

When Non-Earned Revenue Looks Like Taxes: An Experimental Test of the Differential Accountability Hypothesis in Ghana^{*}

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Abstract

The resource curse literature has put forth several mechanisms to account for the comparatively worse performance of countries that rely on non-tax revenues to finance government spending. One of the most prominent is the so-called accountability effect, whereby citizens, when taxed, are more willing to invest resources in the monitoring and punishment of elected officials. Yet the micro-level evidence for this mechanism is limited. We provide empirical support for the accountability effect through a lab-in-the-field experiment conducted in Ghana, finding that taxed citizens demand more from leaders than untaxed citizens, even when their effective wages are identical. Extending a model developed in Martin (2014), we also address an important but under-examined question in the literature: when, and under what conditions, might non-tax revenues elicit behavior similar to those associated with tax-based revenue? Our results suggest that the differential accountability observed in experimental settings is driven almost entirely by citizens' comparatively stronger feelings of ownership over tax-based revenue. Taxation induces differential accountability only to the extent that citizens feel stronger ownership of tax revenues; citizens who feel strong ownership over non-tax revenues demand no less accountability for spending behavior than those who are taxed. Recently completed work tests the ownership mechanism further, and suggests that interventions to increase ownership over non-tax revenues might blunt the accountability effect.

Key words: resource curse, endowment effect, field experiment, accountability, taxation

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1 Introduction

Political accountability is a critical element of democracy. Accountability means that government officials should be held responsible for their decisions and actions by their citizens so that these officials act in the best interests of their country; those who fail to do so should face consequences like removal from office. There is substantial evidence that how governments are funded is a key factor affecting accountability; countries that rely on taxes, rather than non-earned revenues, are more likely to democratize, more likely to provide public goods, and less likely to be corrupt (Ross 2004*b*; Timmons 2005; Baskaran and Bigsten 2013; Prichard 2015). In particular, natural resource wealth, such as oil and natural gas that have been discovered recently in Uganda and Ghana, is often claimed to undermine good governance, as is foreign aid (Morrison 2009, 2015). This effect is known as the resource curse.

One common explanation for the link between taxation and accountability is that paying taxes motivates citizens to demand accountability from their representatives. The psychological mechanism underpinning this taxation-causes-accountability argument is often taken to be the endowment effect, well known in social psychology and behavioral economics (Kahneman, Knetsch and Thaler 1990). Presumably, this endowment effect extends to government funding. Martin (2014) argues that citizens, wishing to recover the money they have lost through paying taxes, will be more willing to monitor and sanction how officials spend tax revenue, even when doing so is costly. In particular, taxation may increase the personal utility citizens lose due to corruption; if these personal utility losses affect the expressive benefits citizens receive from sanctioning the government, taxation will increase citizens' willingness to punish their leaders.

However, the experimental evidence for this endowment effect is mixed. Paler (2013) finds that taxed citizens express higher willingness to seek information about how government spends funds, and Martin (2014) finds that citizens are more willing to sanction leaders for misuse of tax funds, compared to when the budget comes from a windfall. However, Paler finds no difference in citizens' willingness to punish across revenue sources, and de la Cuesta, Milner, Nielson and Knack (2016) find that citizens may even be more willing to monitor oil revenues than tax revenues in some cases.

One possible explanation for the contradictory findings on revenue source and bottom-up accountability pressures is that some citizens do feel ownership over non-earned revenues such as aid or oil. In Paler (2013), the proportion of respondents willing to act in the windfall treatment group is remarkably high—even when not statistically distinguishable from those in the tax treatment—and suggests that there is a strong appetite in developing countries for greater accountability regardless of revenue source. Given that many low-income countries derive significant revenues from oil and foreign aid, citizens may realize that they could potentially benefit greatly from these funds, and may feel that they should in truth belong to citizens. In this case, such citizens may be equally willing to punish malfeasance involving all types of revenues. It is also possible that citizens feel a

stronger sense over some types of non-earned revenues than others. For example, citizens may feel stronger ownership over oil money that comes from within a country, compared to foreign aid which is more of a pure windfall.

To better understand how endowment and ownership effects fit into broader patterns of taxation and accountability, we conducted a set of lab-in-the-field experiments that follow in broad strokes the [Martin \(2014\)](#) design, in which the author utilized laboratory experiments to measure the existence of a loss aversion mechanism after citizens pay taxes. In the core games, one Citizen and one Leader play a modified ultimatum game, in which the Leader must allocate revenues to a group fund and the Citizen can choose whether to pay to punish this allocation; the source of the group fund is either a tax on the Citizen's "wages" or non-tax revenues from aid or oil. The citizen then identifies the threshold of money returned by the leader to him from the group fund at which he will choose to punish. This punishment threshold is our main variable of interest, with lower thresholds meaning less likelihood of punishment and greater tolerance for rent extraction by the leader. We augment this initial design with additional arms designed to test different forms of non-tax revenue, in particular foreign aid and oil. We then use post-treatment measures of citizens' ownership over the group fund to examine the degree to which ownership effects are driving any differences between revenue types.

Our hypotheses examine whether willingness to punish varies by the revenue source and whether it varies according to how much ownership the respondent feels over the particular revenue source. Preliminary analysis of the results reveals several findings that support our theoretical suppositions. Overall, we find large and significant differences in respondents' willingness to punish across revenue types. Compared to the tax treatment, citizens in the aid, oil, and grant conditions have lower punishment thresholds; that is, they are less willing to punish on average. However, contrary to expectations, we find no significant differences across the three types of nontax revenues. Our theory, however, implies that citizens who feel ownership over the group fund would demand higher transfers from leaders. In exploring this hypothesis, we further find that respondents who felt that the group fund belonged to the citizen exhibited much greater willingness to punish. Once differences in perceived ownership are controlled for, the treatment effect of taxation on punishment thresholds is no longer different from that in the aid and oil conditions.

The results raise an intriguing possibility: if a sense of ownership over the foreign aid and oil funds varies across individuals, it may be malleable. If so, it suggests ways to alleviate at least in part the resource curse. To test this possibility, we are currently conducting additional laboratory experiments in Uganda. These experiments replicate our initial findings from Ghana, then add two additional treatment arms in which the revenue source is oil, but respondents receive different treatments intended to strengthen their ownership over the group fund. Data collection for these experiments is ongoing.

2 Theory

A large body of evidence suggests that taxation is associated with good governance along a variety of measures. Taxation is higher in democracies, and increases in taxation can increase the likelihood of future democratization (Ross 2004*b*). Taxation is positively associated with public goods provision, and these public goods appear to be targeted towards the preferences of taxpayers (Timmons 2005). Governments that receive their funding primarily from taxes also exhibit lower corruption (Baskaran and Bigsten 2013; Prichard 2015). These patterns hold not only in cross-national datasets, but also within countries (Fisman and Gatti 2002; Brollo et al. 2013; Gadenne 2015).

In contrast to taxes, funds from oil and aid are believed to be “windfall revenues” that enable corruption, undermine governance, foster repression, prolong autocratic rule, and increase conflict (Bräutigam and Knack 2004; Djankov et al. 2008; Caselli and Cunningham 2009; Morrison 2009, 2015; Smth 2008). Elites benefit from windfalls since they now have access to more funds that can be diverted to corruption and clientelism relatively free from citizen scrutiny. Citizens, on the other hand, suffer from windfalls, as money from non-tax sources is said to undermine accountability, generate resources for repression, and buy citizen quiescence toward bad governance (Mahdavy 1970; Beblawi and Luciani 1987; Chaudhry 1998; Waterbury 1998).

There are two political economy explanations for why taxation and good governance are linked. First, where citizens can credibly threaten to withhold tax payments, governments may have to bargain with citizens, often using policy or institutional concessions to increase quasi-voluntary tax compliance (Bates and Lien (1985); North and Weingast (1989); Levi (1989)). This is also in line with the tax morale literature, which shows that individual tax compliance is increasing in the degree to which citizens perceive tax funds to be well spent (see e.g. Torgler (2007)). Oil and aid, it is asserted, have neither component: they can’t be used by citizens to bargain with the government since citizens can’t withhold these non-tax revenues and they can’t be used to pressure governments to spend on public goods since the public doesn’t know how they are spent. Hence oil and foreign aid, it is claimed, do not operate in the same way as taxes to foster accountability and representation. There is substantial evidence that tax bargaining occurs, and that it is responsible at least in part of the relationship between taxation and accountability.¹

However, more recent work suggests that there is a second mechanism at play, one that can impact accountability even where tax bargaining cannot or does not function. In this story, money collected from taxes is spent in ways that are less likely to face resource-curse problems because taxes heighten citizens’ attention to accountability and therefore make political elites more likely to provide public goods, rather than private ones that benefit them and their political allies (Bates and Lien 1985; Ross 2001, 2004*a*; Robinson, Torvik and Verdier 2006; Ross 2012; Paler 2013). Under the

¹For example, Prichard (2015) shows that tax bargaining can explain patterns of taxation and accountability in sub-Saharan Africa today.

differential accountability hypothesis, funds provided by tax revenues are much more likely to be monitored by citizens, which makes politicians more likely to face sanctions if the taxes are misused (Huntington 1993; Ross 2001, 2004*a*).

The logic for this second mechanism is straightforward: citizens feel the loss of tax money from their own pockets and are therefore willing to pay costs to monitor the revenue and hold officials to account for its spending (Sandbu 2006; Paler 2013; Martin 2014). The psychological mechanism underpinning this argument is the endowment effect, well known in social psychology and behavioral economics (Kahneman, Knetsch and Thaler 1990). When people feel ownership of something, they tend to value it more dearly than when they do not possess it. This induces them to pay higher-than-expected costs to retain or recover it (Kahneman, Knetsch and Thaler 1990). Presumably, this endowment effect extends to government funding. Martin (2014) argues that taxation increases the personal utility losses that citizens suffer due to corruption; if these personal utility losses affect the expressive benefits citizens receive from sanctioning the government, taxation will increase citizens' willingness to punish their leaders. Indeed, experimental evidence suggests that people appear to be significantly more likely to monitor and sanction governments when their endowments are taxed compared to when they benefit from windfalls alone (Paler 2013; Martin 2014). These findings corroborate many studies in social psychology and behavioral economics indicating that owners are willing to pay greater costs to retain goods than non-owners (Van Dijk and Van Knippenberg 1996; Van Boven, Dunning and Loewenstein 2000; Morewedge et al. 2009).

While we do not question the existence of the endowment effect, whether it is in operation for a high enough proportion of the citizenry to act as a constraint on politician behavior is an open question. Indeed, Paler (2013), in a field experiment comparing respondents who received information about either windfall or tax revenues, finds no evidence for a differential accountability effect for any observable political behavior at conventional levels of significance. Only in the case of citizens' stated (e.g. hypothetical) willingness to monitor behavior does there appear to be a differential willingness. Equally as noteworthy, the proportion of respondents willing to act in the windfall treatment group is remarkably high—even when not statistically distinguishable from those in the tax treatment—and suggests that there is a strong appetite in developing countries for greater accountability regardless of revenue source. In ongoing work related to this project, we also find limited evidence for differential accountability, and in some cases evidence that suggests citizens, especially those who are taxed weakly or not at all, may be more willing to pay to monitor oil-based than tax-based revenues (de la Cuesta, Milner, Nielson and Knack 2016).

The starting point for this paper is therefore that while taxation may be associated with citizens' sense of ownership over government revenue, leading to an increase in citizens' willingness to punish, there may be cases where citizens also feel ownership over non-tax revenues, such as aid and oil. It is also possible that citizens may view aid and oil differently. Aid is a pure windfall: it comes from outside the country, and citizens play no role in extracting the money. Citizens in most developing countries are aware that aid money exists, but may have a low sense of ownership

over it. Many aid agencies have recognized this and now try to instill much greater ownership by consulting citizens and NGOs more (Winters 2010; Akerhman 2004).

In contrast, oil revenues are extracted quite literally from the country itself. Citizens are often involved in and affected by its extraction, and even when they lack information about the exact size of oil revenues, they know that it exists. This may be especially pronounced in regions where oil extraction is taking place. Thus, it is an open question whether citizens should view oil revenues as a windfall similar to aid, or whether they should see it as “their” money in the same way as taxes are. It is also not clear whether citizens’ feelings of ownership are fixed or malleable; it may be possible to alleviate the resource curse by instilling a sense of ownership over non-tax revenue in otherwise complacent citizens.

A basic definition of “ownership” over a particular type of revenues could be that a citizen believes that he or she should have a say in how that revenue is spent. In this paper, we employ a stronger definition of ownership: citizens feel ownership over funding when they expect to receive a certain level of benefit from how those funds are used, and these benefits become an integral part of their reference utility. Thus, when a citizen does not receive sufficient benefits from that revenue source, they are in the realm of losses. This is stronger than the belief that one should have a say over how revenue is spent, as that definition does not automatically imply that a citizen believes that she should automatically benefit to a specific extent from those funds.

To see how a sense of ownership over non-tax revenue could affect citizens’ willingness to punish, consider an extension of the model in Martin (2014). Martin’s basic model of taxation and punishment considers a single-shot game between a government and a unitary group of citizens in which the government must allocate a budget between personal rents and public goods, and the citizens must then decide whether to pay to enact a punishment on the government. Citizens receive no economic benefits from punishment, but may receive a psychological, expressive benefit. This is in line with work in psychology that individuals punish in part to relieve the negative emotions associated with behavior that is perceived as unfair or otherwise unacceptable (Fehr and Gächter 2000; Fehr and Schmidt 1999).

The model—a single-shot game between a unitary citizen and a government—considers two fiscal regimes, one in which the government’s budget is a windfall from oil or aid, and one in which it is derived from taxes on citizens; the size of the budget is identical across the two regimes. Martin’s model relies on two assumptions to demonstrate that taxation will increase punishment. First, citizens have reference-dependent utility, in which they feel like they “own” their pretax income. Second, citizens’ willingness to punish is increasing in the degree to which corruption affects their own economic utility. In Martin’s model, taxation pushes citizens below their reference point; the S-shape that is characteristic of reference-dependent utility functions then implies that a taxed citizen loses more economic utility from corruption than a non-taxed citizen, and this drives the increased willingness to punish under taxation.

A simple extension to the model in Martin (2014) can demonstrate how aid, oil, and tax money may be different. In the model, the Government always has access to some budget, T , that is derived either from citizens' taxes, or from an outside windfall. Assume that a citizen's utility function is

$$V_C = u(x|G, r, t) + s_i(\beta_i * \Delta u(x|G, r, t) - c). \quad (1)$$

The first term, $u(x|G, r, t)$, describes a citizen's economic utility. Let $u(x|G, r, t)$ follow the characteristics of S-shaped loss-averse functions, and let $x = y(1 - t) + G - r$, where y is income; $t \in \{0, \tau\}$ with $\tau \in (0, 1)$ is the tax rate; $G \in [0, T]$ is the transfer provided by the leader; and r is the citizen's reference point, explained more below.

The second term describes utility from punishing the Leader. The Citizen makes a binary punishment decision $s_i \in \{0, 1\}$. If the Citizen punishes he pays a cost, c (which could include opportunity costs; collective action costs; and the possibility of repression), but gets a non-economic, expressive benefit $\beta_i * \Delta u(x|G, r, t)$, which is a function of citizens' personal propensity for punishment β_i , and the economic utility losses they suffer due to corruption, $\Delta u(x|G, r, t)$. Let

$$\Delta u(x|G, r, t) = u(x|T, r, t) - u(x|G, r, t), \quad (2)$$

where T is the government's total budget.² That is, $\Delta u(x|G)$ is the gap between the utility the citizen receives if the government spends the entire budget on the public good, and the utility the citizen receives given the government's choice of $G \in [0, T]$: it is the *economic utility a citizen loses due to rent-seeking*. This economic loss is then multiplied by β_i , the citizen's individual propensity for punishment. Let $\beta_i \sim F(\cdot)$ with support \mathbb{R}_+ .

Holding constant the government's level of transfer G , a citizen's optimal punishment decision is therefore

$$s_i = \begin{cases} 1 & \text{if } \beta_i > \beta^* = \frac{c}{\Delta u(x|G, r, t)} \\ 0 & \text{otherwise} \end{cases} \quad (3)$$

Note that as G increases, $\Delta u(x|G)$ decreases. Therefore as the government provides a higher level of transfers, fewer citizens will be willing to punish. For each citizen there will be some level of public goods provision, G_i^* , where the citizen will only punish if they receive less than G_i^* .

How will revenue source affect this decision? First, consider a regime in which there is no taxation, and the government's budget is a windfall from foreign aid or oil. Martin (2014) assumes that a citizen's reference point, r , is pretax income y . Thus, economic utility is evaluated in reference to $r = y$: when $y(1 - t) + G > r$ the Citizen is in the realm of gains; if $y(1 - t) + G < r$ she is in the realm of losses. Martin proves that if citizens are loss-averse, taxation increases citizens' willingness to punish: taxed citizens demanded a higher share of the group fund than non-taxed citizens whose government receives its budget from windfalls. This is because taxation, by sending citizens into

²Note that this budget is held constant across fiscal regimes.

the realm of losses, increases $\Delta u(x|G, r, t)$ for a given G , thus increasing the range of β_i in which citizens punish (see Figure 4). For each individual citizen, it also increases the lowest transfer G_i^* that they will accept without punishing.

This prediction assumes that citizens' reference point is y : they feel ownership only over their own pre-tax income, not over any other revenues. However, it is possible that citizens may also feel a sense of ownership over windfall revenues such as oil and aid. For foreign aid, this could be because citizens believe that aid is given to benefit citizens; for oil it could be because oil is ultimately extracted from the country, and thus seen by citizens as rightfully theirs. If citizens do feel a sense of ownership over aid or oil revenues, one way to understand this is as an increase in a citizen's reference point: instead of feeling ownership over only their pretax income y , some citizens also feel ownership over the windfall revenues T . We assume that each citizen is either a High or Low ownership type. Let δ_i be an indicator for whether an individual is a high or low type, and let $\delta_H = 1$ and $\delta_L = 0$, with $Pr(\delta_H) = p$. Now the citizen's reference point in the windfall conditions is $r_i = y + \delta_i T$. If $\delta_i = 0$, that citizen feels no ownership over the windfall, and the model predicts that he or she will be less likely to punish than taxed citizens. If $\delta_i = 1$, then that particular citizen will be in the realm of losses for any $G < T$, and will punish at the same level as a comparable taxed citizen.

We now have an alternate way to understand the effect of taxation on citizens' demands for accountability. Recall that, in the tax regime, $y\tau = T$. The citizens' reference point under taxation, y , is equivalent to $y(1 - \tau) + \delta_H * y\tau$. Within each windfall revenue type, the variation in δ_i can be understood as representing real-world variation in the degree to which individuals feel ownership over a particular source of revenues. However, we might also expect that the distribution of δ_i varies by revenue type. Let p^j be the probability of a high-ownership type within revenue type $j \in \{Oil, Aid, Grant\}$; "Grant" refers to an unspecified windfall, matching one of the conditions in the experiment below. We can understand varying demands for accountability as different average expected values for δ_i . Thus, if taxation increases the average likelihood that citizens punish, it must be that $p^j < 1$ for all forms of non-earned revenues.³ This directly implies the following:

Hypothesis 1 *Citizens' willingness to punish will be higher under taxation than under any form of non-tax revenues.*

Second, we argue that citizens will feel a stronger sense of ownership, on average, for some types of non-tax revenue than for others. In particular, citizens will feel stronger ownership over aid and oil revenues, relative to an unspecified "grant". This might be the case if citizens are unsure how to interpret an unspecified windfall, or if citizens are unable to point to strong norms regarding how such a windfall is to be used. Formally, we expect $p^{Oil} > p^{Grant}$ and $p^{Aid} > p^{Grant}$.

³As p^j increases, however, the effect of taxation on average punishment will be smaller, asymptoting towards zero as p approaches 1.

Hypothesis 2 *The treatment effect of taxation on citizens' willingness to punish will be larger relative to grant revenues than to aid and oil revenues.*

The final implication comes from the assumption that there is variation in δ_i within each revenue type. As the differences in citizens' willingness to punish are driven by a differential sense of ownership, controlling for that sense of ownership should reduce or eliminate the differences in punishment across revenue types.

Hypothesis 3 *Controlling for a citizen's sense of ownership over the group fund will reduce or eliminate the treatment effect of revenue sources on citizens' willingness to punish.*

3 Intervention Description

To test these hypotheses, we designed a set of laboratory experiments, conducted in Ghana, that are based on those in Martin (2014). Martin's original experiments consisted of the "Tax" and "Grant" games, each played between one "Citizen" and one "Leader." In each game the Leader had to allocate a group fund between his own salary and the Citizen; the citizen chose whether to pay a small cost to enact a fine on the Leader. The games differ only in the source of the group fund. We keep this basic structure for the experiments introduced below, and we retain many of the rules and constraints Martin used. These include the notion that taxes are exogenous and mandatory, preventing bargaining between leaders and citizens. Additionally, government budgets are constant and observable across treatments.

To test our hypotheses regarding the accountability effects of different types of revenues, we designed a set of four games, the steps on which are summarized in Table 1: the Tax, Grant, Aid, and Oil games. The steps for the Tax and Unspecified Grant versions are identical to those in Martin (2014), other than adjusting for local Ghanaian currency. We then add two additional revenue source treatments: Aid and Oil. The basic steps for these games are the same as the Grant game, with one key difference. Whereas in the Grant game the source of the group fund is not specified, in the Aid and Oil games respondents are told either that the group fund is money that was given by a donor as foreign aid, or that the money comes from Ghanaian oil revenues.

The source treatments were built into the game scripts used by the enumerators as well as illustrated on the game boards. During both participant training and actual gameplay enumerators stated the revenue source each time the group fund was mentioned. In order to emphasize the treatment, enumerators placed the coins representing the group fund on a tile illustrating and the source, and verbally stated the source, before moving the group fund to the leader's tile. The game board for the Oil condition is given below in Figure 1; game boards for the remaining conditions differ only in the image on the source tile.

Table 1 describes the citizen as making a punishment decision after the Leader decides on

Stage	Tax Game	Windfall game		
		Unspecified Grant	Aid	Oil
1	The citizen is given a wage of 5GHC.	The citizen is given a wage of 2.5GHC		
2	The citizen is taxed 2.5GHC. This is doubled to 5GHC and given to the leader as the group fund.	The leader is given 5GHC as the group fund.		
3	The Leader allocates 5 GHC between himself and the Citizen.			
4	The Citizen observes the Leader’s decision and, based on the decision rule they specified, decides whether to pay .5GHC to have enumerators remove 2 GHC from the Leader.			

Table 1: Timing of Original Tax and Grant Game. The game is identical to that of Martin (2014) except that in addition to the unspecified grant, players may be randomized into a version of the game in which the source of the grant may be either aid or oil. Additional treatments, outlined in Section 3.1 alter the game as described here.

an allocation of the group fund. For implementation purposes, Citizens were instead asked to make an ex ante decision rule; they were asked to decide which possible allocations of the group fund they would punish. This substantially increased the experiment’s power. For example, in the two-player games, enumerators would start by asking the Citizen “If the Leader kept 5 GHC, and gave you 0 GHC, would you pay 0.5 GHC to punish the leader?” If the Citizen replied “yes,” the enumerator would keep asking for different allocations, increasing the share the Citizen receives in 0.50 GHC increments.⁴ Enumerators stopped when they received a transfer level at which the Citizen would no longer punish: this becomes the punishment threshold in the analysis below. All games were implemented using real Ghanaian coins to make the decisions concrete for respondents.

We ran two versions of the experiments; each contained the four source treatments just described. In the first set, citizens are perfectly efficacious: a decision to punish a leader is implemented with probability one. In the second set, we consider how the effects of revenue on accountability change in the presence of uncertainty. In this second set of experiments, the game is identical until the final stage. The key difference is that, after a citizen pays the cost to try to punish, the leader is only actually punished 50% of the time. This induces uncertainty about whether punishment actions will be successful akin to that which exists when citizens actually seek to hold leaders accountable.

To implement the 50% likelihood of punishment, respondents would first decide which allocations of the group fund they would like to try to punish. They were then asked to draw a stone from a bag that contained 5 red stones (“punishment succeeds”) and 5 yellow stones (“punishment fails”). If the punishment succeeds, the citizen pays 0.5 GHC and the Leader loses 2 GHC. If the punishment fails, the citizen still pays the 0.5 GHC, but the Leader does not lose any money. We ran a version of the uncertain punishment games for each of the four revenue sources.⁵ For analysis,

⁴i.e. the next step would be to ask “If the Leader kept 4.5 GHC, and passed you 0.50 GHC, would you pay to punish?”

⁵An extension of the model introduced above suggests that while overall willingness to punish should decrease in

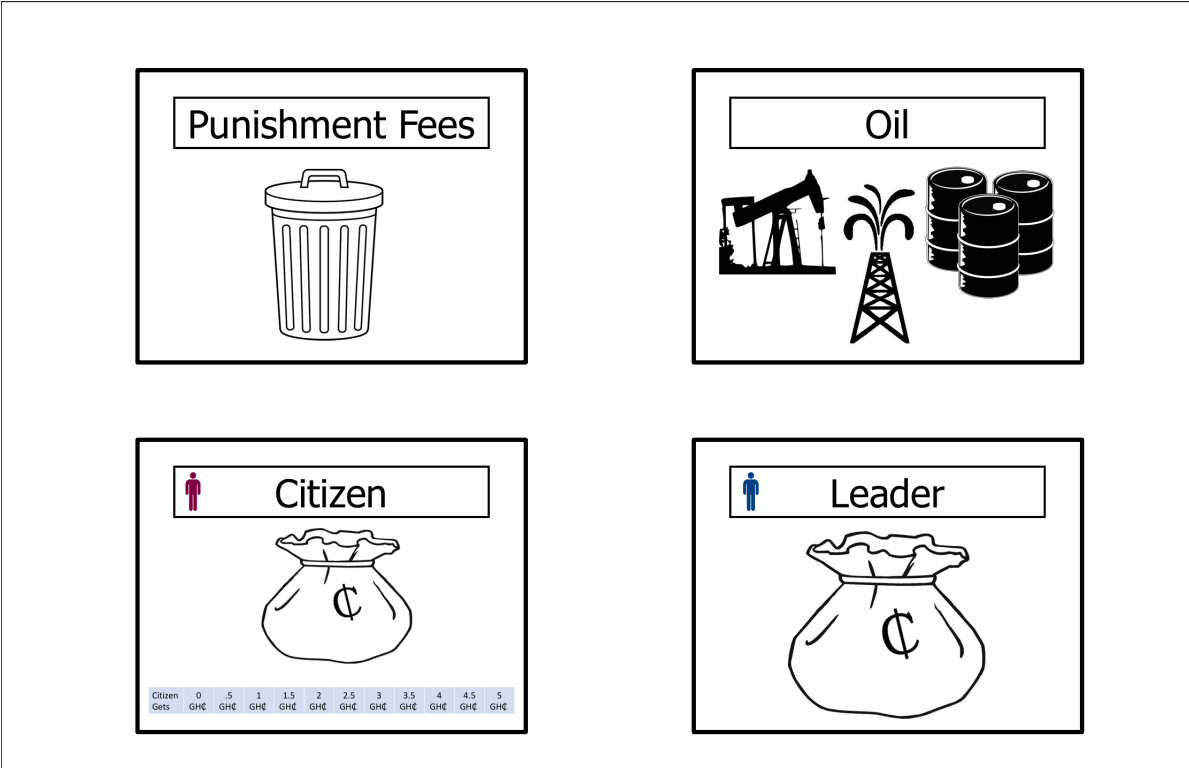


Figure 1: Example of Game Board, Oil Condition. Game boards for the Aid, Tax and Grant conditions differ only with respect to the image on the source tile. The Grant condition source tile has no image and is simply titled “Group Fund”. To emphasize the source of the group fund, the enumerator places the money on the source tile before transferring it to the Leader. At the time the Citizen sets her transfer threshold, the revenue is on the Leader’s tile.

the two sets of games are pooled together, as discussed further below; the differences between the certainty and uncertainty conditions are discussed in a related paper.

Because this is a single-shot game, punishment strictly decreases the citizen’s economic utility in all versions of the game. When the citizen receives no expressive benefit for punishment, the unique subgame-perfect Nash equilibrium is for the Leader to offer 0 GHC to the Citizen, and for the Citizen to never sanction the leader for any transfer size. Thus, punishment is an expressive action rather than economically rational. Following [Martin \(2014\)](#), we refer to the Leader’s salary as the group fund to signal that Citizens have some degree of discretion over its disbursement. Note that no one gets the money that is taken away in punishment; this was repeatedly stressed to all respondents.

We expect that respondents assigned to be Citizens in the Tax condition will be more willing to pay to punish the leader, relative to citizens in any of the three non-earned revenue conditions. However, we expect that the effect of taxation on punishment will be strongest relative to the unspecified Grant condition, and weakest relative to the Oil condition. We also expect that these results will be mediated by the degree to which respondents feel that they have ownership over the group fund. We expect that this sense of ownership will be highest among respondents in the tax condition, and that those respondents who feel a strong sense of ownership over non-tax revenues will exhibit similar punishment thresholds to those in the tax condition.

3.1 Additional Treatments

This paper is based on data from a larger set of laboratory experiments conducted in Ghana in 2016. In addition to the Certain and Uncertain punishment games, we ran a set of collective action games, and included a cross-cutting valence treatment. The results below include data from all treatments except the collective action games, for reasons discussed further below.

Collective Action Treatment. In addition to the uncertain punishment games, we tested a set of games in which we added a second citizen to each group. After the Leader allocated the group fund between himself and the two citizens, each citizen had to privately decide whether to pay a cost to try to punish the Leader. However, the Leader was only punished if both citizens pay to punish; if only one citizen punishes he or she still pays a cost, but nothing happens to the leader. The collective action treatment can be thought of as a proxy for existing institutions that allow citizens to learn each other’s preferences and coordinate in taking political action. We implemented these games in Ghana; however, feedback from a post-treatment debrief survey suggests that a large number of subjects fail a key manipulation check, in that they do not understand that the leader will only be punished if both citizens agree. Furthermore, there is some evidence that the likelihood of passing the manipulation check is not constant across treatments. For this reason we exclude

the presence of uncertainty, it will decrease the most in the tax condition, thus increasing the effect of taxation on punishment.

these games from the main analysis.

Valence Treatments. We also designed a set of treatments that used a valence priming to attempt to inculcate a sense of ownership over non-earned revenues in the minds of respondents. We hypothesized that such a treatment, which mimics a public education campaign arguing that aid (oil) revenue is meant for the benefit of all Ghanaians, could reduce the effect of taxation on punishment. This was a cross-cutting treatment, and thus a portion of the sample used for the analysis below also received this prime. Qualitative feedback from enumerators suggests that the valence priming may have created the opposite effect than intended, making some respondents feel that money kept by the Leader was going to public goods, rather than going to his personal salary. Thus, we do not consider it separately in our analysis, instead controlling for its effect by including it in our estimation equation.

4 The Ghanaian Context

Ghana is a particularly apt location to test the effects of different revenue sources on accountability pressures. The government budget is relatively diversified in terms of the relative share of oil, aid and tax revenues, particularly compared to its poorer counterparts in the region. In 2016, Ghana was projected to raise over half of its revenue from taxes – 19.5% of revenues come from taxes on goods and services, and 31.7% come from income and property taxes. Yet Ghana also has large oil reserves that account for the lion’s share of the 19% of the government’s non-tax revenue. On-budget support from grants, a category that includes and is dominated by development assistance, is the smallest of the three major sources at 4.2%. Yet, according to Aid Data, in terms of total worldwide share of Official Development Assistance (ODA) from 2000-2013, Ghana is ranked 23 out of 154 recipient countries.⁶

Ghana’s set of revenue sources thus has the desirable feature of being weighted much more towards taxes than many other countries in the sub-continent, while also relying on large oil reserves and a non-trivial amount of foreign aid. As we discuss in greater detail below, we expect that exposure to real-world taxation should create a strong sense of ownership over the use of tax-based revenues in the experimental context. It is less clear, however, that non-tax revenues should act similarly. An ideal country for the study of both is one in which neither form of revenue dominates government spending. This ensures that both tax and non-tax sources will be salient to respondents, and, critically, that non-tax revenue is of sufficient importance to engender citizen concern with how it is spent. The intense public debate over the use of oil-based revenues in particular makes Ghana an attractive place to study accountability pressures for collectively owned but non-earned resources.

Equally as important is the existence of real accountability in Ghanaian politics. A stable

⁶For more information, see the Aid Data page at http://www.openaiddata.org/recipient_country/241/2013/.

democracy with two large parties, the New Patriotic Party (NPP) and National Democratic Party (NDC), Ghana has enjoyed meaningful political competition, with power changing from the NDC to the NPP in the 2016 elections. While the NDC and NPP rely on strong support from ethnically heterogeneous regions, political competition in the general election can be fierce, particularly in urban areas, making Ghana’s political system relatively more responsive to citizen demands than in more authoritarian regimes in sub-Saharan Africa. As such, the idea at the core of our experimental intervention—that citizens feel empowered to demand accountability from their leaders, and have the ability to punish poor performance—has ecological validity in Ghana.

Finally, there is evidence of previous linkages between taxation and accountability in Ghana. Prichard (2015) discusses in detail the evolution of taxation in Ghana, including the explicit bargaining between taxpayers and citizens that has occurred over the past 20 years. However, this bargaining has frequently been catalyzed by popular protests among citizens. This points to the role of citizens’ willingness to engage in protest and sanctions, suggesting that we might expect to find the types of expressive benefits from punishment that we study here.

4.1 Implementation

These experiments were conducted in Accra, Ghana in June and July 2016, using subjects recruited from 8 constituencies in the Greater Accra region. Each day we recruited respondents for three enumeration sessions, each consisting of 16 respondents. Each session was randomly assigned to one of the possible treatment conditions, blocking on the average income level in the constituency. Chosen constituencies fell into a “low” or “medium/high” income category. We avoid high-income enclaves of the city because of low recruitment rates during piloting, due both to the difficulty of finding high-income individuals at home during the day and also because the compensation offered was far less attractive to high-income individuals. Table 2 summarizes the eight treatments, and the number of total subjects assigned to each. Note that the number of observations in each cell varies due to the need to balance treatment assignment across blocks.

At the beginning of each session, subjects were given a short group training, lasting approximately 10 minutes, which laid out the basic rules of the assigned game. After group training, enumerators then administered a short on-on-one training with each subject, explaining a sample round of the game and probing subjects on their comprehension of the key game steps, particularly the allocation decision. After one-on-one training was complete, subjects were then sent back to the group training room and called up one at a time to complete five single-shot rounds of the game. At the start of rounds 2-5, respondents were told what had happened in the previous round, but were not told the decisions of any other respondents. Subjects were instructed not to speak about the game between rounds and were monitored at all times by project staff to ensure this rule was followed. At the end of the five rounds, respondents completed an outtake survey. They were then paid a show-up fee, plus their earnings from the five rounds.

	Tax	Grant	Oil	Aid
Certain Punishment	420	360	365	365
Uncertain Punishment	360	300	360	360

Table 2: Number of respondent-round observations in each of the eight treatment conditions. The differences between cells are driven by the need to balance treatments within two sampling blocks. The randomization algorithm used gave optimal balance within each block given design constraints. Cell sizes are the final number of subject-round observations included in the dataset.

Within each game session, we randomly assigned subjects to the role of citizen or leader at a ratio of 3 citizens per leader. In the first round, each citizen was randomly assigned to a play with a leader. During the game, each citizen received the transfer decided by the leader to whom he or she was assigned. Because each leader played with multiple citizens, one was selected to serve as the leader’s pair, and his or her punishment threshold determined whether or not the leader was punished. In each subsequent round, the subjects’ roles remained the same, but citizen-leader pairs were re-randomized. Our randomization algorithm took an arbitrary n subjects, k leaders, and l rounds as arguments and returned a series of pairings that satisfy the above criteria. To stress that each round was a single-shot game, in between rounds enumerators stressed to respondents that the pairings would be different than in the previous round.

5 Data

The resulting dataset used in the analysis below consists of 5900 subject-round observations coming from a total of 1180 respondents. Of these, 25% were leaders. These observations are dropped from the analysis to avoid double-counting citizen responses. Table 2 reports distribution of subject-rounds across our two-dimensional design. There exists some mild imbalance between cells due to the need to ensure equal numbers of unique treatments across blocks.

A potential concern with studies of this type is that the use of convenience sampling produces subject pools that are highly skewed towards young, unemployed men who are available during the day and for whom the compensation is especially attractive. For the purposes of our experiment, convenience sampling would also have the unfortunate effect of producing a sample in which the number of subjects who had experience paying direct taxes—a key group of interest—was small. A highly skewed sample thus reduces the external validity of findings, an especially important concern for this study since we are interested in accountability pressures broadly, not within a narrow and unrepresentative sample. For this reason, subjects were recruited via random-walk sampling from a central polling station. Each session of 16 was recruited from a single polling station and then provided transport to the field office, located in Adabraca, Accra. While recent representative statistics on Metropolitan Accra are difficult to obtain, a comparison with a large-scale study of 5,484 respondents from 1,250 households conducted from 2008 to 2010 (Fink, Weeks and Hill 2012)

suggests that our sample performs favorably in terms of representativeness given that we did not sample from high-income areas of the city.

Statistic	Sample Mean	Fink et al. Estimate
Age	32.238	29
Female	52.5	62.4
Employed	62.2	60.2
No Schooling	5.5	17.6
Completed Primary	33.6	21.9
Completed Secondary	23.1	52.0
Ga	56.7	42.2
Akan	30.7	31.0
Ewe	6.5	12.4
Household Income	604.579	NA

Table 3: Summary Statistics for Experimental Sample.

Table 3 reports the means of several socioeconomic characteristics of interest (Column 1) alongside the Fink et al estimates where available (Column 2)⁷. On balance, our sampling strategy yielded a sample that is approximately gender-balanced (52.5% women) and considerably wealthier than a pure convenience sample. While our sample is relatively less educated, we nearly match the Fink figures for age, employment, and ethnicity. Approximately 60% of our sample was employed, with 11% formally employed by a firm and 12.6% as traders. Critically for our purposes, over half were primary earners, and a full 31% paid some form of direct tax in the previous 6 months. The average per-month household income was 604 GHC, slightly higher than the inflation-adjusted average of 479 GHC reported for the Greater Accra region by Ghana’s national statistics bureau in 2008. Expanding the sample of educated, high-income respondents with experience paying taxes was our primary motivation for a more rigorous sampling strategy than is often used in experimental games. Nonetheless, to the extent that our sample more closely resembles the broader population, this also increases the external validity of our findings.

6 Outcomes and Predictions

Our key outcome of interest is the “punishment threshold” for each citizen, defined as the smallest transfer made by the Leader at which the Citizen does not punish the Leader. For example, if a Citizen reports that she would punish the Leader if he passed back 1.5 GHC or less of the 5 GHC group fund, but not 2 GHC, her punishment threshold for that round is 2 GHC. Table 4 summarizes the predictions from Hypotheses 1 and 2 from Section 2 about the impact of each of

⁷The Fink et al sample is highly imbalanced along the gender dimension because the sample was recruited based on participation in an earlier survey of at least one adult woman in the household. As such these estimates should be taken as rough estimates rather than as definitive values for a representative sample

our source treatments on the expected punishment threshold. These were specified in a pre-analysis plan registered with the Evidence in Governance and Politics website prior to data collection and gated.⁸ Because citizens play multiple single-shot rounds, we take as our main dependent variable the average threshold for a given citizen across the five rounds. All analysis is thus at the individual level unless otherwise noted, although all results presented here are also robust to using subject-round data in which each observation represents a single round played by a single subject.

Table 4 summarizes our key predictions regarding how revenue affects punishment; the reference group refers to the “control” group against which the comparison group is measured, such that a positive hypothesized effect indicates that we expect the mean of the comparison group to be larger than that of the reference group. If a comparison refers only to one treatment dimension (e.g. refers only to a source treatment), the comparison is pooled across the remaining treatment dimensions. So, for example, a comparison of Oil versus Tax would compare all those who received the Oil source treatment against all those who received the Tax source treatment regardless of their treatment status in the uncertainty dimension. The directional hypotheses in Table 4 refer only to comparisons on items that are relevant for the chosen treatment groups.⁹

Reference Group	Comparison Group	Hypothesized Direction
Non-Tax	Tax	+
Oil	Tax	+
Aid	Tax	+
Grant	Tax	+
Grant	Oil	+
Grant	Aid	+

Table 4: Comparisons of Interest and Hypothesized Direction. Rows 1-4 correspond to Hypothesis 1, and Rows 5 and 6 correspond to Hypothesis 2

7 Results

Results for all the comparisons listed in Table 4 are reported below. All revenue source effects are calculated by pooling across the Base and Uncertain Punishment conditions unless otherwise noted. All results use ordinary least squares regression with HC3 robust standard errors and enumerator fixed-effects.¹⁰ This yields the following model for the estimation of treatment effects:

⁸See protocol 20160624.

⁹In the pre-analysis plan, we identified several additional quantities of interest. These are included in the appendix but omitted here for space considerations.

¹⁰In our pre-registered design, we noted that we would use randomization inference with OLS as a robustness check. However, due to the replacement of an enumerator partway through the project and the use of substitute enumerators on several occasions due to illness, there was imbalance in the enumerator-game distribution. Given that, as in Martin (2014), there are large enumerator effects with respect to the subject threshold, OLS more readily controls for these effects than does randomization inference.

$$Y_i = \alpha + \beta(\text{Source}) + \gamma(\text{Uncertainty}) + \delta(\text{Enumerator}) + \phi(\text{Valence}) + \epsilon_i$$

where Y_i is subject i 's average transfer threshold across all 5 rounds—that is, the lowest Leader transfer at which the Citizen would not choose to punish. The effect of the source conditions (Aid, Oil, Tax or Grant) is given by the β coefficient vector, while the effect of the Uncertain Punishment game is given by γ . The term δ is the coefficient on a vector of dummies for the enumerator who administered the game to the subject. The ϕ term is the coefficient on a dummy variable for whether a subject received the valence condition discussed above. Because the number of sessions in each block (36) was not a multiple of the number of unique treatments (24), there was result imbalance in the valence dimension.¹¹ We thus include the valence term in our estimating equation to control for the effect of this imbalance.¹²

7.1 Revenue Source

Our first set of comparisons, reported in Panel A of Table 5, tests the key implication of the model presented in Section 2, given as Hypothesis 1: that punishment thresholds should be higher in the Tax condition relative to non-Tax conditions. Empirical tests of this hypothesis are carried out using the comparisons in rows 1-4 in Table 4. The first comparison of interest is Tax vs non-Tax, in which all subjects who received the Oil, Aid or Grant conditions were pooled into a single non-Tax category. Those in the Tax condition demanded, on average, 0.23 GHC more from the Leader than those in the non-Tax conditions ($p = 0.001$). As Rows 2-4 of Panel A demonstrate, this result is not due to a single large effect for a particular source but rather consistently higher thresholds in the Tax condition relative to all non-Tax source. Transfers in the Tax condition are 0.23 ($p = 0.006$), 0.22 ($p = 0.008$), and 0.23 ($p = 0.006$) GHC higher than in the Aid, Grant and Oil conditions respectively.¹³ Given that the mean threshold across all non-tax conditions is 2.17 GHC, these treatment effects increase thresholds by approximately 10% relative to the baseline. Overall, the data thus clearly bears out the model's prediction of significant positive differences in thresholds for those in the Tax condition relative to those in non-Tax conditions, providing clear evidence that taxation operates as the model predicts.

¹¹The 24 treatments include the cross-cutting valence prime, and the collective action games discussed above.

¹²Unless otherwise specified, all models are subject-average data in which each subject appears once in the data. However, all results are robust to using a subject-round dataset in which subject i 's threshold in round j is the dependent variable, resulting in each subject appearing once per round played. In by-round models, standard errors are clustered at the subject level to account for non-constant error variance. Individual-level results are also robust to clustering of the standard errors at the session level, although diagnostics suggest negligible heteroskedasticity using classical standard standard errors.

¹³Because our theory makes clear directional predictions, we report one-sided p-values unless otherwise noted. However, all results reported below are robust to the use of two-sided p-values.

		ATE	S.E.	p-value	n
Panel A: Tax Effect (H1)					
1	Tax - non-Tax	0.226***	0.073	0.001	578
2	Tax - Grant	0.222***	0.092	0.008	288
3	Tax - Oil	0.229***	0.091	0.006	301
4	Tax - Aid	0.226***	0.09	0.006	301
Panel B: Aid/Oil Effect (H2)					
5	Aid - Grant	0.005	0.094	0.52	277
6	Oil - Grant	0.007	0.094	0.531	277

Table 5: Average Treatment Effects Relative to Baseline Condition. Panel A shows strong support for Hypothesis 1, with all treatment effects large and precisely estimated. Panel B reveals no differences in Aid and Oil conditions relative to Grant. Positive differences represent greater transfers under the treatment (first) condition relative to control (second). All reported p-values are one-sided (greater) to account for directional predictions. Classical standard errors used. Reported n represents total number of observations used to estimate effect. Enumerator, valence and uncertainty fixed-effects included but not reported for presentation purposes.

One potential objection to our interpretation of these findings is that the results may be driven, not by taxation per se, but rather by something else about the basic mechanics of the game – for example, the fact that the citizen’s initial endowment is higher in the tax condition. Are these results revealing something about taxation specifically, or about the general psychology of loss? If taxation is driving the results, we might expect to see that the treatment effects will be largest among those individuals for whom the treatment is most salient, namely respondents who pay some form of direct taxes in their own lives. To test whether this was the case, we identified subjects who had paid a direct tax of any kind (e.g., an income tax or a licensing fee) at least once in the last 6 months. We then estimated the model from Equation 7 but with an interaction term for these high-type subjects. The interaction term has a point estimate of 0.27 and is significant at the 5% level ($p = 0.044$), implying that the effect of taxation on punishment among subjects with personal experience paying taxes was 0.27 GHC higher than the treatment effect of taxation for subjects with no exposure to taxation outside the lab. If the differential effects in Table 5 were being driven by other aspects of the game mechanics, we would not expect these differential treatment effects.

7.2 Ownership Effects

Our second major prediction was the existence of a so-called “ownership effect” (Hypothesis 2), whereby, under certain conditions, non-tax forms of revenue that are thought by citizens to be collectively owned and thus could engender an endowment-type effect. This occurs despite the fact that citizens only realize gains from these revenue sources indirectly, such as through the improvement of public infrastructure financed by the proceeds from the sale of oil. We hypothesized that the ownership effect would produce higher transfers for the Oil condition relative to the Grant

condition, and a smaller but still positive difference for the Aid condition. Table 5 reports the results of this comparison when pooled across the Base and Uncertain Punishment games as well as within each game type. We observe differences that are small in substantive terms and not distinguishable from zero, with subjects in the Oil condition requesting approximately 0.007 GHC *less* than in the grant condition ($p = .96$) and subjects in the Aid condition requesting 0.004 GHC less ($p = 0.94$). Simply put, subjects request approximately the same transfers from Leaders regardless of whether the source of revenue is Oil, Aid or (an unspecified) Grant. This is particularly interesting for the Oil vs Grant comparison, where we expected the Oil treatment to produce a positive treatment effect but one of smaller magnitude than in the Tax condition.

The results in Panel B of Table 5 reveal that, in general, subjects behaved similarly for all non-tax revenue sources. Why do subjects not respond differentially for our two named non-tax sources (Oil and Aid) compared to the Grant condition? Our hypothesis was that thresholds for Oil and Aid would increase relative to the Grant condition only if subjects felt greater ownership over these sources than for the generic, unnamed group fund in the Grant condition. It is thus important to understand whether respondents felt differential ownership over revenue sources. It may be, for example, that an ownership effect does exist, but naming the source of non-tax revenue does not itself increase this sense of ownership. This result is consistent with qualitative work that suggests citizens have very weak intrinsic ownership over non-tax revenues, owing largely to low priors about their ability to control or observe expenditures from these sources and to a widespread belief that corruption is particularly acute for these sources (see also de la Cuesta et al. 2016). In terms of the model presented in Section 2, this result would be consistent with a world in which the probability that $\delta_i = 1$ is low for aid- and oil-based revenues.

To establish whether subjects felt differential ownership according to the source of the non-tax revenue—in other words, whether subjects felt more intrinsic ownership over aid and oil revenues than for the unnamed group fund in the Grant condition—we examine a survey item in which subjects were asked to what extent they agreed with the following statement: "the group fund of [revenue source] belonged to me." The measure ranges from 0 to 3, with 0 representing strong disagreement with the statement and 3 strong agreement.¹⁴ The raw ordering in terms of average levels of ownership are as expected by our theoretical predictions in Section 2: average ownership is highest in the Tax condition at 2.07, followed by Oil at 1.88, Grant at 1.72 and Aid at 1.70. Given that a response of 2 corresponds to weak agreement, it is noteworthy that only in the Tax condition is the average response above a weak feeling of ownership over the group fund. Moreover, the only significant difference is between Tax and the remaining sources (one-sided $p = 0.04$, 0.008, and 0.0035 for Oil, Grant and Aid, respectively). Neither Aid, Oil or Grant are significantly different from each other.

For a more straightforward interpretation, we recode the ownership measure such that

¹⁴This question was added three days after data collection began, resulting in the loss of 131 subjects from our sample. Of the total, 51 were assigned to the Oil condition, 28 to Grant, 29 to Aid, and 23 to Tax.

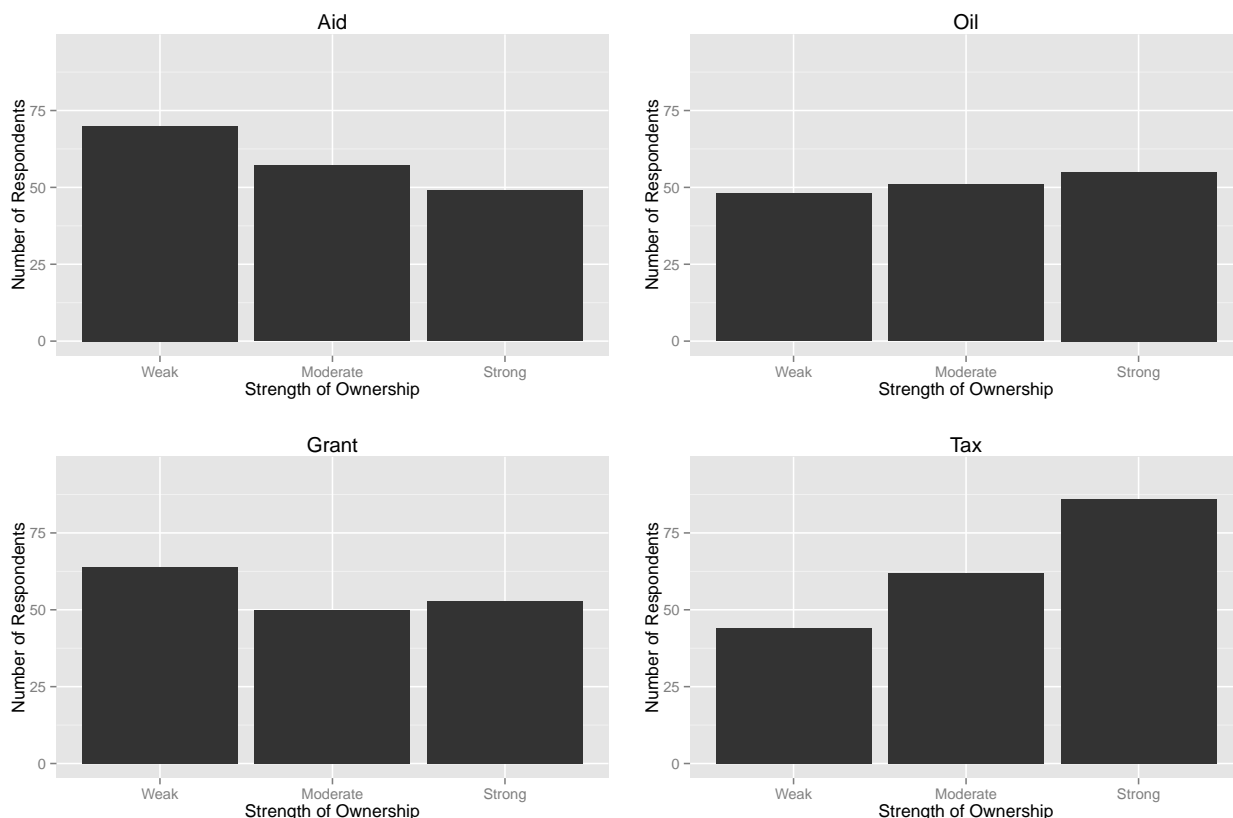


Figure 2: Distribution of Ownership Measure by Source Condition. The “weak” category contains respondents who weakly or strongly disagreed with the statement that “the group fund belonged to me”. The “moderate” and “strong” categories contains respondents who agreed or strongly agreed respectively. The Tax and Aid conditions are the most clearly distinguishable, with the former being weighted towards strong ownership and the latter weak ownership. Oil occupies an intermediate position slight imbalance towards strong ownership.

those who disagreed with the statement receive a 0, those who weakly agree receive a 1, and those who strongly agree receive a 2. Figure 2 shows histograms of the recoded ownership measure for each of our source conditions. As the figure demonstrates, there is considerable variation both within and across revenue sources, with Aid and Grant showing weakest ownership, Tax the strongest, and Oil at an intermediate level with similar numbers of respondents in each bin. All results reported below are robust to the original specification of this variable.

What effect does a sense of ownership have on subjects’ punishment thresholds? Our theory posits that the relationship between ownership and thresholds is both positive and, importantly, causal: higher ownership should lead to higher thresholds (e.g., the lowest amount at which the subject chooses not to punish should be higher). In other words, it is not just that ownership is correlated with transfer thresholds, but that ownership *mediates* the relationship between revenue

sources and accountability. This yields two related empirical implications, both of which flow from Hypothesis 3 in Section 2.¹⁵ They can be stated as follows:

Empirical Implication 1 *Ownership should be a substantively meaningful and statistically significant predictor of subjects’ punishment thresholds.*

Empirical Implication 2 *Inclusion of the ownership measure in the primary analysis should eliminate the differences we observed in Table 5 between Tax relative to Grant, Aid and Oil.*

To test whether these two conditions are true, we add the ownership variable to the model given in Equation 7, yielding the following equation:

$$Y_i = \alpha + \beta(\text{Source}) + \theta(\text{Ownership}) + \gamma(\text{Uncertainty}) + \delta(\text{Enumerator}) + \phi(\text{Valence}) + \epsilon_i$$

where Y_i is again subject i ’s average punishment threshold across all 5 rounds—that is, the lowest amount that the Leader transfers at which the Citizen would not choose to punish. The inclusion of the source treatments is necessary because our theory predicts that a sense of ownership should be a significant predictor of punishment thresholds *independent* of revenue source. More importantly, the treatment effects of the Aid and Oil conditions should lose their statistical significance and become small in substantive terms. Table 6 reports the results of two models with the ownership measure included on the right-hand side, one without dummies for revenue source treatments (Column 2) and one with the source treatments included (Column 3). Because missingness on the ownership measure has altered our sample relative to the baseline results, Column 1 reports the results of a specification identical to that estimated in Table 5 for the purposes of comparison.¹⁶ The Tax condition is taken as the reference category in all columns, such that negative coefficients on Aid, Grant and Oil represent lower average transfers under those conditions compared to Tax.

The results in Column 2 support Hypothesis 3, demonstrating that high ownership is a substantively strong and statistically significant predictor of subject thresholds. Subjects who report weak or strong ownership ask for larger transfers from Leaders, with strong ownership corresponding to an increase in transfer thresholds of 0.613 GHC ($p = 0.000$). Both effect sizes are larger than the strongest treatment effects reported in the baseline treatment effects reported in Table 5. Turning to the mediation model, we see that the inclusion of ownership drives the Aid and Oil treatment effects toward zero, making them substantively small (0.04 and 0.037 GHC respectively) and statistically insignificant ($p = 0.69$ and 0.628 respectively). The drop in the Grant treatment effect is similar

¹⁵This prediction comes from a model extension that did not exist at the time the pre-analysis plan for this experiment was registered. As such, the tests conducted in this section were not pre-registered.

¹⁶The missingness occurs due to enumerators mis-entering the respondent’s ID number on 55 surveys; these thus cannot be matched with the games data, which were entered separately, and are dropped from the sample here.

in magnitude and the point estimate also becomes insignificant. Ownership, on the other hand, remains an especially strong predictor of punishment thresholds, retaining its statistical significant and substantive magnitude. Empirical implication 2 thus holds in its entirety: the strength of a respondent’s ownership over the group fund accounts completely for the differential accountability between tax and non-tax revenue sources.

	<i>DV: Average Subject Threshold</i>			
	Baseline Results	Ownership	Both	w/ Activism
Aid	-0.133* (0.100)		-0.041 (0.099)	-0.033 (0.100)
Grant	-0.210** (0.124)		-0.150 (0.122)	-0.147 (0.123)
Oil	-0.179** (0.107)		-0.091 (0.106)	-0.082 (0.107)
Moderate Ownership		0.340*** (0.117)	0.330*** (0.119)	0.332*** (0.120)
High Ownership		0.613*** (0.122)	0.592*** (0.125)	0.590*** (0.127)
Observations	463	463	463	458
Adjusted R ²	0.215	0.263	0.262	0.259
Residual Std. Error	0.767 (df = 448)	0.743 (df = 448)	0.743 (df = 445)	0.745 (df = 439)

Note:

*p<0.1; **p<0.05; ***p<0.01

Table 6: Impact of Ownership on Punishment Thresholds and Source Effects. The reference category for the estimates on the Ownership coefficient are those that report weak or strong disagreement with the statement that the group fund “belonged to them”. Enumerator fixed-effects as well as dummies for Uncertain Punishment and Valence treatments included but omitted for presentation purposes. Classical standard errors in parentheses. One-sided p-values used to correspond to directional predictions.

One potential criticism of these results is that higher ownership is correlated with a higher baseline of expressive benefits from punishment. It may be, in other words, subjects who get more utility from punishment, and are thus more willing to demand higher transfers from leaders and increase the chance they are forced to pay the cost of punishment, are also those who report strong ownership of the group fund. If this were the case, the ownership results would be an artifact of this unmodeled relationship. In particular, the model predicts that the treatment effect of taxation will be smallest among those who have a high propensity to punish (i.e high β_i) even in the absence of taxation.

To account for this possibility, we constructed a rough proxy for β_i using a weighted index of three survey items that asked respondents whether they had contacted elected officials, participated

in a protest march, or raised an issue at a local community meeting in the past year. These actions are costly in both economic and reputational terms, and citizens who engage in these activities more frequently are those that gain sufficient utility from political action to outweigh such costs. Our measure of activism is a weighted index of these three items, with higher values representing more activism. We then dichotomize this measure, classifying respondents in the top 25th percentile as high-activism types and giving them a value of 1, with the remaining respondents receiving a zero. We report the results of the model with the high-activism dummy in Column 4, using a specification otherwise identical to that in Column 3. The inclusion of this additional measure does not alter our results.

8 Inducing Ownership

The results thus far suggests that citizens are more willing to engage in costly sanctioning behavior when tax revenues are at stake, and that this effect is driven by a stronger sense of ownership over tax revenues. We are currently conducting additional data collection in Uganda to replicate these results, and to test a final hypothesis: that ownership is malleable, and that a greater sense of ownership over oil funds in particular can be generated.

In this final set of experiments, there are six treatment conditions. The first four are identical to the four certain punishment games reported above (Tax, Grant, Aid, and Oil). The final two are additional variants on the oil game with certain punishment. In each variant, respondents are exposed to a prime that encourages them to feel ownership over oil revenue. In the “Oil Framing” game, every time the enumerator gives the group fund of oil money to the Leader, they remind the respondent that “Oil money is meant to belong to all Ugandans, and to be used to benefit citizens like you.” This mimics the types of public education campaigns that often attempt to convince citizens that oil money should be monitored and used well.

In the final, “Oil Ownership” condition, citizens are told that a specific portion of oil revenues actually belongs to them. In the script for each round, the enumerator tells the citizen that 500 Ugandan Shillings (UGX) of the 1,000 UGX group fund “represents the share of the oil money that belongs to you, as the citizen”. This closely mimics the script for the tax game, with one key difference: the 500 UGX that “belongs” to the citizen is never actually held by them. This is a much stronger treatment, as it assigns a particular citizen ownership over a particular set of revenues. We expect that both treatments will raise citizens’ self-reported ownership over the group fund, and that this will lead to an increase in punishment thresholds, relative to the “basic oil” game, and will reduce or eliminate differences between the oil and tax conditions.

Uganda is an excellent case to run these experiments; the country recently discovered oil, and qualitative interviews suggest that, while citizens vary in the degree to which they view oil money as theirs, views on oil may still be malleable.

9 Discussion and Conclusion

In this study we have used a lab-in-the-field experiment to simulate what people in the developing world might experience if they had to pay income taxes or were told about other revenue sources going to the government. We wanted to gauge their reactions to public officials given how they chose to “spend” the group funds they were given. Did taxes induce more accountability in the sense of willingness to punish than the other non-tax sources? Our results suggest that this is indeed the case. Having money taken away directly from them made people more likely to punish their leaders (i.e., to set a higher minimum threshold for leader transfers) for not doing enough for the citizen and their community. This was the case compared to other revenue sources, such as their own national oil proceeds as well as foreign aid. And this pattern held even when punishment was not certain to affect the leaders. In this simulation of the endowment effect, direct income taxes evoke more political accountability efforts.

However, this finding seems to be tempered by the sense of ownership that citizens feel about the revenue source. What do we mean by ownership? We think it is a sense held by a citizen that government revenues from whatever source are theirs and should be used primarily to better their lives; it may even entail an individual’s sense that they should receive concrete benefits of a specific size from such funds. If citizens feel that revenues collected by the government from whatever source are best allocated by leaders alone, should be used by their leaders for any purpose the leader wants, and/or should be allocated by leaders to reward themselves and their political allies, then they have no sense of ownership and will never monitor and sanction their leaders for how they use these revenues. It is only when revenues in the government’s hands are believed by the citizens to belong to the public that accountability for them will be demanded.

In most developing countries, however, very few people pay income taxes, or taxes of any sort. In our sample, only about 16 percent of the people paid any income tax, and only 21 percent paid any other kind of direct tax. And these figures are likely high compared to the whole Ghanaian population since we sampled urban Accra and higher income people. Over the past 30 years, Ghana has seen tax bargaining taking place, with “the government [making] relatively explicit concessions to taxpayers in response to the reality or threat of popular mobilization and tax resistance” (Prichard (2015), p83). However, these bargaining pressures have typically been present at the time a new tax is introduced—in the Ghanaian case, often indirect taxes such as VAT. At times, these bargains are not always kept in the long run.¹⁷ It is also not clear the extent to which indirect taxes promote day-to-day accountability pressures, relative to income taxes, business fees, and other forms of direct taxation. In future research we are testing whether indirect taxes like the VAT can induce accountability effects like the income tax here. And we remain intrigued by the possibility that creating a sense of ownership among citizens over resource revenues and foreign aid (and other foreign sources like international loans and private investment) can also induce greater

¹⁷See e.g. the case of the 2008 mobile phone tax in Ghana, where far less funds were earmarked for youth development than the government initially claimed (Prichard 2015).

willingness among citizens to hold their leaders accountable. Aid agencies seem to have understood some of this and have tried to engage citizens at times more actively in aid projects.

From a policy perspective, the finding that differential accountability across sources—operationalized in our lab game as the minimum transfer at which the Citizen will not punish the Leader—is driven almost entirely by differential levels of ownership is especially noteworthy. As developing countries, particularly in sub-Saharan Africa, discover and monetize large natural resource endowments, a critical concern of donors and international institutions is not whether they will fall victim to the resource curse but how to avoid it. Our results suggest that accountability pressures for these sources are low precisely because citizens feel little ownership over these sources. As such, interventions that can enhance the level of ownership felt by citizens for all government revenues but especially for non-tax sources may therefore help to improve democratic accountability in weakly institutionalized countries.

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