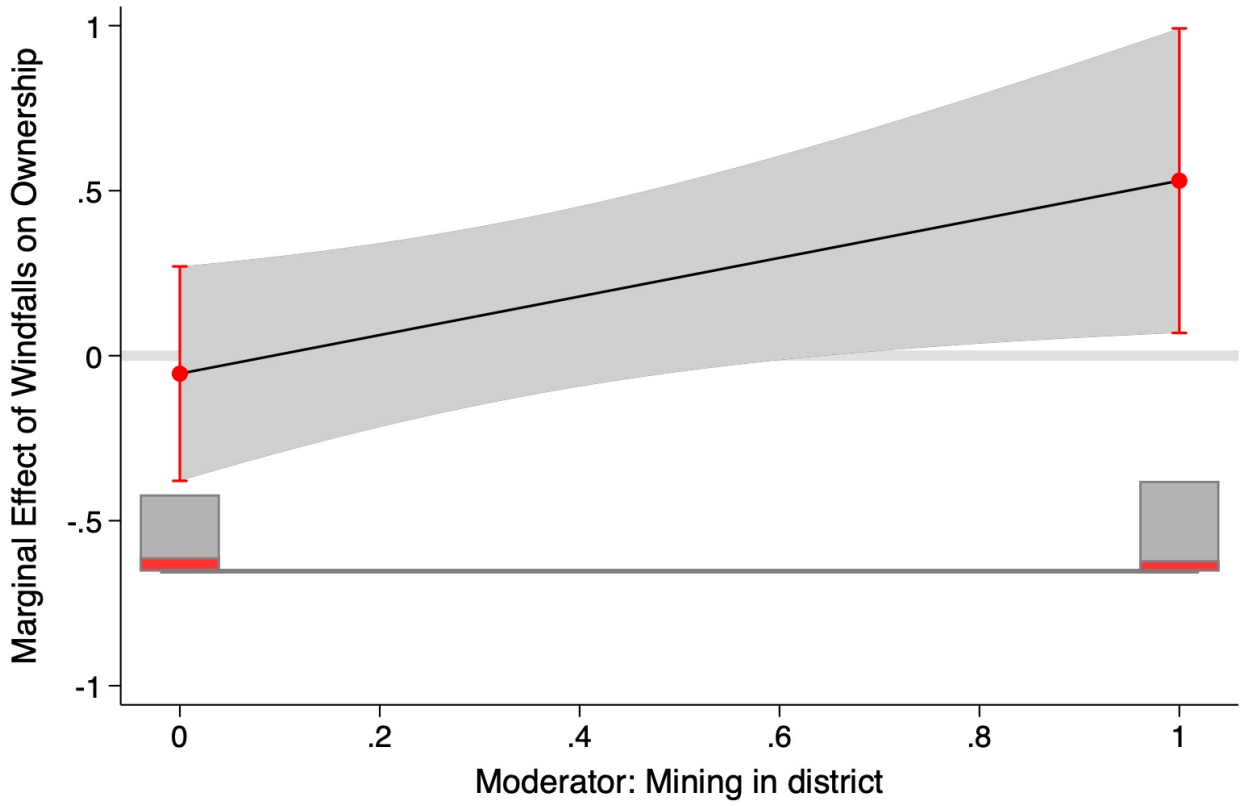
A Analyses Using National Survey Data

Table A.1: Source of revenues and ownership

	DV: Decision-making power	
	Full sample	HH heads only
Windfalls (vs local revenues)	0.130	0.260
	[0.139]	[0.202]
Age	-0.023	-0.268
	[0.071]	[0.167]
Sex	-0.003	0.177
	[0.105]	[0.239]
Education	-0.023	-0.136
	[0.052]	[0.087]
Socio-economic status	0.023	-0.077
	[0.043]	[0.074]
Urban	-0.287	-0.426
	[0.193]	[0.336]
Constant	3.703***	5.532***
	[0.542]	[1.095]
Observations	648	240
R-squared	0.008	0.030

Outcome is a dummy variable identifying respondents who think municipal budget comes from windfalls (transfers and/or resource canons), relative to those who think it comes from municipal taxes and/or fees. Robust standard errors in brackets.
*** p<0.01, ** p<0.05, * p<0.1

Figure A.1: Heterogeneity by presence of mining activity in district



Note: Model includes controls for age, sex, education level, socio-economic status and urban location.

B Descriptive Statistics and Balance Tests

Table B.2: Descriptive statistics

Variable	Group 1		Group 2		Group 3		Group 4		Group 5		Group 6	
	$\overline{X}$	SD	$\overline{X}$	SD	$\overline{X}$	SD	$\overline{X}$	SD	$\overline{X}$	SD	$\overline{X}$	SD
Demography												
Age	41.062	14.732	40.418	15.012	39.394	14.140	40.483	15.028	39.748	15.382	40.692	15.361
Male	1.492	0.501	1.502	0.501	1.514	0.501	1.520	0.500	1.498	0.501	1.495	0.501
Literacy	1.065	0.247	1.068	0.252	1.077	0.267	1.071	0.257	1.056	0.230	1.071	0.257
Education: less than secondary	0.443	0.498	0.406	0.492	0.388	0.488	0.406	0.492	0.366	0.482	0.391	0.489
Education: secondary	0.397	0.490	0.434	0.496	0.462	0.499	0.431	0.496	0.483	0.500	0.428	0.496
Education: post-secondary	0.160	0.367	0.160	0.367	0.151	0.358	0.163	0.370	0.151	0.358	0.182	0.386
Marital status: single	0.349	0.477	0.330	0.471	0.390	0.489	0.372	0.484	0.347	0.477	0.360	0.481
Marital status: married	0.225	0.418	0.247	0.432	0.226	0.419	0.185	0.389	0.189	0.392	0.225	0.418
Length of residence	3.722	0.679	3.748	0.597	3.652	0.789	3.674	0.710	3.723	0.655	3.762	0.601
No. of adults	1.565	0.761	1.537	0.732	1.462	0.727	1.455	0.650	1.459	0.714	1.506	0.672
No. of children/adolescents	1.333	0.595	1.306	0.547	1.246	0.498	1.280	0.527	1.325	0.589	1.264	0.539
Employment: independent	0.293	0.460	0.286	0.452	0.309	0.463	0.241	0.428	0.282	0.451	0.272	0.446
Employment: dependent worker	0.086	0.281	0.115	0.319	0.102	0.303	0.105	0.307	0.062	0.241	0.090	0.286
Employment: housemaker	0.235	0.424	0.217	0.413	0.213	0.410	0.281	0.450	0.266	0.443	0.257	0.438
Employment: peasant	0.336	0.473	0.335	0.473	0.343	0.475	0.336	0.473	0.353	0.479	0.328	0.470

Table B.3: Covariate balance

Variable	Group 2 vs. Group 4			Group 6 vs. Group 1			Group 6 vs. Group 3		
	Diff	Se	t-value	Diff	Se	t-value	Diff	Se	t-value
Demography									
Age	-0.065	1.178	-0.055	1.298	1.158	1.121	-0.369	1.181	-0.313
Male	-0.018	0.040	-0.470	-0.018	0.039	-0.470	0.003	0.039	0.078
Literacy	-0.003	0.020	-0.154	-0.006	0.021	-0.300	0.006	0.020	0.301
Education: less than secondary	0	0.039	0	0.003	0.038	0.080	-0.052	0.039	-1.352
Education: secondary	0.003	0.039	0.079	-0.034	0.039	-0.867	0.031	0.039	0.796
Education: post-secondary	-0.003	0.029	-0.106	0.031	0.029	1.053	0.022	0.030	0.729
Marital status: single	-0.042	0.037	-1.122	-0.030	0.038	-0.790	0.011	0.038	0.299
Marital status: married	0.062	0.032	1.932	-0.001	0.033	-0.042	-0.001	0.033	-0.021
Length of residence	0.074	0.051	1.435	0.110	0.055	1.999	0.040	0.050	0.796
No. of adults	0.081	0.055	1.472	0.044	0.056	0.796	-0.059	0.057	-1.037
No. of children/adolescents	0.026	0.049	0.528	0.018	0.048	0.381	-0.069	0.053	-1.311
Employment: independent	0.045	0.035	0.528	-0.036	0.036	-1.013	-0.021	0.035	-0.586
Employment: dependent worker	0.010	0.025	0.404	-0.012	0.023	-0.521	0.003	0.022	0.151
Employment: housemaker	-0.063	0.034	-1.867	0.044	0.033	1.320	0.022	0.034	0.661
Employment: peasant	-0.001	0.037	-0.027	-0.014	0.037	-0.388	-0.008	0.037	-0.222

C Survey Questionnaire

C.1 Survey items for demographic variables

Q1. Record sex (by observation)

- Male
- Female

Q2. Could you please tell me your exact age? (NOTE EXACT AGE AND PULL TO RANGE)

- 18 to 24
- 25 to 39
- 40 to 70

Q3. Can you or can you not read and write?

- You can
- You cannot
- (DO NOT READ) Not specified

Q4. What is the last year or grade and level of education that you have achieved?

- No Education/ Initial Education / Incomplete Primary Education,
- Primary Completed / Secondary Incomplete
- Completed Secondary / Higher Technical Incomplete
- Higher Technical Complete
- Higher Univ. Incomplete / Complete
- Post-Graduate Degree

Q5. What is your marital status?

- Single
- Married
- Widower
- Divorced
- Cohabitant
- (DO NOT READ) Not specified

Q6. Please tell me how long you have been living in this district?

- Less than 6 months
- 6 months to 1 year
- Between 1 year and 5 years
- Over 5 years
- (DO NOT READ) Not specified

Q7. How many adults, i.e. people over 18 years of age, live in addition to you in this household at the moment?

- 1 to 2 adults
- 3 to 4 adults
- 5 to 6 adults
- More than 6 adults
- (DO NOT READ) Not specified

Q8. How many children or adolescents, under the age of 18, are currently living with you in this household?

- 1 to 2 children/adolescents
- 3 to 4 children/adolescents
- 5 to 6 children/adolescents
- More than 6 children/adolescents
- (DO NOT READ) Not specified

Q9. Which of the following best describes your current employment status? Please list your main employment status

- Employer or patron (with employees)
- Independent / self-employed (with and without premises)
- Dependent worker / for a company
- Housemaker
- Domestic worker
- Member of Armed and Police Forces
- Peasant / Farmer or Livestock Farmer
- (DO NOT READ) Other
- (DO NOT READ) Not in employment/retirement
- (DO NOT READ) Not specified

Q10. In which sector do you currently work? Please select only one option

- Public / private administration

- Education / health
- Mining
- Construction
- Trade (shop owner / salesperson)
- Transportation(shop owner / salesperson)
- Tourism / accommodation / restaurants)
- Construction / real estate
- Industry
- Banking/finance
- Agriculture/livestock
- Telecommunications
- (DO NOT READ) Others
- (DO NOT READ) Not specified

C.2 Treatments

(EN: READ AND SHOW TREATMENT CARD) As you may know, your district municipality has a public budget that it must use to provide goods and services that benefit everyone in the district. This budget comes from different sources, including transfers from central and regional government, local taxes and different types of fees. Note that taxes are compulsory payments that individuals and businesses make to the government to finance public expenditures. The different types of fees (e.g. mining, gas or forestry) are a part of the revenues obtained by the state from the exploitation of natural resources.

Next, we would like to share with you information about your district's budget.

GROUP 1 (EN: READ) (SHOW TELEPIC GROUP 1 AND 2)

In recent years the municipality of this district had a budget of around S/. X coming from mining fees. This money comes from the exploitation of natural resources in your district and is intended to compensate local people like you for the fact that others extract resources from your community. The money generated by these fees should be used to provide goods and services for the benefit of the community.

P11. Because of the origin and intended use of these funds, do you feel that these funds belong to you in any way? (READ OPTIONS)

- Yes, to a large extent
- Yes, to some extent
- Yes, to a small extent
- No, not at all
- (DO NOT READ) Not specified

GROUP 2 (EN: READ) (SHOW TELEPIC GROUP 1 AND 2)

In recent years the municipality of this district had a budget of around S/. X coming from mining fees. The money generated by these fees should be used to provide goods and services for the benefit of the community.

GROUP 3 (EN: READ) (SHOW TELEPIC GROUP 3 AND 4)

In recent years the municipality of this district had a budget of around S/. coming from local taxes. This money comes from the payment of taxes by villagers like you, such as the property tax, or the taxes you pay when you buy petrol or any product for which you are given a receipt. The money generated by these taxes should be used to provide goods and services for the benefit of the community.

P12. Because of the origin and intended use of these funds, do you feel that these funds belong to you in any way? (READ OPTIONS)

- Yes, to a large extent

- Yes, to some extent
- Yes, to a small extent
- No, not at all
- (DO NOT READ) Not specified

GROUP 4 (EN: READ)

In recent years the municipality of this district had a budget of around S/. coming from local taxes. The money generated by these taxes should be used to provide goods and services for the benefit of the community.

GROUP 5 (EN: READ)

In recent years the municipality of this district had a budget of around S/. coming from different sources. These funds should be used to provide goods and services for the benefit of the community.

GROUP 6 (PROGRAMMING: DOES NOT RECEIVE INFORMATION AND GOES TO POST-TREATMENT SECTION)

C.3 Post-treatment

Q13: As part of your citizen participation rights, we are collecting signatures to ask the mayor to organise a public accountability hearing to inform the population about his projects and the use of the municipal budget. If we collect the signatures of 10% of the residents of the district, the mayor is obligated to organise this meeting and explain, among other things, how he is spending the money from the municipal budget. Would you like to support this initiative by signing the petition?

- Yes, I would like to sign
- No, I would not like to sign

Q14: We are collecting information on the satisfaction of the population of (PROG: FILL IN ACCORDING TO SELECTED DISTRICT) with the use of the municipal budget and on their

preferences and proposals for the use of these resources. If you wish, you can fill in an anonymous postcard and write your requests to the mayor. We will collect all responses and forward them to the mayor. We remind you that the letters are anonymous, i.e. no one will know who wrote them, and that we are not linked to any party or politician. However, this has an administrative cost of S/. 1. If you agree and want to send a postcard with your requests to the mayor, we will deduct the amount from the payment you will receive for filling out the survey, i.e. you will receive S/. 9 in total for your participation. Do you want to fill out the anonymous postcard with your comments to the mayor or not? Please note that we will deduct S/. 1 from your final payment and that nobody will be able to know who wrote it.

- I do
- No, I don't want to

On a scale of 1 to 5 where 1 is very disinterested and 5 is very interested How interested or disinterested are you in (READ PHRASE)...(SHOW AND READ INTEREST CARD)?

Q15. Your municipal government's performance

- Very Disinterested
- Disinterested
- Neither interested nor disinterested
- Interested
- Very interested
- (DO NOT READ) Not specified

Q16. Knowing more about how the municipal government spends its budget

- Very Disinterested
- Disinterested

- Neither interested nor disinterested
- Interested
- Very interested
- (DO NOT READ) Not specified

Q17. Attending a meeting where villagers are informed about the district government's use of the budget

- Very Disinterested
- Disinterested
- Neither interested nor disinterested
- Interested
- Very interested
- (DO NOT READ) Not specified

Q18. Participating in a protest or public demonstration to express your opinion about the district mayor's administration

- Very Disinterested
- Disinterested
- Neither interested nor disinterested
- Interested
- Very interested
- (DO NOT READ) Not specified

Q19. Voting in the next municipal elections

- Very Disinterested
- Disinterested
- Neither interested nor disinterested
- Interested
- Very interested
- (DO NOT READ) Not specified

Q20. Voting for the current mayor's party

- Very Disinterested
- Disinterested
- Neither interested nor disinterested
- Interested
- Very interested
- (DO NOT READ) Not specified

Q21. On a scale of 1 to 5 where 1 is very disinterested and 5 is very interested, how interested or disinterested would you be in being part of the local coordination council in your district? The local coordination council is a space where villagers can propose investment projects (SHOW AND READ INTEREST CARD).

- Very Disinterested
- Disinterested
- Neither interested nor disinterested
- Interested

- Very interested
- (DO NOT READ) Not specified

Q22. On a scale of 1 to 5 where 1 is very disinterested and 5 is very interested, how interested or disinterested would you be in being part of the participatory budget in your district? Participatory budgeting allows citizens to participate in decisions about how to use the municipal budget. (SHOW AND READ INTEREST CARD)

- Very Disinterested
- Disinterested
- Neither interested nor disinterested
- Interested
- Very interested
- (DO NOT READ) Not specified

Using the following card, on a scale of 1 to 5 where 1 is strongly disagree and 5 is strongly agree, how much do you agree or disagree with the following statements. . . ? (SHOW AND READ CARD AGREE)

Q23. I am satisfied with the way the municipality spends the district budget. Please answer using the card.

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

- (DO NOT READ) Not specified

Q24. I trust that the current municipal government makes decisions for the good of the district's inhabitants

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree
- (DO NOT READ) Not specified

Q25. When you think about the money that goes into the municipal budget, do you feel that some of that money belongs to you in some way? (READ OPTIONS)

- Yes, to a large extent
- Yes, to some extent
- Yes, to a small extent
- No, not at all
- (DO NOT READ) Not specified

Q26. When we talk about the municipal budget, where do you think these resources come from? from what kinds of sources? Please mention all the options that apply (READ OPTIONS)

- Mining fees
- Other fees
- Taxes

- Transfers from the regional or central government
- (DO NOT READ) Not specified

Q27. And where (from which part of the country) do you think the money for the municipal budget mainly comes from? (READ OPTIONS)

- From my local area
- From other parts of the country
- (DO NOT READ) Not specified

Q28. Thinking back over the last 12 months, have you paid any of the following taxes? List all the taxes you have paid (MULTIPLE ANSWER) (SHOW TAX CARD)

- Value added tax
- Income tax
- Motor vehicle tax
- Property tax
- (DO NOT READ) Others
- (DO NOT READ) I have not paid any tax
- (DO NOT READ) Not specified

Q29. How many district councillors do you think are involved in corruption or none are involved in corruption? (READ OPTIONS)

- All
- Almost all of them
- Some

- None
- (DO NOT READ) Don't know
- (DO NOT READ) Not specified

C.4 Visual Support

Figure C.2: Illustration mining canon (groups 1 and 2)

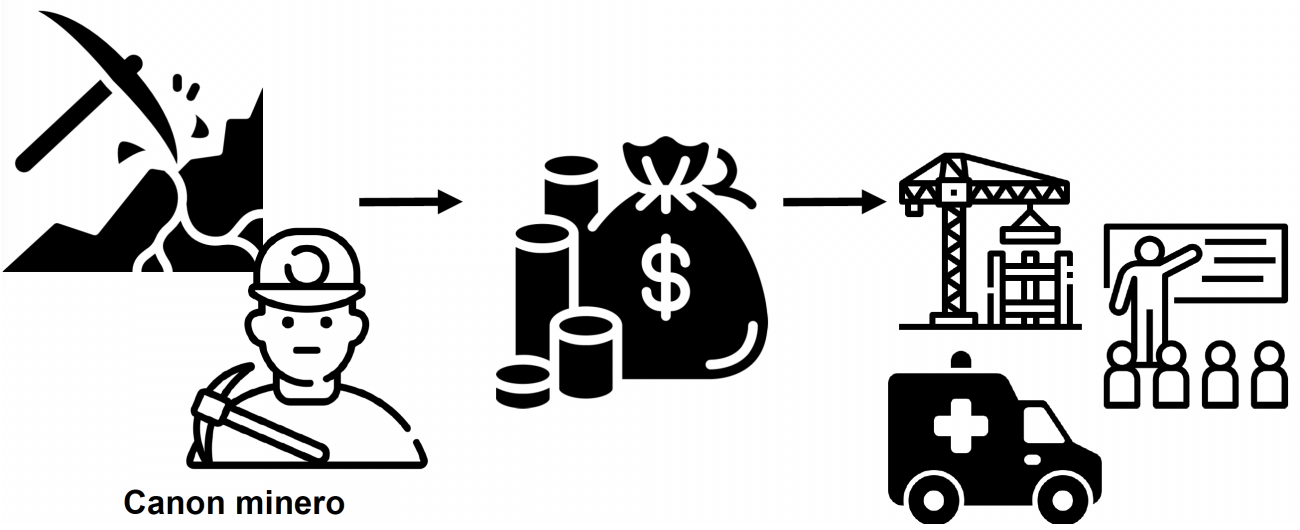
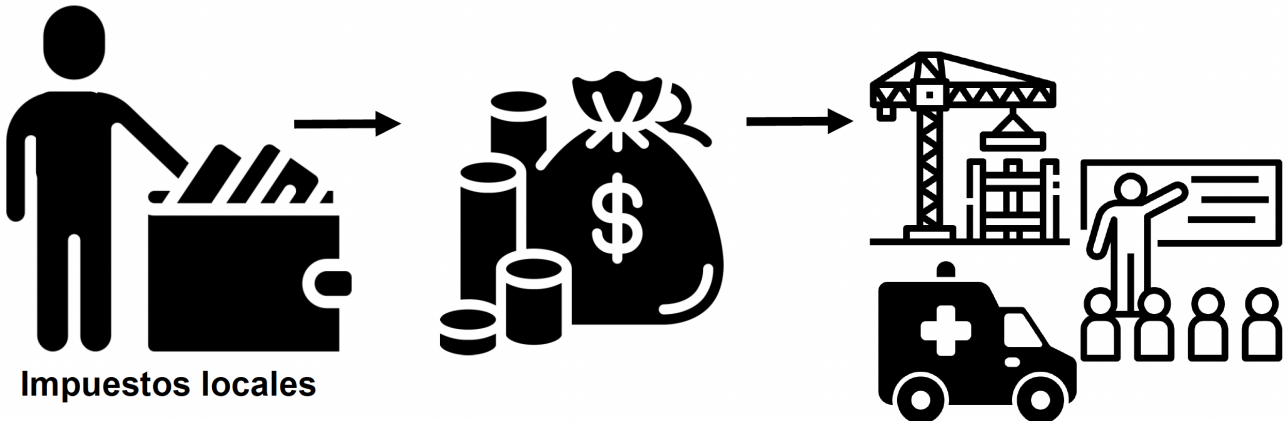


Figure C.3: Illustration local taxes (groups 3 and 4)



D Outcomes Measured

Table D.4: Post-treatment variables

	Outcomes	Intended use
	Quasi-behavioral	
1	Signing request for participatory meeting	Accountability - Monitoring
2	Filling (and paying for) postcard	Accountability - Participation
3	Type of good requested: public vs private	Accountability - Type
	Attitudinal	
4	Interest in municipal performance	Accountability - Monitoring
5	Interest in how budget is spent	Accountability - Monitoring
6	Interest in attending accountability meeting	Accountability - Monitoring
7	Interest in participating in local council	Accountability - Participation
8	Interest in participating in participatory budgeting	Accountability - Participation
9	Interest in protesting	Accountability - Participation
10	Interest in voting	Accountability - Participation
11	Interest in voting for mayors' party[a]	Accountability - Sanctioning
12	Satisfaction with use of the budget	Alternative mechanism
13	Trust in municipal government	Alternative mechanism
14	Corruption perception	Alternative mechanism
15	Perception of ownership over public funds	Manipulation check
16	Perception of source of funds	Manipulation check
17	Perception of origin of funds (geographic)	Manipulation check
18	Awareness of tax payments	Robustness

[a] This question was not included in the global index because it was not answered by all respondents (only by those who said they were interesting in voting in the next election).

E Pre-Analysis Plan

E.1 Introduction

There is an established association between the source of public revenues in a country and its level of accountability (Ross, 2004): when a state is funded through taxes, governments tend to be more accountable to citizens. On the other hand, rentier states, or those that get the bulk of their revenues from windfalls —i.e., unexpected economic gains often originating from resource rents— tend to have leaders which are less accountable to their citizens and more likely to exhibit a number of negative governance outcomes. This latter phenomena usually goes under the name of the resource curse. To better understand the driving mechanisms causing this curse is not only of academic importance but can also generate governance tools contributing to overcoming this problem. This is of particular importance in light of the fact that across the developing world local government revenues often come from windfalls —either in the form of resource rents

or transfers from higher levels of government— rather than taxes, a reality that is unlikely to change soon.

Much has been written at the micro-level about the mechanisms through which the source of government revenue might affect citizens' accountability demands (and ultimately, governance). Some scholars focus on the information and motivation mechanism (Paler, 2013), which describes the role of taxation in providing citizens with information that will increase their ability to monitor the government, and interest in doing so. Conversely, windfalls exacerbate government's informational advantage, thereby undermining citizens' capacity to hold the government accountable.

Others put forward the bargaining mechanism. The idea here is that, in order to collect taxes, governments must engage with citizens, either more or less coercively, or through a voluntary exchange. To the extent that citizens have bargaining power or leverage, governments will be forced to respond to citizen preferences, leading to higher levels of accountability or responsiveness (Levi, 1989; Ross, 2004; Moore, 2004; Bates and Donald Lien, 1985; Timmons, 2005). Conversely, windfalls allow governments to exchange "free" goods for political quiescence (Ross, 2001).

Others have contended that the relationship between public resources and accountability demands may be driven by something that is not inherent to taxation, but that can be manipulated and constructed, possibly leading to greater accountability demands (Martin, 2016; De la Cuesta et al., 2022): feelings of ownership over government revenues.

In all of these studies, it is typically assumed that citizen participation and accountability demands are intrinsically beneficial and associated with positive governance outcomes. However, the mechanisms proposed might just as easily trigger a rapacity effect among citizens, leading them to hold the government accountable not for the provision of public goods, but of particularistic benefits, ultimately strengthening clientelistic practices. Thus, the question of whether different forms of accountability are generated in response to different sources of revenues has eluded systematic assessment in the experimental literature.

In this project, we ask: do citizens' perceived ownership of government revenues alter their

accountability demands? Does the source of revenues matter for the type of accountability that is demanded? We differentiate between government revenues originating from taxes and windfalls in the form of resource rents. We extend previous research by paying closer attention to the different forms of accountability that may be generated. That is, we seek to differentiate between positive or public goods accountability, and accountability for the provision of private or clientelistic benefits. We propose hypotheses that are tested in a survey experiment in local governments in Peru.

Empirically, we focus on Latin America, a region in which observational research has found a positive relationship between windfalls and both contentious forms of participation and patronage (Bhavnani and Lupu, 2016; Caselli and Michaels, 2013; Martínez, 2023; Monteiro and Ferraz, 2010). In particular, our empirical focus is Peru, a prominent producer of subsoil minerals whose exports make up a large part of its revenues. Given that some scholars of resource extraction and collective action have long argued that mineral wealth is a dominant driver of different forms of mobilization (Arce et al., 2018), Peru is a well-suited case to benchmark the effect of windfall treatments against that of taxes. The assumption underlying our experiment is that if the causal mechanisms put forth in the recent fiscal contract and rentier states literature are indeed relevant, their successful manipulation should allow us to observe a differential effect in levels of accountability in such a setting.

E.2 Literature Review and Theory

The political economy literature has long found an association between the source of public revenues in a country and its level of accountability. On the one hand, fiscal states or those that get the bulk of their revenues from taxes have been found to be more accountable to citizens. On the other hand, rentier states or those that get the bulk of their revenues from windfalls are less accountable and more likely to exhibit a number of negative governance outcomes (thus the resource curse). As such, taxation has been found to be correlated with democracy (Ross, 2004), while resource rents are correlated with authoritarianism, corruption, civil war, patronage, low institutional quality and under provision of public goods (Ross, 2004, 2015; Jensen and

Wantchekon, 2004; Busse and Gröning, 2013), to name a few.

However, this literature's reliance on large N cross-country correlations has made it difficult to assess the causal nature of this assumed relationship and the potential mechanisms underlying it. Moreover, it has led to the accumulation of contradictory findings and growing claims that relationships found on the basis of observational data were either endogenous, spurious, or conditional (Haber and Menaldo, 2011; Ross, 2015). As a result, the last decade has seen the adoption of a number of methodological improvements seeking to probe potential mechanisms. These include the use of exogenous and/or subnational variation in revenues (Martínez, 2023; Caselli and Michaels, 2013; Monteiro and Ferraz, 2010; Arezki and Brückner, 2011; Gadenne, 2017), the study of conditional effects (Bhavnani and Lupu, 2016) and the examination of micro-level data (McGuirk, 2013).

These refined methodological approaches have allowed researchers to establish that windfalls cause higher levels of corruption and patronage and have no effect on public goods provision (Caselli and Michaels, 2013; Monteiro and Ferraz, 2010), while taxes do lead to higher levels of public goods (Martínez, 2023; Gadenne, 2017).

Nonetheless, mechanisms are still not explicitly and sufficiently tested, making it difficult to determine whether these effects are driven by the source of revenues itself or other factors potentially associated with it, such as their scale or predictability. Moreover, this research has tended to focus on politician rather than citizen behavior.[46]

In recent years a number of experimental studies have thus sought to advance this literature by pinning down the mechanisms underlying observational findings. These works have mainly examined two mechanisms through which taxation might affect citizens' accountability demands (and ultimately, governance): information and motivation.[47] The first mechanism focuses on the

[46]This limitation is also shared with formal work such as Robinson et al. (2006), Caselli and Cunningham (2009) and Brollo et al. (2013).

[47]A third mechanism that is prominent in this literature, but is less amenable to experimentation, has to do with bargaining. While the first two mechanisms —which will be tested in this project— operate mainly by affecting citizens' accountability demands, this latter, alternative mechanism, shifts the focus to citizen-leader interactions and models the conditions under which leaders will be motivated to tend to citizen demands. According to Herb (2003), however, this mechanism is only relevant in the medieval and early modern periods when premodern assemblies had a direct role in the administration of taxation. He argues that it was the assembly's role in the collection of taxes, and its members' capacity to negotiate collectively, that gave them bargaining power vis-a-vis the ruler.

role of taxation in providing citizens with information that will increase their ability to monitor the government. The information provided could refer to the size of the budget, the level of government that should be held accountable or government's capacity to implement the budget. Conversely, windfalls exacerbate government's informational advantage, undermining citizens' capacity to hold it accountable.

Weigel (2020) provides evidence consistent with an informational mechanism through a field experiment in Congo. In it, he randomizes the collection of a new property tax and finds that taxation is indeed linked to citizen engagement with the government, not through a payment-based but through a signaling mechanism wherein tax collection signals higher state —and in particular spending— capacity. In this context, information about tax collection leads to higher levels of participation because it offers citizens a reason to participate in the form of the possibility of benefitting from an availability of resources that gives the state a greater capacity to provide public goods than was previously thought.

The second mechanism focuses on how taxation might affect citizens' willingness to hold the government accountable. The basic intuition here is that because people are loss averse, they dislike taxation and are more sensitive to the misuse of tax revenues. Conversely, citizens care less about foregone gains from windfall revenues.

In her 2013 article, Paler sets out to test whether taxes and windfalls have differential effects on citizen motivation to hold leaders accountable. She also examines the relationship between the informational and motivational effects of taxation by assessing whether taxation motivates citizens to acquire more information, or conditions how they process information. To do so she conducts one of the first experiments aimed at measuring the effects of taxation on citizens' political behavior in a poor district in Indonesia. Results show that a tax treatment increased respondents' willingness to monitor the budget, and to sanction (though only in the low information environment), but had no effect on participation. Moreover, the information treatment eliminated any differences between the two groups in willingness to monitor and sanction, suggesting that once in possession of information, the windfall group was just as intolerant of misuse. Finally, she also assesses whether, in line with the bargaining mechanism, citizens feel more ef-

ficacious or empowered as government increases its fiscal dependence on society, but found no evidence for it.

Martin sets out to more specifically develop and test the loss aversion mechanism in her 2016 article, through a lab in the field experiment in Uganda. She finds that a taxation treatment increases citizens' willingness to punish the leader (as compared to an unearned grant), and argues that citizens receive an expressive benefit from punishing bad leaders, and that taxation increases this benefit relative to the costs of action.

De la Cuesta et al. (2022) build on these findings and posit that the causal mechanism by which taxation induces greater accountability is ownership. In particular, they argue that "citizens may feel budget ownership only when they contribute to it through taxation, and such feelings may be weaker when budgets rely mostly on nontax revenues" (De la Cuesta et al., 2022, p. 305). In making subjects "pay to punish the leader" for unsatisfactory performance, their design follows a similar approach to the lab-in the-field experiment from Martin 2016, also in Uganda.[48] Their findings reveal that "treatments designed to increase subjects' sense of psychological ownership over government revenues lead to substantively meaningful and statistically significant increases in subjects' willingness to hold elected officials to account" (De la Cuesta et al., 2022, p. 305). Further, the authors find that respondents are more likely to believe the group fund belongs to them when it is made up of taxes (as opposed to windfalls), and that this feeling of ownership is a significant predictor for willingness to pay to sanction a leader. They also find that ownership is malleable, and while it is naturally higher over tax revenues compared to oil and gas, treatments that assign abstract ownership over portions of aid or oil revenues significantly increase both ownership and punishment.

The key insight emerging from these findings is that the positive relationship between taxation and accountability may be driven by something that is not inherent to taxation, but that can be manipulated and constructed. Either because what matters is not the source of government

[48]Hoem Sjursen (2018) finds support for this argument through a similar online experiment conducted on a convenience sample from Amazon Mechanical Turk. She finds that taxation causes a significant increase in citizens' willingness to punish the leader, and that tax revenues have to be both earned and in the possession of citizens for this effect to be present. Moreover, she claims negative emotions may be a mechanism for the effect of taxation on willingness to punish, as taxation makes citizens more upset by -and therefore more willing to punish- unfair leader investments.

revenues but how citizens relate to them (whether they feel ownership over them) as suggested by Martin (2016) and De la Cuesta et al. (2022), or the information they convey about state's spending capacity as suggested by Weigel (2020), these findings suggest that at least some of the positive outcomes associated with taxation may be achieved even in its absence.

However, the nature of these experiments raises important questions about their external validity. For one thing, findings appear to be inconsistent: while De la Cuesta et al. (2022)'s findings indicate that ownership over resources is what matters, Weigel's results are explained by a signaling rather than a payment-based mechanism. For another, lab experiments typically have limited external validity and the fact that De la Cuesta et al. (2022) study accountability in a non-democratic setting amplifies this concern. More generally, African countries may be particularly hard settings in which to study citizen accountability, given that fewer than 25% of respondents have been found to believe citizens are responsible for monitoring the performance of elected officials and 60% to see the relationship between citizen and government as one not between boss and employee but between child and parent (Gyimah-Boadi, 2015).

Moreover, existing research has not paid sufficient attention to the dependent variable or the types of accountability that may be generated. In fact, citizen participation and accountability demands are usually assumed to be intrinsically beneficial and associated with positive governance outcomes. However, the mechanisms discussed might just as easily trigger a rapacity effect among citizens, leading them to hold the government accountable not for the provision of public goods, but of particularistic benefits, ultimately strengthening clientelistic practices. In fact, observational research in Latin America highlights this concern, as a positive relationship between windfalls and both contentious forms of participation and patronage has been established (Caselli and Michaels, 2013; Martínez, 2023; Monteiro and Ferraz, 2010; Bhavnani and Lupu, 2016).

In light of these findings, our research design seeks to test the implications of recent research by asking: do citizens' perceived ownership of government revenues generated from various sources alter their demand for accountability?

This question implies two separate issues:

1. Can individuals be encouraged to participate/engage with the government in a context of windfalls? And if so,

2. Do people do so in a way that generates positive outcomes?

The project will test the ownership mechanism described above by manipulating citizens' feelings of ownership over the public budget while keeping information about the size and intended use of the budget constant in an attempt to isolate the ownership mechanism.

Our first, descriptive, hypothesis seeks to confirm Martin (2016) and De la Cuesta et al. (2022)'s finding that feelings of ownership are naturally higher over tax revenues. We therefore expect the local population to be more likely to claim ownership of the district budget when it is made up of taxes (as opposed to windfalls):

H1: Feelings of ownership are higher over tax revenues than windfalls.

In accordance with the findings from Martin (2016) and De la Cuesta et al. (2022)'s lab experiments, we expect ownership to have a positive effect on citizen accountability demands. Unlike them however, we intend to test this hypothesis in the context of a real-world policy regarding windfall revenues. This leads us to expect:

H2: Increasing citizens' feelings of ownership over the budget motivates them to demand higher levels of accountability.

However, while feelings of ownership may explain levels of participation or accountability demands, the form of accountability that is chosen may be determined by citizens' expectations regarding the stability or predictability of these revenues. If they perceive windfall revenues to be extraordinary or temporary, they may be more concerned with getting their share of the prize than with ensuring a rational investment strategy. On the other hand, if they perceive taxes as being a more permanent revenue stream, they may place more value in their transparent and accountable management. We therefore formulate the following expectation:

H3: Conditional on feeling ownership over the budget, the source of revenues matters for the type of accountability that is demanded. Windfall revenues are associated with more negative/private forms of accountability than taxation.

As such, this proposed design builds upon and contributes to the existing literature in a variety of ways. For one thing, instead of focusing on the effect of taxes (as compared to windfalls) on accountability, it focuses on the effect of ownership treatments on accountability within a context of windfall revenues. It therefore proposes a more stringent (and novel) test of the proposed mechanisms. In doing so, it expands upon Martin (2016) and De la Cuesta et al. (2022) testing the ownership mechanism (and in particular the idea that it is malleable) outside the lab, and upon Paler (2013) by doing it in the context of a real world government policy that is expected to promote feelings of ownership. Moreover, it adds nuance to the dependent variable by allowing for different forms of accountability.

Perhaps the most similar effort is that of Armand et al. (2020), who randomize information about a future windfall to different groups of subjects —local leaders only and both leaders and citizens— in Mozambique, and measure a wide range of outcomes. However, they do not explicitly test mechanisms. Moreover, by providing information about legal rights and expected windfall amounts in combination their treatments bundle the ownership and information mechanisms. Nonetheless, their findings do highlight the importance of information treatments, by showing that providing information to citizens increases trust, voice and some measures of political accountability, as compared to providing information only to leaders.

E.3 Research Design

To test these hypotheses we propose to conduct a survey experiment that will examine whether priming feelings of ownership over the budget has an effect on citizens' level and type of accountability demands. The setting are Peruvian districts benefitting from mining fees.[49]

Peru is in many ways similar to other resource-rich developing countries. Outside of the

[49]These fees amount to 50% of mining companies' income tax payments and are distributed among all districts located in regions in which mining activities take place (Peru is divided into 1874 districts embedded in 196 provinces themselves embedded in 26 regions). More specifically, 10% of the mining fees are distributed in equal parts among the districts in which exploitation takes place, 25% are distributed among all districts in the province in which exploitation takes place, and 40% are distributed among all districts in the region in which exploitation takes place, on the basis of population and poverty levels. The remaining 25% go to the regional government. All of these revenues must be spent in the provision of public goods (Ley de Canon 27506).

capital local taxes make up less than 1% of the median local governments' budget.[50] Moreover, even in the capital very low levels of awareness of tax payments and knowledge regarding who individuals are paying taxes to and what for underscore the need to identify alternatives to the traditional fiscal contract.[51] At the same time, local politics is characterized by a high perception of corruption and low levels of interest in politics, political participation and knowledge of public finances.[52] All this despite the fact that the comprehensive decentralization process begun in 2002 added multiple spaces of citizen participation to an already extensive offer.

In this context, mining fees are formally intended to allow local communities to share in the benefits of the exploitation of natural resources that belong to all Peruvians.[53] As such, feelings of ownership over these fees are promoted by an official discourse that presents them as a form of collective compensation for the symbolic and material costs generated by the extraction of non-renewable natural resources.

To disentangle the effect of the source of revenues from that of its scale, the survey experiment will take place in districts i) benefitting from mining fees, and ii) where the amounts of revenue coming from mining fees and local taxes are equivalent. The experiment has a 3x2 factorial design, with the 6 experimental groups shown in table E.5.

[50] Using revenue from municipal taxes over modified budget for 2017, data from the Ministry of Finance.

[51] In an original survey fielded in April 2019, only 40% of respondents in Lima responded affirmatively when asked whether they pay any taxes. Of those, only 20% can correctly name more than one tax that they pay and the plurality name city fees (not technically a tax). Only 19% mentioned sales taxes. Moreover, 25% of those who claim not to pay taxes also claim to be property owners and almost 20% are salaried employees, suggesting they likely do pay taxes (though given high levels of informality it is difficult to know for sure).

[52] According to the 2017 Corruption Perceptions Survey, 62% of respondents consider corruption among public officials and bureaucrats to be the main problem facing the country. Moreover, 22% consider local governments to be one of the three most corrupt institutions in the country. In our April survey more than half of national respondents had little or no interest in politics, 76% had no form of local-level political participation, and more than 60% refused to pick the approximate size of their local government's budget out of 4 options.

[53] The 1993 Constitution states that natural resources are the patrimony of the nation (art. 66) and fees are used to ensure constituencies receive an adequate share of the revenues accrued to the state as a result of the exploitation of natural resources in each zone (art. 77).

Table E.5: Experimental Groups 1: Districts with Mining Activity

		Ownership	
		Yes	No
Source of Revenue	Mining fees	1. The budget = S/. from mining fees from the exploitation of your community's natural resources, intended to compensate local dwellers	2. The budget = S/. from mining fees
	Taxes	3. The budget = S/. from tax payments from local dwellers like you	4. The budget = S/. from taxes
	Control	5. The budget = S/.	6.

These conditions allow us to i) manipulate the intensive margin of pre-existing feelings of ownership over mining fees, and ii) benchmark the effect of windfalls to that of tax revenues. We use vignettes to manipulate descriptions of these public funds, analogous to the groups in table 1.

To check whether we were able to effectively manipulate ownership feelings we will compare the relevant outcomes (see table E.6 below) of groups 2 vs 1 and 4 vs 3.

In order to test H1 (whether baseline levels of ownership are higher over tax revenues than windfalls), we will compare the relevant outcomes of groups 2 and 4.

In order to test H2 (whether ownership induces accountability) we will compare the relevant outcomes of groups 1 and 3 to those of the control group (6), both combined and individually. We also examine whether any effect from the aforementioned comparison is indeed driven by sense of ownership over government budget (as opposed to information about the budget) by comparing groups 1 and 3 with group 5. Control group 5 gets the same information regarding the intended use and magnitude of the government budget but different information regarding its source.

Finally, to test H3 (whether different sources of revenue lead to different types of accountability demands), we will compare the types of demands made by respondents in groups 1 and 3.

The sequence of the experiment will be as follows [54]. All respondents will start by answering a questionnaire that will collect information on their socio-demographics. Respondents in all treated groups will then receive the vignettes described above. Outcomes will then be measured. In addition to quasi-behavioral outcomes, we also collect self-reported measures of monitoring, participation and sanctioning of local (municipal) officials. The post-treatment survey also collects information regarding satisfaction with the use of the local government's budget, trust in the municipal government, and perceptions of corruption in the municipal government, which we will use to probe potential alternative mechanisms. As our manipulation check, we i) ask respondents to what extent they feel that part of the funds going to the municipal budget belong to them, and ii) where they think this budget comes from (both geographically and in terms of the sources of these revenues).

Treatments will be assigned at the individual level and blocked at the community level.[55] Since outcomes will be measured immediately, spillovers do not cause grave concern. Yet, it is possible that surveying a given community takes multiple days, in which case respondents may have already heard about the survey. To assess this possibility, we will ask respondents at the start of the survey whether they have heard about it and check for possible heterogeneous effects.

We will conduct our survey in districts in which revenues from mining fees and local taxes are similar. While doing so limits the external validity of findings, it allows for a more nuanced understanding of the mechanisms linking different sources of revenue and accountability. In particular, it enables us to examine whether taxes have a differential effect on accountability demands net of ownership, such as effects due to scale or predictability. Nonetheless, additional observational evidence will be presented to describe how selected districts differ from the universe of districts in the country, and outline the conditions under which findings are expected to apply.

In terms of scope conditions, it is important to underline that while our ultimate goal is to identify mechanisms that can promote the development of a fiscal contract-equivalent in a context of windfalls, the success of such an endeavor ultimately depends also on leaders' reactions. That is, even if citizens can be induced to demand positive forms of accountability, this will only

[54] See the full survey questionnaire in the appendix.

[55] Communities are embedded in districts and are the smallest political unit for which census data is aggregated.

lead to positive governance outcomes if leaders respond with greater transparency and public goods. While one expects this to be the case in a democratic context, it may not necessarily be so. One alternative is that, as suggested by the bargaining mechanism, leaders will only be motivated to respond to accountability demands if they depend on citizens for revenue and the latter can credibly threaten non-compliance. If this were the case, it would support Sala-i Martin and Subramanian (2003)'s argument that windfalls should be distributed directly to citizens and then taxed. Another alternative is that, even if citizens demand positive forms of accountability, leaders may respond with more aggressive forms of clientelism, highlighting the importance of the quality of institutions (as argued by Bhavnani and Lupu (2016). These are all issues to examine in future research.

E.4 Outcome Measurement

Our dependent variables therefore seek to capture both the level of accountability and the type of accountability that is demanded (over public goods vs clientelistic benefits). Following Paler (2013), we focus on three aspects of accountability demands: monitoring, participation, and sanctioning.

Two quasi-behavioral measures of participation will be measured immediately after treatments have been applied. The first one will measure the effect of treatments on public goods accountability and will consist of the following:

- Respondents will be offered the chance to sign an official request for the mayor to hold an accountability meeting explaining the use of the budget, with the promise that if the required level of constituent support is reached, the research team will present the demand to the proper authorities.[56] Outcome measure is a dummy indicating whether respondents sign the request.

The second one will force respondents to state the type of accountability they desire. It will consist of the following:

[56]By law, if 20% of constituents sign the request, mayors are obligated to hold these meetings.

- Respondents will be paid for their participation in the survey and given the opportunity to, at a cost equivalent to 10% of their payment, send a postcard to the municipal mayor indicating i) their level of satisfaction with the use of the budget in their district and ii) how they would like the municipal government to spend those resources. These open-ended answers will be hand-coded to capture the extent to which respondents demand excludable benefits, which we will take as an indication of more negative forms of accountability. Postcards will be completed immediately and collected by enumerators with the promise to send aggregated results to the mayor. Three outcome measures are collected: a dummy for whether respondents fill out the postcard, and among those that fill it out, an ordinal variable capturing their level of satisfaction (on a likert scale) and a dummy for whether they choose a private good.

These outcomes will allow us to estimate the effect of each of the treatments on both respondents' level and type of accountability demands.

In addition, the post-treatment survey will measure respondents' self-reported willingness to monitor the local government, intention to participate in community meetings/participatory budgeting/other available forms of institutionalized participation, intention to participate in protests against the local government, intention to vote in next election, intention to support the party of incumbent in next election and interest in learning more about the management of the public budget.

Table E.6 lists all of the outcomes measured and their intended role.

In our analyses we will measure the level of accountability using outcomes 1, 2 and 4-11 both individually and aggregated into one or more indices.

E.5 Analysis Plan

The difference-in-means between the relevant treatment groups will be estimated using regression analyses according to the following benchmark model:

$$Y_{icd} = \alpha + \beta_1 D_{icd} + \gamma \mathbf{X}_i + \mu_d + \epsilon_{icd} \tag{2}$$

Table E.6: Measured Outcomes

	Outcomes	**Intended use**
1	Signing request for participatory meeting	Accountability - Monitoring
2	Filling (and paying for) postcard	Accountability - Participation
3	Type of good requested: public vs private	Accountability - Type
4	Interest in municipal performance	Accountability - Monitoring
5	Interest in how budget is spent	Accountability - Monitoring
6	Interest in attending accountability meeting	Accountability - Monitoring
7	Interest in participating in local council	Accountability - Participation
8	Interest in participating in participatory budgeting	Accountability - Participation
9	Interest in protesting	Accountability - Participation
10	Interest in voting	Accountability - Participation
11	Interest in voting for mayors' party	Accountability - Sanctioning
12	Satisfaction with use of the budget	Alternative mechanism
13	Trust in municipal government	Alternative mechanism
14	Corruption perception	Alternative mechanism
15	Perception of ownership over public funds	Manipulation check
16	Perception of source of funds	Manipulation check
17	Perception of origin of funds (geographic)	Manipulation check
18	Awareness of tax payments	Robustness

For respondent i in community c and district d outcomes Y_{icd} represent behavioral or attitudinal outcome measures as described above. D_{icd} is an indicator identifying the treatment groups for the relevant comparisons. $\mathbf{X}_i$ is a vector of control variables added for precision, which includes gender and age. μ_d are district fixed effects. The most conservative models will also include enumerator fixed effects. Robust standard errors are clustered at the community level.

In terms of our hypotheses, H1 implies that β_1, the coefficient on an indicator identifying the tax treatment (group 4=1 and group 2=0), is positive, indicating that baseline levels of ownership are higher over tax revenues than over windfalls. We will use as outcome in this analysis variable 15 listed on table 1.

To test H2 we will construct an indicator variable comparing the ownership treatment groups to the control group (groups 1 and 3=1, group 6=0). We expect β_1, which identifies the average treatment effect (ATE) of the ownership treatment, to be positive, indicating it increases accountability demands. Outcomes will be variables 1, 2 and 4-11, both individually and combined into indices. We will also examine whether the magnitude of this effect varies depending on the source of revenues (i.e., between groups 1 and 3).

To test H3 we will construct an indicator variable comparing groups 1 and 3 (group 1=1, group 3=0). The outcome variable is the hand-coded variable for choosing a private good in the postcard (variable 3 in table 1. We expect β_1 to be positive, reflecting the fact that feeling ownership over mining fees leads to more negative forms of accountability than feeling ownership over taxes.

We will also explore heteroegeneous effects by levels of tax awareness, socio-economic status and literacy.

Manipulation check. To assess whether the treatment was successful in manipulating both ownership and perceived origin of public funds we construct an indicator variable comparing groups 1 and 3 to 2 and 4 (groups 1 and 3=1 and groups 2 and 4=0). Outcomes are variable 15 and 17 (as a dummy for local sources). Additionally, to assess whether treatments effectively manipulate perceptions of the source of public funds, we construct an indicator variable comparing treatments with mining fees to those with taxes (groups 1 and 2=1 and groups 3 and 4=0). Outcomes are coded from variable 16. We expect that mining treatments (1 and 2) will increase the perception that budget is made up of mining fees and tax treatments (3 and 4) will increase the perception that it is made up of taxes.

Mechanism. We shed light on alternative paths that may drive our results. The main alternative mechanism in the literature is information. To explore this possibility we will compare groups 1 and 3 to group 5 instead of group 6. If the effect disappears, this would indicate that it was driven by information regarding the size of the budget rather than ownership. We also examine whether any effects are driven by our treatments affecting respondents' attitudes towards the municipal government, using variables 12-14 (satisfaction with use of budget, trust in local government, perceptions of corruption) as outcomes in analyses analogous to the ones used to test H2.

F Data Collection

Our sampling frame is made up of the districts satisfying the condition that i) revenues from mining fees and local taxes are similar, and ii) they have mining activity. Of this universe we selected districts on the basis of i) level of similarity between mining fees and local tax revenues, and ii) presence of communities with at least 200 inhabitants. This led to the selection of the following districts (region/province/district):

1. Lima/Barranca/Supe
2. Puno/San Roman/Caracoto
3. Junin/Huancayo/Chongos Alto

Within each district the largest communities were selected to ensure that a sufficiently large sample could be drawn from within each community. Treatment assignment is blocked at the community level, with 13 respondents per treatment group (i.e., 78 respondents per community) in each of 25 communities, for a total of 1,950 respondents. Households will be randomly selected by community and assigned to an experimental group, with one adult randomly sampled by household. Data will be collected through face-to-face interviews conducted in a single wave by a team of experienced enumerators from the survey firm Ipsos.

G Sample Selection

Table G.7: Districts in Sample

			In 2022 Budget (S/.)			
Region	Province	District	Mining fees	Local taxes	Treatment prompt	Respondents
Lima	Barranca	Supe	1,719,487	2,370,680	2 million	1,522
Puno	San Roman	Caracoto	967,430	1,126,556	1 million	289
Junin	Huancayo	Chongos Alto	114,340	98,569	100,000	108
Junin	Chanchamayo	Vitoc	106,302	60,620	80,000	31

Figure G.4: Districts in Sample

G.1 Deviations from sampling plan

The original plan intended to survey 78 subjects per community in 25 different communities within the four selected districts. Data from the latest (2017) census was used to ensure selected communities were large enough to reach the 78 targeted surveys. However, during enumeration it was found that some of the communities in the sample had very small populations[57], making it impossible to reach the target of 78 responses. At this point, two strategies were used to ensure the total target number of respondents (1,950) was reached. The first was to select new communities in the same districts. The second, which was used exceptionally (only 7 times), was to interview two respondents in the same household.[58] As a result, the number of responses per community varies between 3 and 78 (20/32 of communities reached the targeted 78 respondents).

H Additional Results

Table H.8: Effect of source of revenues on type of accountability

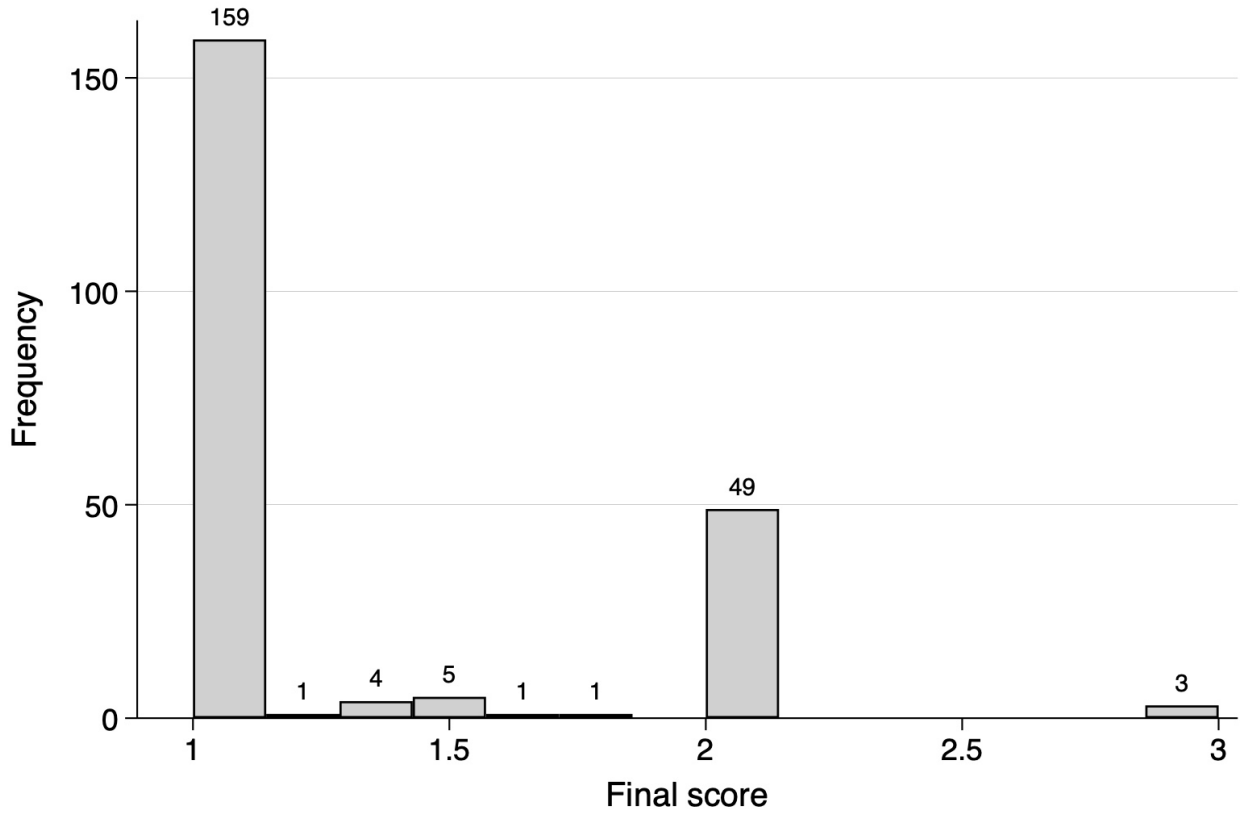
	DV: Score
Group 4.Tax+Own vs group 2.Canon+Own	0.248*
	[0.062]
Constant	1.195***
	[0.033]
Observations	65
R-squared	0.079
Region Fixed Effects	Yes

Standard errors clustered by region in brackets.
*** p<0.01, ** p<0.05, * p<0.1

[57]It was mentioned that some people returned for the purposes of responding to the census but no longer actually lived there.

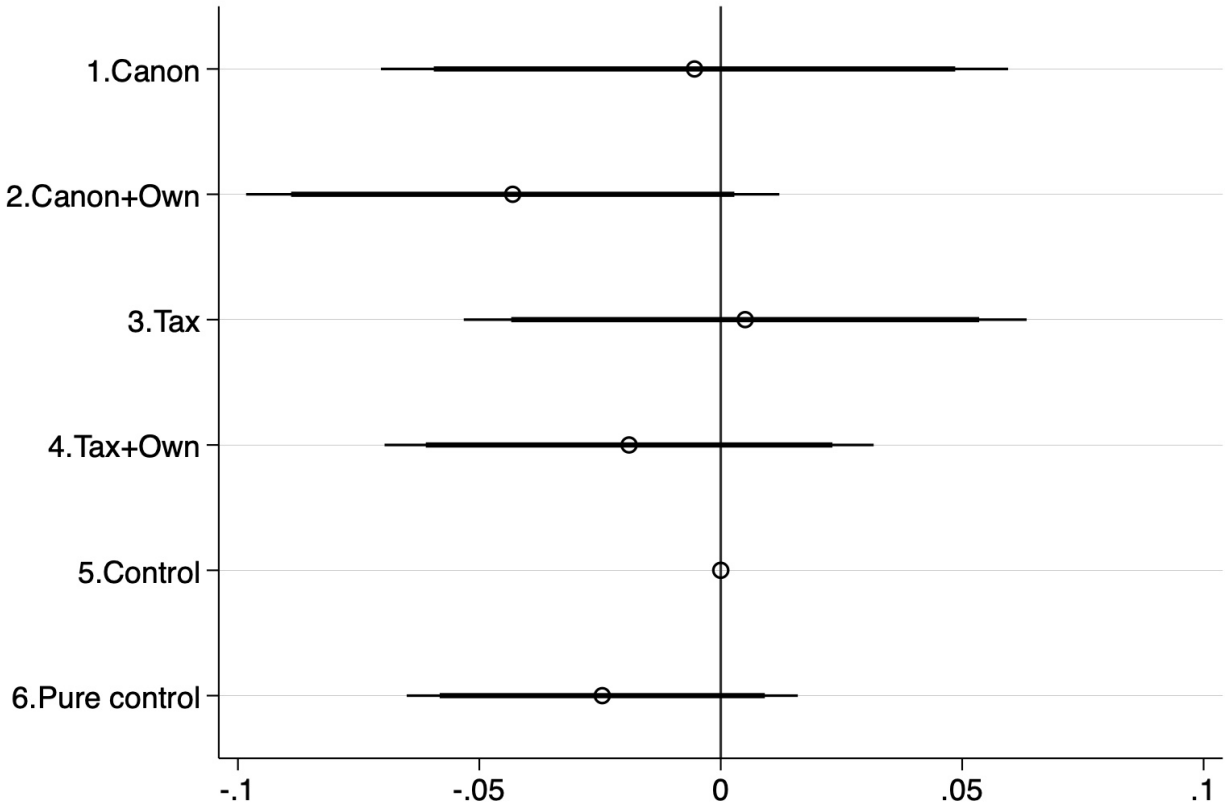
[58]Second interviews are flagged to ensure results are robust to excluding them.

Figure H.5: Histogram of coded open-ended requests



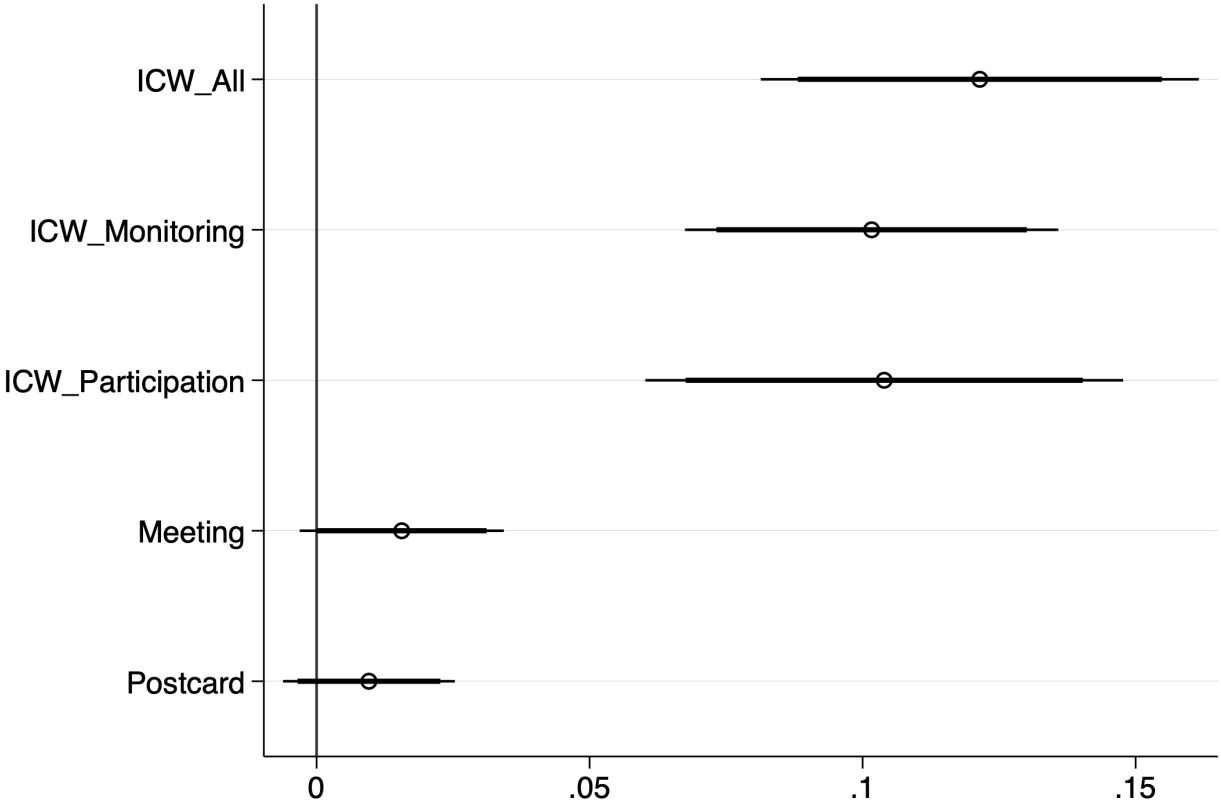
Note: Coding of open-ended requests in postcards. Requests were coded as 1 if public goods that would benefit the whole district were requested, 2 if club goods that would benefit one specific community were requested and 3 if private goods that would personally benefit the respondent or her family were requested. For postcards with multiple requests the final score is a simple average.

Figure H.6: ATEs on probability of sending the postcard



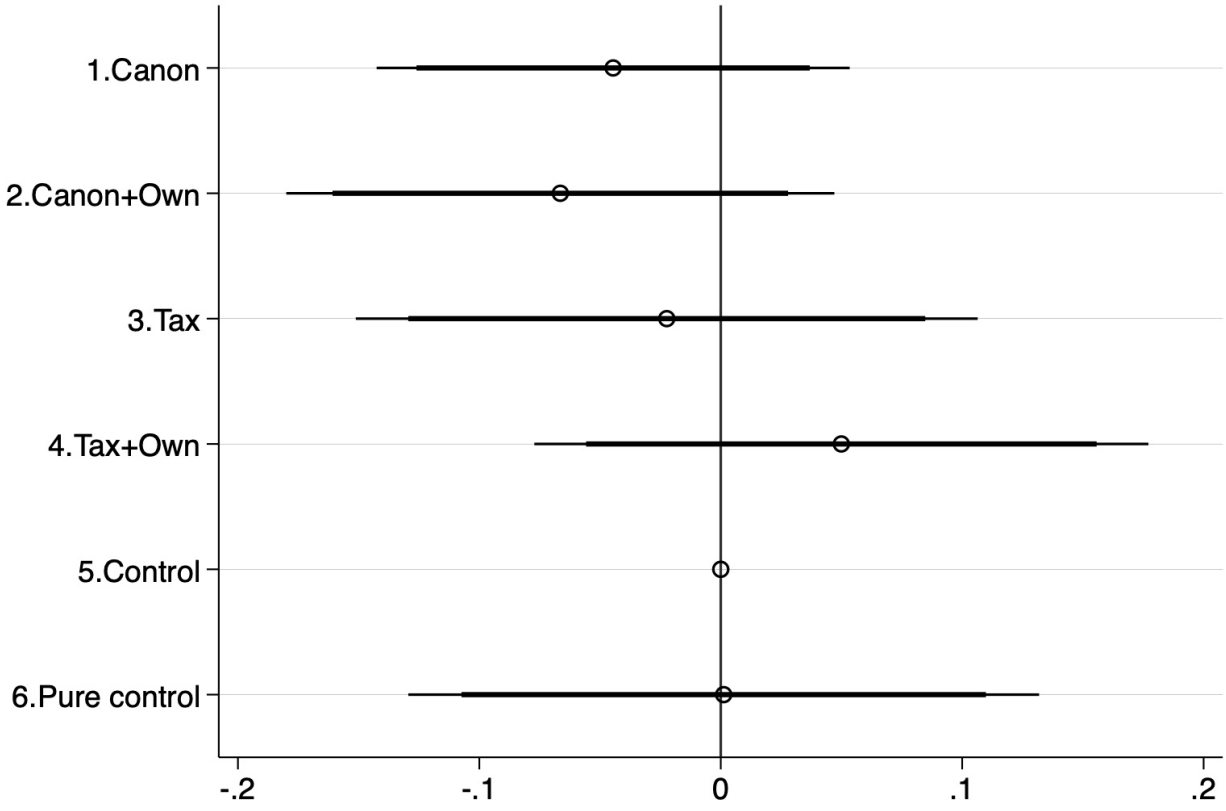
Note: Dependent variable is a dummy indicating whether the respondent chose to pay 10% of his compensation to send a feedback postcard to the mayor. Model includes controls for gender, age and literacy, as well as region and enumerator fixed effects. Standard errors clustered at the community level.

Figure H.7: Correlation between ownership and accountability in control group (6)



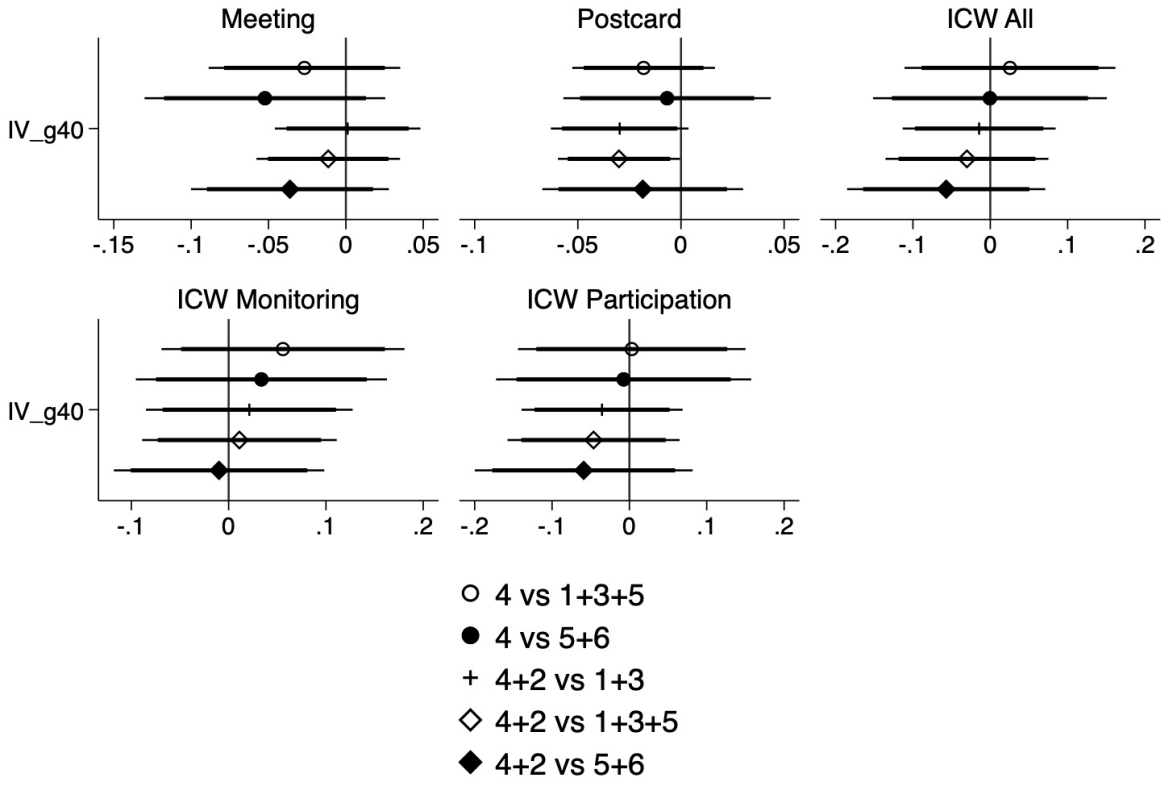
Note: Coefficients from separate regressions. Models include controls for gender, age, education, socio-economic status, tax awareness and length of presence in community, as well as region and enumerator fixed effects. Standard errors clustered at the community level.

Figure H.8: ATEs on tax awareness



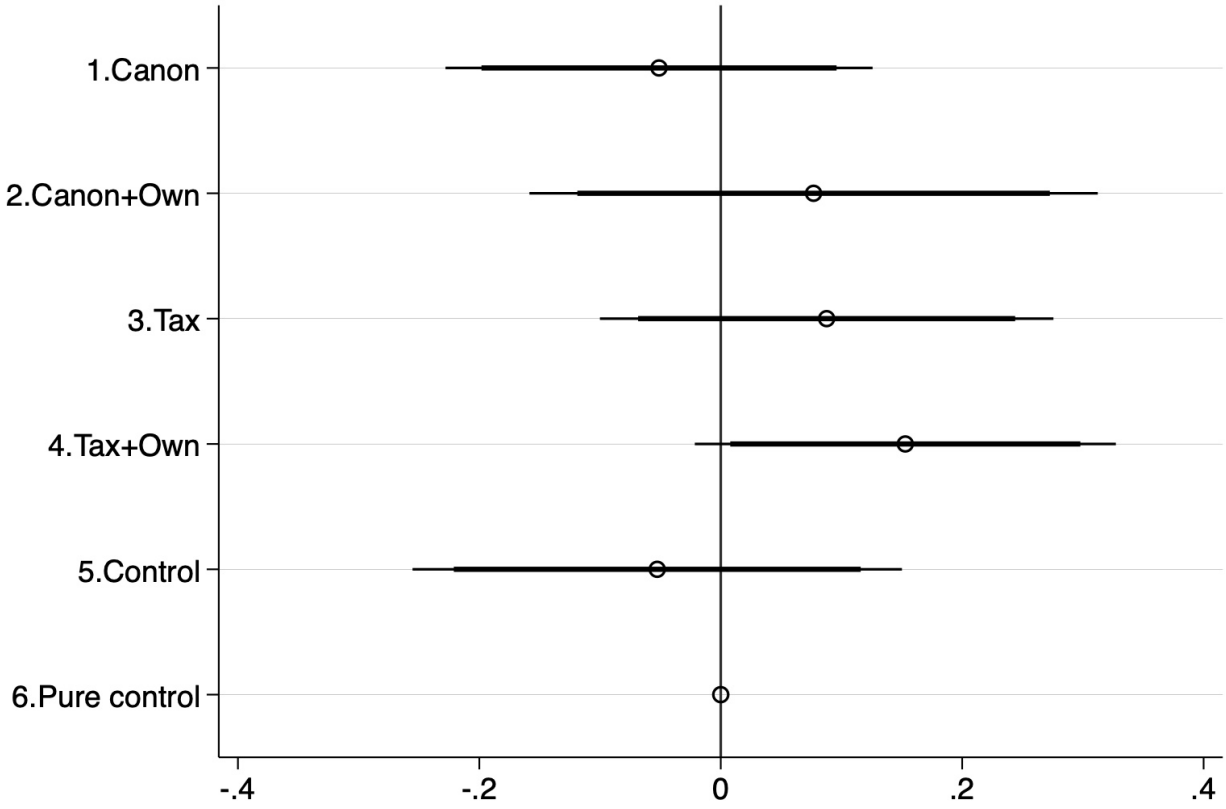
Note: Model includes controls for gender, age and literacy, as well as region and enumerator fixed effects. Standard errors clustered at the community level. Black bars indicate 90 and 95% confidence intervals.

Figure H.9: ATEs pooling different treatment groups



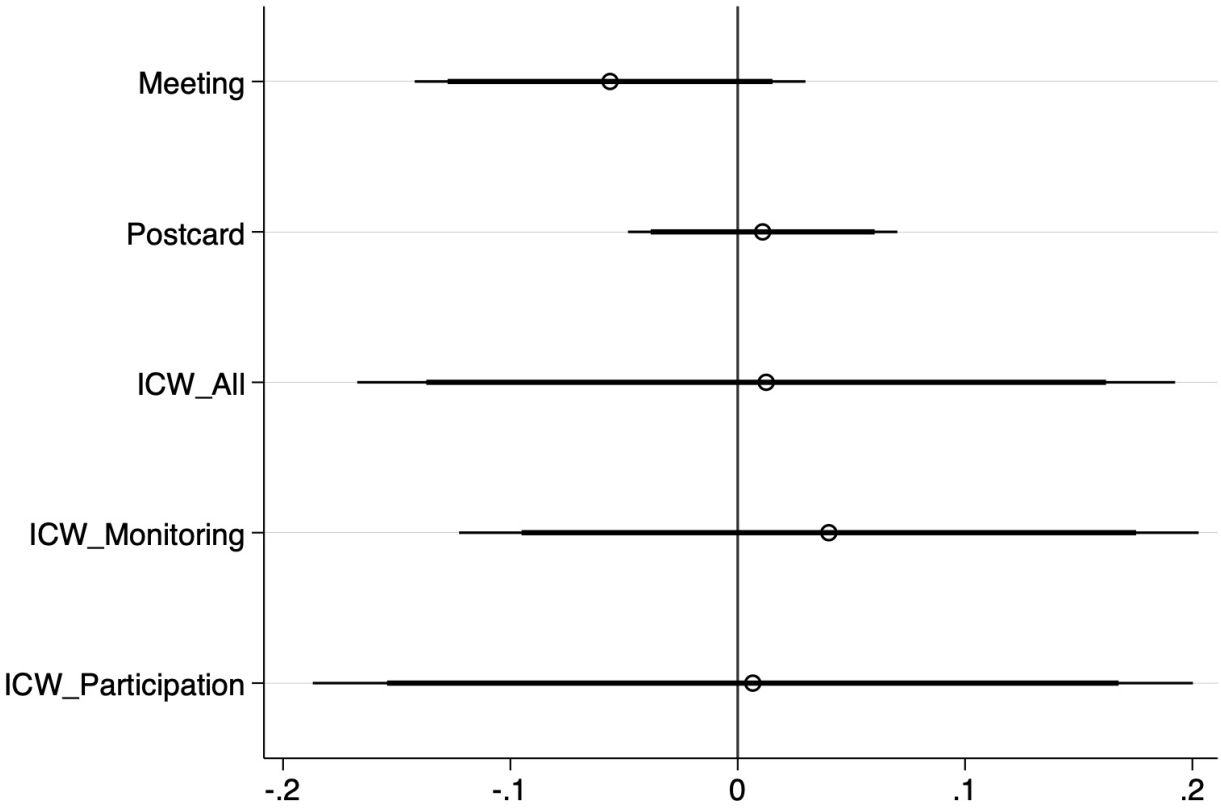
Note: Coefficients from different models. All models include controls for gender, age and literacy, as well as region and enumerator fixed effects. Standard errors clustered at the community level. Black bars indicate 90 and 95% confidence intervals.

Figure H.10: Robustness: ATEs on ownership (relative to group 6)



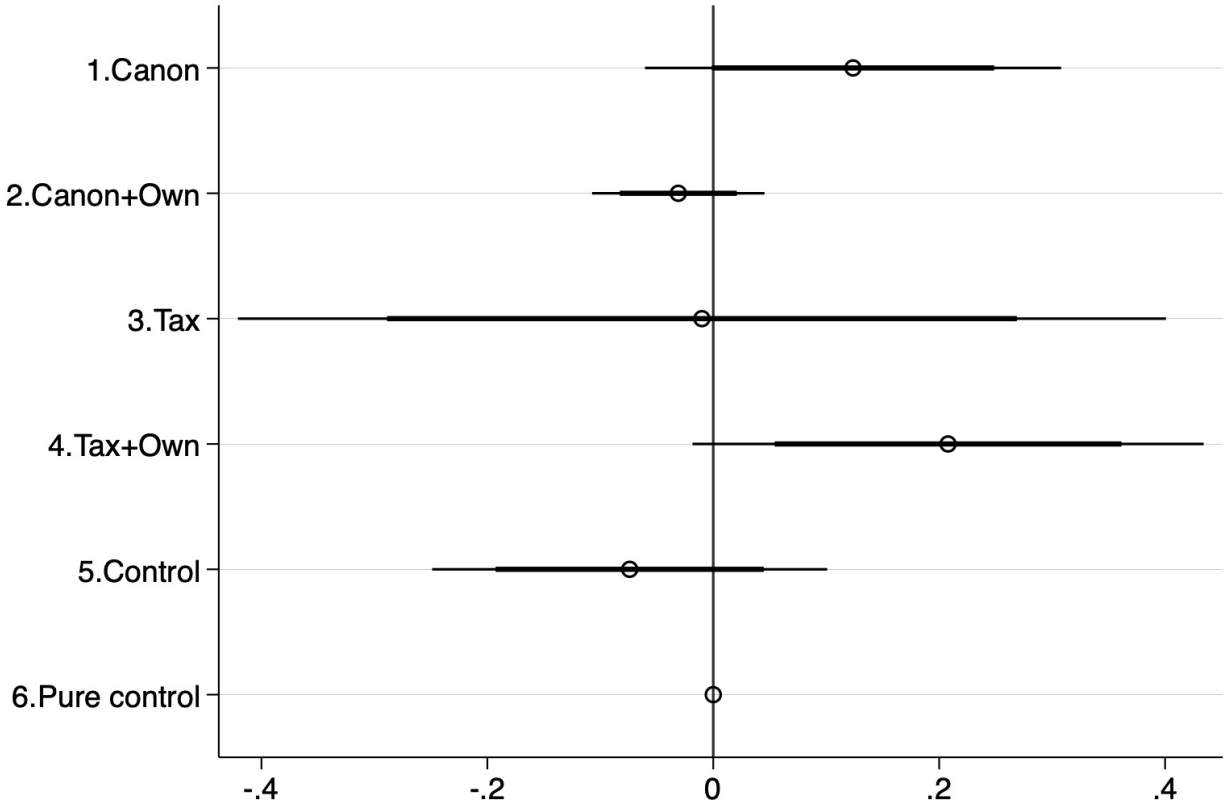
Note: Model includes controls for gender, age and literacy, as well as region and enumerator fixed effects. Standard errors clustered at the community level. Black bars indicate 90 and 95% confidence intervals.

Figure H.11: Robustness: ATEs of 4.Tax+Own (relative to group 6)



Note: Coefficients from separate regressions. Models include controls for gender, age and literacy, as well as region and enumerator fixed effects. Standard errors clustered at the community level. Black bars indicate 90 and 95% confidence intervals. Reference group is group 6.Pure Control.

Figure H.12: Robustness: ATEs on type of accountability (relative to group 6)



Note: Outcome is a score ranging from 1 (public goods) to 3 (private goods). Model includes region fixed effects. Standard errors clustered by region. Black bars indicate 90 and 95% confidence intervals.