

Owning It: Accountability and Citizens' Ownership over Oil, Aid, and Taxes*

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Abstract

Government accountability is severely lacking in many developing countries, yet we know relatively little about the causal dynamics that produce citizen demands for greater responsiveness. We argue that a sense of ownership over public money heightens expectations for government services and induces expressive demands for accountability, and we apply the new theory in sub-Saharan Africa. Results from a series of lab-in-the-field experiments in Uganda and Ghana and from a nationally representative survey-based field experiment in Uganda all demonstrate that higher feelings of ownership over public revenues significantly increase citizens' accountability pressures on leaders. Furthermore, simple interventions can significantly increase feelings of revenue ownership over oil and aid windfalls, producing demands for accountability indistinguishable from taxes.

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Political accountability, a concept central to democracy, implies that citizens can hold their government responsible for its policy actions and punish it if the public’s preferences go unmet. But government responsiveness is frequently weakest in those places where it is most important: low-income countries with poor public-goods provision and high levels of corruption. Scholars across subfields in political science have offered various accounts of this empirical regularity. Resource-based explanations suggest that reliance on non-tax revenues such as oil or foreign aid generates fewer accountability pressures from citizens than taxes (Ross 2012; Morrison 2009). Low accountability may then produce a reinforcing negative cycle: poor government performance confirms citizens’ pessimistic expectations about public services, leading to feelings of cynicism and despair (Gottlieb 2016; de Kadt and Lieberman 2017). Hence, improving accountability can foster economic development and promote democracy.

A desire to heighten government accountability has led researchers to provide information on government performance directly to voters (Dunning et al. 2019); establish democratic institutions at the local level (Olken 2007; Raffler et al. 2019); and allow voters to observe important forms of political competition such as campaign debates (Bidwell et al. 2019; Platas and Raffler 2019). However, these interventions have had mixed success in improving accountability. The preponderance of evidence suggests that either interventions are targeting mechanisms that only weakly affect accountability, or other institutional or material barriers undercut whatever accountability pressures these interventions create.

In this article, we develop and test an alternative theoretical basis for producing accountability pressures, built around the concept of budget *ownership*. Existing work suggests that citizens will more likely demand accountability when they have high expectations of government (Gottlieb 2016). Drawing on cognitive psychology, we argue that citizens’ subjective feelings of budget ownership, defined as a sense that government monies “belong to them,” condition their expectations. Those with strong ownership expect to benefit from government spending, and thus they are more dissatisfied—and willing to take political action—when

governments underperform. Critically, feelings of budget ownership vary across individuals and revenue sources: stronger for tax revenues, weaker for windfalls like aid and oil.

Yet it is not obvious that this ownership mechanism should drive accountability demands. While psychology experiments have connected a sense of ownership to action (Kahneman et al. 1990), prior studies have not extended psychological ownership to collective resources such as budgets. Indeed, some citizens may feel little ownership over budgets. The concept of *prebendalism* suggests that, in many African countries, revenues are perceived as belonging to government officials rather than citizens (Van de Walle 2001). Alternately, citizens may feel budget ownership only when they contribute to it through taxation, and such feelings may be weaker when budgets rely mostly on non-tax revenues. Even when citizens do feel psychological ownership over budgets, such feelings may prove too weak to overcome barriers to take political action and demand accountability. No research to date has identified interventions that use ownership to increase accountability pressures.

We test the ownership theory using lab-in-the-field experiments and a national survey-based experiment in Uganda, supplemented with lab data from Ghana. We find that feelings of ownership strongly predict accountability demands. Additionally, the lab and survey experiments demonstrate 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. Contrary to conventional wisdom, the results also indicate that subjects care deeply about the fate of non-tax revenues, and that ownership-increasing treatments can produce accountability pressures for oil and aid windfalls that are statistically indistinguishable from those of taxation.

These results have several implications for the study of accountability. First, the findings on ownership's malleability provide a potential way to alleviate the resource curse (Ross 2004; Morrison 2009). Second, given frequent null findings for the effectiveness of other accountability-enhancing interventions (Dunning et al. 2019), our results provide a potential alternative path for increasing citizen demands on governments more generally.

Finally, our findings suggest several areas for future research. We find that several demographic variables correlate with higher budget ownership (see Section Discussion and Robustness), but more work is needed to understand how citizens develop a sense of ownership. Future work could also consider how ownership affects politicians' incentives. If leaders realize that ownership drives political action, they may attempt to lower citizens' ownership by using less visible forms of taxation or laying personal claim to revenues. They may also attempt to buy off or repress high-ownership segments of the population. Politicians in some contexts (perhaps especially in developed countries) may also attempt to heighten ownership for their own strategic purposes, putting rhetoric like "your tax dollars" into new perspective.

A Theory of Ownership, Expectations, and Punishment

Following Pierce et al. (2001), we define psychological ownership as "that state in which individuals feel as though the target of ownership (material or immaterial in nature) or a piece of it is 'theirs'." Ownership "can also be felt toward nonphysical entities such as ideas, words, artistic creations, and other people" (Pierce et al. 2003). This suggests that ownership can apply to budgets, which citizens rarely experience as tangible objects.

This definition distinguishes psychological ownership from legal ownership. While the latter is recognized primarily by society, the former is recognized primarily by the individual who feels it (Pierce et al. 2003). Psychological and legal ownership do not always align. Consider an employee who feels that she "owns" her work computer, while legal ownership resides with the firm. Alternatively, a couple may legally own two cars jointly, yet only feel psychological ownership over the specific car they drive.

The concept of legal ownership allows for variation in ownership across legal settings, but not within them: all citizens in a country have the same legal ownership over government revenues. Psychological ownership focuses on whether citizens *feel* that government revenues belong to them, making it useful in studying accountability pressures. Psychological ownership associates the owned object or idea with the self, incorporating it into individuals'

identity (Dittmar 1992; Gawronski et al. 2007). Ownership also determines “whether a loss is perceived” (Shu and Peck 2011) when an individual loses or fails to benefit from an object; it affects expectations and makes individuals more likely to reject or punish “unfair” divisions of a resource. Ownership as a causal mechanism thus differs from the related concept of loss aversion (Kahneman and Tversky 1979), which takes subjects’ reference point as given. Ownership, in contrast, can explain where expectations come from. As individuals cannot feel the loss of something they do not own, ownership causally precedes loss aversion.¹

In democracies, budgets may legally “belong” to citizens, in that they are supposed to be used for their benefit; anti-corruption laws typically forbid officials’ diverting government funds toward their private gain. However, understanding when this translates into psychological ownership over the budget proves more complicated. Existing research in psychology has focused on goods for which physical, legal ownership is clearly established and assigned to a particular individual (e.g., Kahneman et al. 1990). Government budgets, on the other hand, are collectively owned, and there is little work on how individuals develop psychological ownership over commonly held resources.²

Citizen budget ownership conforms with theories of democracy in which government “belongs” to citizens in a more abstract sense. However, even in democracies some citizens may not feel that government is truly “theirs” or that they have a right to government services. In authoritarian or hybrid regimes, citizens may not feel any ownership over the budget. This is especially true in countries where patronage and clientelism are common. Van de Walle (2001) argues that in many African countries *prebendalism*—a belief that resources are owned by the government officials who control them—prevails. In such cases, citizens may only expect to benefit from public budgets if they are clients of the relevant officials (Van de Walle 2001). We therefore expect variation in whether citizens feel ownership over government budgets, even within a given regime type. Some citizens may feel strong

¹A related concept, the endowment effect, suggests individuals overprice owned objects (Kahneman et al. 1990). The ownership mechanism appears to produce the endowment effect (Shu and Peck 2011).

²The discussion section describes the individual characteristics associated with high ownership.

ownership, while others believe that the budget belongs to politicians.

Individuals may also feel different levels of ownership over different revenue types. Previous research suggests that citizens hold leaders more accountable for how they spend taxes relative to windfall revenues from oil or aid (Paler 2013; Martin 2014; Weigel 2019). When citizens pay taxes, they contribute their own income to the budget; this may increase budget ownership. Indeed, Paler (2013) finds that a simulated tax heightens ownership over government budgets, yet ownership there remains conceptually entangled with loss aversion and the endowment effect (see also Sandbu 2006). Other work has focused more exclusively on loss aversion (e.g., Martin 2014), which as noted above is theoretically distinct from ownership.

Linking Ownership to Accountability Demands

In contrast to a prebendalist system, an accountable government implements citizens' preferred policies efficiently and with a minimum of corruption and mismanagement (Fearon 1999). However, governments are unlikely to provide citizens' preferred policies unless deviations are punished. This makes citizens' willingness to sanction poor government performance a key element of accountability. When, then, will citizens be willing to vote for the opposition, donate to civil activists, contact their representatives, or otherwise make demands on leaders? In general, citizens will take action when the expected benefits of doing so exceed the costs. Costs include monitoring government behavior, forgoing economic activity, engaging in collective action, and facing the possibility of repression.

By demanding accountability, citizens hope to benefit economically from improved government policy in the future. However, citizens face a collective-action problem: each individual's action is unlikely to prove pivotal, and a rational citizen can therefore free-ride on others' efforts. Individuals will thus most likely participate politically when doing so garners private, excludable benefits (Olson 1965). One form these may take is psychological, expressive benefits. A large body of work in psychology and behavioral economics has demonstrated that individuals are willing to punish others for how they allocate a resource

even when there is no economic benefit from doing so (see e.g., Henrich et al. 2006), and that punishing bad behavior appears to alleviate negative emotions (Fehr and Gächter 2000).

We argue that high budget ownership increases the expressive benefits citizens receive from demanding accountability from leaders; this then makes citizens more willing to take action. The key mechanism through which ownership acts is citizen expectations. Recent work has shown that “performance relative to expectations” predicts sanctioning better than absolute levels of government performance (Gottlieb 2016). Citizens effectively compare actual government performance to what they expected: as this difference increases, citizens are more likely to pay the costs of action.

We argue that ownership is a key lens through which citizens view government performance. It determines citizens’ answer to the question: how much do I feel that I “should” benefit personally from government spending? Higher feelings of ownership thus yield higher expectations and, in turn, increase citizens’ dissatisfaction when they observe corruption or poor performance. As a citizen’s dissatisfaction increases, so too will the value of the expressive benefit that comes with punishment.

Some work in psychology suggests that ownership affects willingness to punish—that “emotions spark when we experience the invasion of what we feel is ‘ours’” (Pierce et al. 2001). Ownership is closely related to the *desire* to control how the object is used (Pierce et al. 2001). In Ultimatum games, individuals are more likely to reject low transfers when they have ownership over the resource being divided (Wu et al. 2012). Likewise, subjects who divide a resource in a Dictator or Ultimatum game give higher transfers when the receiver has initial ownership over the endowment (Leliveld et al. 2008; Wu et al. 2012). However, there is little work testing whether these findings will transfer to political or policy contexts.

Focusing on ownership helps us understand why accountability for tax revenues may be higher and the conditions under which some citizens may demand accountability for windfall revenues like aid and oil. Foreign donors give aid expressly to help beneficiaries, so some recipient citizens may feel that it “belongs” to them. Likewise, oil is extracted from the

country itself, which represents a common legacy and thus may lead to higher psychological ownership among some citizens, perhaps especially in oil-producing regions.

Furthermore, we suggest that ownership over the budget may be malleable. This paper focuses on a normatively positive effect of malleability: the potential to increase citizens' ownership over windfalls like aid and oil. Civil society groups may be able to develop campaigns to heighten public sentiment that windfalls belong to citizens, thereby increasing demands for accountability. Indeed, the survey-based field experiment tested below was designed with just such an application in mind.

More ominously, leaders may see strategic benefits to lowering any public sense of ownership. In Uganda, President Museveni has referred to the country's oil reserves as "my oil" (Mwesigwa 2016); invoking prebendalism may dampen citizens' expected benefits. Politicians may also strategically allocate public goods disproportionately to citizens with high ownership—such as wealthier urban areas—especially when those areas have high collective-action capacity. This may help to account for the well-studied phenomenon of urban bias in sub-Saharan African public policy (Bates 2014; Sandbrook 1986; Eicher and Baker 1982). Thus, ownership of public revenue has wide-reaching implications for practical politics and policy-making.

Hypotheses: Testing the Ownership Effect

The ownership theory suggests two hypotheses. First, we posit that there is substantial variation in the level of ownership individual citizens feel over a given government revenue source, and that greater ownership will positively correlate with each citizen's willingness to demand accountability through engaging in costly political behaviors. We test this using correlations between self-reported ownership and costly actions in our lab and survey data:

Hypothesis 1 *Variation in citizens' sense of ownership over a particular revenue source will predict variation in their accountability demands.*

Our theory is agnostic about what individual characteristics predict high ownership.

Following our main experimental results we explore potential sources of variation, including demographics like age, wealth, education, and urban-rural status. Regardless of which individuals have higher budget ownership, our theory predicts that a sense of ownership is not fixed and can be manipulated by outside treatments.

Hypothesis 2 *Ownership is malleable: an experimental intervention that increases citizens' sense of ownership over government revenues will lead to higher accountability pressures from citizens.*

The theory explicated above was developed over multiple rounds of fieldwork and data collection. In 2016, we measured budget ownership as part of lab experiments in Ghana that focused on other aspects of governance. We expected (but did not find) that ownership might be higher for oil than aid. This led us to focus on ownership during subsequent data collection in Uganda, including devising treatments to manipulate ownership. Appendix A.4 discusses this process in more detail, including which hypotheses and tests were pre-specified in each phase of data collection.

We pre-registered an early version of the ownership hypothesis (H1) in the Ghana study, but did not pre-register the ownership manipulation hypothesis (H2) until the Uganda studies. Below we use the Ghana data, as it includes a tax treatment and a measure of ownership, to test—in an exploratory, out-of-sample analysis—taxation's effect on ownership and ownership's mediation of taxation's effect on accountability demands.

We test our hypotheses using multiple methods. We first use lab-in-the-field experiments for tests in a controlled setting. In the lab experiments, we designed a modified Ultimatum game in which a “Leader” must allocate resources to a “group fund,” and a “Citizen” can pay to punish the Leader if she does not approve of the allocation. To test Hypothesis 1, we examine whether Citizens' sense of ownership over the group fund predicts sanctions on Leaders for low transfers. To test Hypothesis 2, we used simple prompts identifying part of the group fund as belonging to the Citizen to test whether it is possible to manipulate ownership over windfalls and whether such manipulation increases punishment for low transfers from

Leaders. The order we present the lab experiments is slightly different from the order in which they were conducted. We do this to streamline the explanation of each experimental protocol and to draw a clearer link between the ownership manipulations in the lab and the comparable treatments in our national survey data.

The controlled setting of lab experiments enables us to isolate the effect of ownership and to manipulate ownership while holding constant all other aspects of a citizen-leader interaction. However, lab results may not fully generalize to real-world political contexts. For this reason we also designed and ran a survey-based field experiment on a large, nationally representative sample of Ugandan adults. The survey experiment assesses both how ownership correlates with accountability demands and how ownership manipulations affect political activity for a representative sample of Ugandan citizens in a more naturalistic setting.

The theory presented here has significant implications for politicians' behavior and for general welfare. First, ownership may have redistributive consequences: if high ownership raises demands on the state, it makes those with high ownership more expensive to buy off, but also potentially more necessary to appease, especially if those citizens are a key voting bloc or able to credibly threaten protest. This could lead politicians to target policy or transfers to those with high ownership, or—in authoritarian countries—lead to higher repression of high-ownership groups. The exact redistributive consequences will depend on who has high ownership in the first place; while we argue here that taxpayers will have higher ownership, and that it is possible to raise ownership over windfall revenues, after our main results we briefly discuss the individual-level characteristics that correlate with high budget ownership.

In the long run, a second implication of our theory is that politicians have incentives to strategically manipulate budget ownership. Systems of clientelism and patronage rely in part on the idea that politicians and bureaucrats own the resources they have access to and at their discretion dole out benefits to supporters. This raises the possibility that accepting a clientelist offer lowers ownership, although this is not tested in the current study. Other ways

of lowering ownership could be through making taxation less visible to reduce ownership over tax revenues or attempting to set norms around ownership over revenues like aid and oil. For example, Uganda’s President Museveni has laid personal claim to the country’s oil reserves, even saying of the opposition that “[t]hey are targeting my oil” (Waswa 2015).

Case Selection

As a low-income, quasi-authoritarian African country, Uganda is a particularly apt location to test the effects of different revenue sources on accountability pressures. Taxes, foreign aid, and oil revenues are all salient revenue sources in Uganda. All citizens pay value-added taxes. Many also pay some form of direct tax, although the government has eliminated several direct taxes—including head taxes and many property taxes—in the run-up to elections. Observers argue that this has led to lower accountability pressures from citizens (Persson and Rothstein 2015). Significant oil reserves were discovered in 2006, and while oil production has not yet ramped up fully, there has been intense public debate over the use of oil-based revenues. Ugandan citizens are also highly aware of foreign aid. It forms a significant fraction of spending on services, and in 2012 donors cut over US\$300 million in response to a corruption scandal involving aid money.

Testing Ownership in the Lab

We ran three sets of lab experiments in Uganda in 2017, all based on experiments in Martin (2014). All treatments involve a single-shot game between a Citizen and Leader who are randomly assigned to their roles. In all conditions, the Leader chooses how to allocate a group fund, and Citizens can pay to punish the Leader if they are not satisfied. Referring to the leader’s endowment as the group fund signals to Citizens that they should benefit from its disbursement. The experiments vary (1) the source of the group fund and (2) whether Citizens are given a treatment designed to strengthen ownership over the group fund. The outcome is Citizens’ willingness to punish the Leader for a given transfer; the independent

variables are the source of the group fund and a post-treatment variable measuring the degree to which citizens feel ownership over the group fund, described below.

To test Hypothesis 1 we examine whether, across conditions, ownership over the group fund predicts willingness to punish the Leader for low allocations. To test Hypothesis 2, we designed treatments to manipulate ownership and then assess the treatments' effects on punishment thresholds. A taxation treatment in the Tax Experiment tests how assigning physical ownership over revenues increases psychological ownership and, hence, punishment. The Oil Ownership and Aid Ownership Experiments test whether it is possible to increase psychological ownership over oil and foreign aid revenues, respectively, by identifying a portion of the group fund as belonging to the subject. We also assess whether the treatments—through increased ownership—heighten Citizens' punishment of Leaders for low transfers.

Lab Experiment 1: Manipulating Ownership through Taxation

The Tax Experiment uses four treatments to test whether ownership and punishment increase when Citizens pay taxes compared to their receipt of windfalls from aid, oil, or an unspecified grant. The steps of each treatment are given in Table 1.³ In all treatments, the Leader receives a group fund of 10 monetary units (MU) to divide between her own salary and the Citizen. The treatments vary the source of the group fund. In the Tax condition, the Citizen receives 10 MU then pays 5 MU as a tax. The enumerator doubles the 5 MU tax and gives 10 MU to the Leader as the group fund. In the Windfall conditions the citizen receives a 5 MU wage and pays no tax; the enumerator gives the Leader a 10 MU group fund as an unearned transfer. The treatments are identical for the rest of the game. The Leader then allocates the group fund between her own “salary” and a transfer to the Citizen. Before observing the Leader's allocation decision, the Citizen chooses the lowest transfer he is willing to accept from the Leader. If the Leader transfers back less than this amount, the Citizen pays a punishment cost of 1 MU, and the Leader loses 4 MU. No one receives the money lost in punishment.⁴

³Appendix A provides a detailed overview of key game mechanics, implementation, sampling, and wording.

⁴Implementation protocols linked each game component to real-world concepts. The Leader's share of the

Stage	Tax Game	Windfall game		
		Unspecified Grant	Aid	Oil
1	The citizen earns a wage of 10 MU.	The citizen earns a wage of 5 MU.		
2	The citizen is taxed 5 MU. This is doubled to 10 MU and given to the leader as the group fund.	The leader is given 10 MU as the group fund.		
3	The Leader allocates 10 MU 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 1 MU to have enumerators remove 4 MU from the Leader.			

Table 1: Experiment 1. Steps for each treatment condition in Tax Experiment shown.

The games capture two quantities of interest. First, the Citizen’s *punishment threshold* represents the lowest allocation of the group fund by the Leader below which the Citizen will punish. The enumerator asks, “if the Leader keeps 10 MU and passes back 0 MU to you, will you pay 1 MU so that the leader loses 4 MU?” If the Citizen says yes, the enumerator repeats the question, increasing the Citizen transfer by 1 MU, until the Citizen no longer punishes. This transfer value is the punishment threshold. All games are single shot, so punishment strictly decreases the citizen’s economic utility and thus is purely expressive. The Citizen’s threshold represents the point at which the expressive benefits of punishment outweigh the economic costs. Second, we measure Citizens’ post-treatment ownership over the group fund by asking how much they agreed with the statement that “the group fund belonged to me,” on an 11-point ladder with anchors of “Do not agree at all” at 0 and “Strongly agree” at 10. This measure corresponds to those used in cognitive psychology to measure ownership over private goods (see e.g. Shu and Peck 2011).

Lab Experiments 2: Manipulating Oil and Aid Ownership

We designed the Oil Ownership and Aid Ownership Experiments to test whether psychological ownership over windfall revenues is malleable even when subjects never physically or legally own any part of the group fund. The Oil Ownership Experiment, conducted in January 2017, consisted of three treatments: Oil, Oil Ownership, and Oil Framing. In the base Oil condition, enumerators told Citizens only that the group fund came from oil revenue. In the Oil Ownership condition, the group fund was described as salary, while the Citizen transfer represented public services. Survey results show that 86% of citizens saw the transfer as more like services than a personalistic transfer.

enues.⁵ In the otherwise identical Oil Ownership condition, before Enumerators gave the 10 MU group fund to the Leader, they told Citizens that 5 MU of group fund “represents the share of the oil money that belongs to you, as the citizen.” As we designed this treatment to increase psychological not physical ownership, Citizens never physically held any portion of the group fund. Citizens in the Oil Framing condition were only told that “Oil money is meant to belong to all Ugandans, and to be used to benefit citizens like you.” It thus mentions ownership, but does not assign individual citizens ownership.

The Aid Ownership Experiment, run in Kampala in July 2017, consisted of two treatments: Aid and Aid Ownership. These were identical to the Oil and Oil Ownership treatments described above except that enumerators identified the revenue source as foreign aid. Both the Aid and Oil Ownership Experiments use the same punishment threshold measure as the Tax Experiment. The Aid Ownership Experiment also uses the same 11-point ownership measure used in the Tax Experiment. The Oil Ownership Experiment used a similar question with a 4-point response scale; this less-sensitive measure biases against finding an effect of the treatment on ownership or of ownership on punishment.

Lab Experiments: Data and Key Outcomes

Ugandan enumerators implemented all three experiments at field sites in Kampala, Uganda in 2017. At each site, volunteers were recruited for 16-person sessions, conducted in the Luganda language. We randomly assigned treatments at the session level; within each session, subjects were randomly assigned to be Citizens or Leaders. In each session, respondents received a group training on the assigned treatment, then met one-on-one with enumerators to play one practice round and five single-shot rounds of the assigned game. To ensure each round represented a single-shot game, Citizens were randomly and anonymously paired with a different Leader in each round. After round 5, respondents completed a survey that included our ownership measure. For enumeration, 1 MU was set to 100 Ugandan

⁵This was nearly identical to the windfall conditions above; see Appendix A.1.2 for details.

Tax Experiment		Oil Experiment		Aid Experiment	
Tax	208	Oil Ownership	138	Aid Ownership	104
Windfall	207	Oil Framing	143	Aid	101
		Oil	131		
TOTAL	415	TOTAL	412	TOTAL	205

Table 2: Citizens per Treatment in Lab Experiments.

Shillings (UGX); respondents received payouts from 3 randomly selected game rounds. The average Citizen payout was 4,500 UGX, three times our sample’s median daily wage.

Across all three experiments 1,032 Citizens played five rounds each. Leaders are not included in the analysis as they did not set a threshold. Variation in the actual number of observations is due to covariate missingness or respondent attrition across the five rounds. Table 2 shows the distribution of Citizens across each experiment. Chi-squared tests for covariate balance are consistent with successful randomization (See Appendix G).

Lab Experiments: Results

Hypothesis 1 expects that individual variation in ownership will predict Citizens’ punishment thresholds *within* each treatment condition. Hypothesis 2 predicts that the ownership manipulations in each experiment—Taxation in the Tax Experiment, Oil Ownership in the Oil Ownership Experiment, and Aid Ownership in the Aid Ownership Experiment—will increase punishment thresholds relative to baseline. H2 also implies that this increase will be mediated by our ownership measure. This section provides evidence in support of these hypotheses. All tests except the mediation analysis were included in our pre-analysis plans, which were registered with the Evidence in Governance and Politics network (<http://egap.org/design-registrations>). The Aid Ownership analysis was not registered separately, as we followed the Oil Ownership pre-analysis plan (see Appendix A.4 for details).

Ownership Increases Willingness to Punish in the Lab

We estimate the OLS model $Y_{ij} = \alpha + \beta \text{Ownership}_i + \gamma \mathbf{X}_i + \epsilon_i$. The dependent variable is subject i 's punishment threshold in round j ; **Ownership** is the 11-point (or 4-point) post-treatment ownership measure discussed above. \mathbf{X}_{ij} is a vector of controls, including the Leader transfer in the previous round and enumerator and round fixed-effects. Because ownership is not randomly assigned, to alleviate omitted variable concerns \mathbf{X}_{ij} also includes respondent age, gender, education, level of poverty, and perceived quality of local services. For pooled results, we include indicators for each revenue treatment. Standard errors are clustered by respondent. All results are robust to controlling for subjects who failed a source manipulation check.

The first column in each panel of Table 3 reports the relationship between the ownership measure and punishment in the three experiments. In the Tax Experiment, a one standard-deviation (SD) increase in the ownership measure corresponds to a 0.749 MU increase in subject thresholds, equivalent to 0.54 SD. The effects are similar in the Oil and Aid Ownership Experiments; even using our less sensitive 4-point ownership measure in the Oil Ownership Experiment, a 1 SD increase in ownership corresponds to a 0.653 MU punishment threshold increase.⁶ The remaining columns in each panel show that the results hold when we analyze each experiment's treatment conditions separately, reducing concerns that the pooled result simply reflects a priming effect of the ownership treatments. This provides, to the best of our knowledge, the first evidence that budget ownership predicts willingness to punish leaders for their spending behavior. Appendix B shows that group fund ownership is correlated with ownership over the actual Ugandan budget and with hypothetical willingness to take action in response to a corruption scandal. So there is some evidence that psychological ownership might travel beyond the laboratory setting.

As the results in Table 3 are correlational, one concern might be that our ownership

⁶The mean punishment thresholds in the lab experiments range from 4.3 MU to 5.4 MU (i.e. 43-54% of the group fund), depending on the exact experiment and treatment condition; see Appendix G for details.

		DV: Citizen Punishment Threshold			
Panel A: Tax Experiment	Pooled	Aid	Oil	Grant	Tax
Ownership	0.749*** (0.059)	0.650*** (0.171)	0.814*** (0.132)	0.519*** (0.149)	0.802*** (0.084)
Adjusted R^2	0.380	0.370	0.472	0.351	0.401
Subjects	415	67	71	69	208
Rounds	2075	335	355	345	1040
Panel B: Oil Experiment	Pooled	Oil Ownership	Oil Framing	Basic Oil	
Ownership	0.582*** (0.106)	0.653*** (0.25)	0.777*** (0.16)	0.477*** (0.146)	
Adjusted R^2	0.139	0.114	0.176	0.252	
Subjects	387	127	131	129	
Rounds	1927	631	653	643	
Panel C: Aid Experiment	Pooled	Basic Aid	Aid Ownership		
Ownership	1.045*** (0.07)	0.999*** (0.133)	1.047*** (0.091)		
Adjusted R^2	0.473	0.460	0.481		
Subjects	205	101	104		
Rounds	1025	505	520		

Note: *p<0.1; **p<0.05; ***p<0.01

Table 3: Ownership Predicts Punishment Thresholds Within Treatment Conditions. OLS models for each treatment condition estimated separately. SE clustered by respondent. Enumerator and Round FE and subject covariates used in all models.

mechanism is proxying for an underlying characteristic not captured by our model. For example, perhaps ownership does not drive punishment, but rather both ownership and punishment are caused by respondents' education level, or perhaps a psychological characteristic such as egosim or aggression. We are able to partially, but not entirely, control for this by including available covariates in our regressions. To test ownership's ability to causally affect punishment, we turn to our experimental manipulations of ownership.

Manipulating Ownership Increases Punishment in the Lab

This section shows that each treatment successfully increased both ownership and punishment thresholds, and that ownership mediates the effect on punishment. In the analysis, the reference categories are: the three Windfall conditions (Aid, Oil, and Tax) for the Tax

	DV: Ownership			DV: Punishment Threshold		
	(1)	(2)	(3)	(4)	(5)	(6)
Tax Experiment:						
Treatment: Tax	0.244**			0.422***		
Control: Windfall	(0.095)			(0.113)		
Oil Ownership Experiment:						
Treatment: Oil Ownership	0.088			0.435**		
Control: Oil & Oil Framing	(0.084)			(0.176)		
Aid Ownership Experiment:						
Treatment: Aid Ownership	0.229**			0.396***		
Control: Aid	(0.106)			(0.146)		
Round FE				✓	✓	✓
Enum FE	✓	✓	✓	✓	✓	✓
Covariates	✓	✓	✓	✓	✓	✓
Observations	415	387	205	2075	1927	1025

Note:

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

Table 4: Effect of Ownership Treatments on Punishment and Ownership in Uganda.

As predicted by H2, Ownership treatments significantly increase ownership (Columns 1-3, 1 observation/respondent) and punishment thresholds (Columns 4-6, 5 observations/respondent). Heteroskedasticity-consistent (HC3) SEs used in Columns 1-3 and subject-clustered (CR2) SEs used in Columns 4-6.

Experiment; the pooled Oil and Oil Framing conditions for the Oil Ownership Experiment; and the Aid Condition for the Aid Ownership Experiment.

The effect of treatment on ownership is analyzed at the subject level. Columns 1-3 of Table 4 show that all three treatments produced positive, though not always statistically significant, increases in ownership. For the Tax and Aid Ownership conditions, the effect is both substantively large and statistically significant. In the Oil Ownership condition, in which we used the less-sensitive 4-point ownership scale, the coefficient is smaller and not significant. This is likely due to the lower sensitivity of the 4-point ownership measure, which generated significant ceiling effects.

Columns 4-6 of Table 4 show that all three ownership treatments significantly increased Citizens' punishment thresholds. All specifications are OLS and include subject covariates

plus game-round and enumerator fixed effects.⁷ Taxation increases punishment by 0.422 MU ($p=.000$) relative to the three Windfall conditions (Aid, Oil, and Grant). Similarly, the Oil Ownership condition increases punishment by 0.435 MU ($p=0.013$) relative to the Oil and Oil Framing conditions; Appendix Table E.2 shows that the Oil Framing placebo treatment has no significant effect. Finally, relative to the Aid condition, the Aid Ownership treatment increased punishment by 0.396 MU ($p=0.007$). Strikingly, the increase caused by the Aid and Oil Ownership treatments is similar in magnitude to that induced by taxation, even though respondents never physically own part of the group fund as in the Tax treatment.

To test whether increases in ownership are driving the observed increase in punishment, Appendix C.1 performs mediation analysis for the Oil Ownership, Aid Ownership, and Taxation treatments. While mediation analysis was not pre-registered for the lab data, it follows directly from our main hypotheses; running it on multiple samples decreases concerns that any findings are due to chance. We find that the ownership measure, when used as a mediator, accounts for approximately half of the effect of the Tax treatment and Aid Ownership treatments. In the Oil Ownership condition, the mediation effect of ownership is significant at the 10% level but substantively smaller, likely due to the less sensitive ownership measure.

To rule out the possibility that the Aid and Oil Ownership treatments affect punishment by signalling that the group fund *should* be spent to benefit the citizen, we use the “Oil Framing” treatment described above, which told subjects that oil revenues were meant to belong to all Ugandans generally, but did not assign subjects individual ownership. Punishment thresholds in the Oil Framing condition are nearly identical to those in the basic Oil treatment (See Appendix Table E.2).

As predicted by Hypothesis 1, our psychological ownership measure predicts citizens’ demands on leaders in all experimental conditions. The results also indicate, in line with Hypothesis 2, that ownership is malleable. Indeed, in the lab setting manipulating ownership

⁷Covariates are age, education, gender, perceived quality of local public services, and a deprivation index. We include them to keep model specification consistent across tables.

over non-tax sources can produce accountability pressures statistically indistinguishable from those caused by taxation. However, lab experiments have several weaknesses. In particular, many lab results fail in other settings and may not translate to real-world outcomes. In the following sections we use two additional experiments to address these issues: a lab experiment in Ghana, conducted prior to the experiments presented above, and a nationally representative survey-based field experiment in Uganda.

External Validity Check Using Lab Results from Ghana

As noted above, before the Uganda experiments we designed and implemented a similar lab experiment in Ghana in 2016. While the ownership manipulation hypothesis (H2) was not conceived at that time, the Ghana data offer the opportunity to probe the ownership mechanism in an exploratory, out-of-sample check for external validity. We thus re-examine the Ghana data to learn if taxation increases psychological ownership and if ownership mediates taxation’s effect on punishment thresholds in this sample. Compared to Uganda, Ghana is substantially wealthier, relies more on taxation, is less aid dependent, and draws more heavily on oil revenues. Unlike Uganda, Ghana has competitive multi-party elections and a recent history of peaceful leadership transitions.

The Ghana experiment consisted of Tax, Aid, Oil, and Grant treatments similar to those in the Uganda Tax Experiment. The main outcome is still the punishment threshold. The ownership measure is a three-point indicator that takes 0 if the respondent disagreed or disagreed strongly with the statement “the group fund belonged to me,” 1 if they agreed and 2 if they strongly agreed. Coding both types of disagreement as 0 more closely matches our 11-point measure in which subjects cannot give ownership values below 0. Appendix A.4 reports the full experimental design and a description of the original analysis plan. Appendix Tables D.1–D.3 show that, in support of Hypothesis 1, the ownership measure robustly predicts punishment behavior. In support of Hypothesis 2, the Tax treatment increases self-reported ownership as well as punishment thresholds. Finally, as in Uganda, taxation’s effect

on punishment behavior is strongly mediated by the ownership mechanism. We therefore find similar effects of ownership in Ghana and Uganda.

Increasing Ownership in the Field

To test whether our laboratory results hold in a more naturalistic setting, we designed a survey-based field experiment to test the link between ownership and political engagement. In particular, we wanted to use a more representative group of citizens that tested the theory on rural as well as urban dwellers, and to work in a less controlled setting where citizens face more barriers to action. We therefore drew an area probability sample in Uganda and employed an intervention and behavioral outcome measures designed to reflect both civil organizers' information campaigns and real-world political action. The experiment focuses on two questions. First, is it possible to increase citizens' ownership over real-world revenue sources? Second, does higher ownership increase accountability pressures in the field? The experiment was embedded in a national survey of 2,514 Ugandan citizens in 11 districts. Appendix A.3 includes full information on sampling and implementation, along with balance tests, summary statistics, and the wording of treatments and outcome measures.⁸

Respondents were randomly assigned to the control group, Aid Ownership treatment, or Oil Ownership treatment. The control group moved straight from the pre-treatment to post-treatment survey modules. The two ownership conditions received additional treatment modules immediately after the pre-treatment survey. Treatments were designed to mimic the structure of the laboratory experiments while accounting for the more complicated real-world accountability process that Ugandan citizens face. Ugandans theoretically own aid and oil revenues but never physically possess them, making them good candidates for a psychological ownership treatment. Because any treatments that reference actual govern-

⁸Our analysis focuses on household heads only, which our pre-analysis plan identified as more likely to be moved by treatment. Non-heads of household have little experience budgeting or making large purchases, diminishing the treatment's realism. Appendix Table F.3 reports the results for non-heads of household.

ment revenues are inherently informational, our ownership treatments were constructed as information treatments designed to increase subjects' feelings of indirect ownership.⁹

The Aid and Oil Ownership treatments each had two parts. The first part gave respondents information about the actual aid or oil revenues that had accrued to Uganda's government in the past 10 years. It then helped respondents think about how this money could have benefited them, giving personalized information about what kinds of local public goods and household expenditures the aid (or oil) could have financed were it distributed equally to all Ugandans, assuming a 15% overhead cost of distribution. Such a scheme, while not under consideration in Uganda, is similar to oil-fund distribution in Alaska and elsewhere or to using aid funds for unconditional cash transfers.

Enumerators told respondents the amount of money that would have come to their village under equal distribution, using actual village size data. Enumerators then listed local public goods that could have been provided using the money.¹⁰ Next, enumerators told respondents the amount of money that would have accrued to their actual household (based on a pre-treatment household size question) along with a list of common household and business purchases that the money could have financed. The result was a highly-personalized information treatment that implicitly transferred ownership of aid (oil) revenues to the citizen (See Appendices A.3.3 and A.3.2 for further detail).

The second part of the ownership treatment further increases psychological ownership by having respondents think of how they actually would have spent the aid (oil) funds had their household received a share. Respondents completed a budgeting task in which they told enumerators which purchases they would have made for themselves or their households using the aid (oil) money. In practice, most subjects "purchased" business or farming inputs plus some consumer goods. Enumerators recorded each simulated purchase on a card and, at the end of the budgeting task, gave respondents a summary of the decisions. Finally,

⁹Details on a further set of information placebo treatments are provided in Appendix A.3.

¹⁰These goods, based on Ugandan project budgets, included health clinic supplies; textbooks; new boreholes; new schools; and road paving. See Appendix A.3.7 for more detail.

enumerators gave respondents additional information, based on budget projections, about total amount of revenues from aid (oil) that the government expects to receive in the future, given in present, absolute terms (assuming a future discount rate of 6% per annum) and also broken down by village and household size (See Appendix A.3.7 for details).

Immediately following treatment, we measured respondents' budget ownership and other potential mechanisms, discussed further below. Our ownership measure closely matched the 11-point scale used in the lab games, changing the text to reflect that we were asking about actual government revenues. Respondents were asked about their ownership over tax, oil, and aid revenues. The relevant source was always asked first in treatment conditions; the order was randomized in control.

To measure citizen action, we then gave respondents the opportunity to take four costly political actions. Given Uganda's increasingly closed political space, we focused on measures that did not collect respondents' names or otherwise expose them to a risk of government reprisals. We then used these four measures (described fully below) to create an inverse covariance weighted accountability index that summarizes citizens' accountability demands immediately after treatment was delivered. For ease of exposition, we standardize this index against the control group, such that positive values represent increases in standard deviation units relative to those who did not receive the ownership treatment. The variables used in the index and its construction were pre-registered prior to data collection.

For the first behavioral outcome, *Donation*, we told respondents that we would donate 1,000 Ugandan shillings on their behalf to a healthcare- or corruption-focused NGO. Respondents chose which organization to donate to; we coded *Donation* as a 1 if the respondent chose the anti-corruption NGO and 0 otherwise.

Our second behavioral outcome, *Send Message*, asked respondents whether they wanted to anonymously send a message to a government official of their choice. If so, they chose an official, then the enumerator helped them fill out a comment card. As most respondents sent a card, we focus on the level of government targeted by the respondent. As aid and oil

money are controlled by the national government, we created a binary variable that took a value of 1 if the respondent chose to contact a national-level official and 0 otherwise.

Our third and fourth behavioral outcomes measure willingness to pay for additional information about government behavior by sending SMS messages.¹¹ The third outcome (*SMS*) measures whether respondents paid to send a text message to sign up for an NGO’s SMS platform that distributes information about government spending. The final outcome (*Report*) measures whether respondents paid to send an SMS to the researchers requesting more information about survey results, government revenues, or Ugandan demographics (see Appendix A.3 for details).

Results of Survey Experiment

To test Hypothesis 1, Table 5 reports OLS regressions of the (standardized) accountability index on subjects’ (standardized) average ownership over aid, oil and tax revenues, controlling for age, education, household size, gender, and logged personal income. Column 1 pools the treatment conditions together; Columns 2-4 report results by treatment. Coefficients represent the standard deviation change in our accountability index associated with a one-standard-deviation change in subjects’ feelings of ownership. Consistent with our lab results, we find that ownership strongly predicts willingness to take action in both the pooled and disaggregated samples.

	Pooled	Pure Control	Aid Ownership	Oil Ownership
Accountability Index	0.187*** (0.035)	0.121** (0.056)	0.201*** (0.061)	0.243*** (0.066)
N	834	282	276	276
Subject Covariates	✓	✓	✓	✓

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

Table 5: Correlation between Ownership and Accountability Demands. Ownership is the average of ownership over aid, oil and taxes. All models use classical standard errors.

¹¹SMS messages cost approximately 100 UGX (US\$0.03); even this small amount is meaningful for respondents.

To test Hypothesis 2 regarding ownership manipulation, we conducted difference-in-means tests. First, we test whether subjects in the Aid (Oil) Ownership treatment reported higher values for the aid (oil) ownership measure, relative to the control group. Because subjects received treatments about either aid *or* oil, we estimate separate models for each source. As feelings of political efficacy can moderate political behavior, we also estimate treatment effects separately for those falling above and below the sample mean of an inverse covariance weighted efficacy index. We pre-registered that we expected larger treatment effects among those with higher efficacy.¹² These results are reported in Panel A of Table 6. Consistent with the lab results and Hypothesis 2, we find that ownership is malleable: both the Aid and Oil Ownership conditions significantly increase (ATE=0.31 and 0.33 SD, respectively) ownership over the relevant source (Col 1). This effect is largest for those with low efficacy, and notably smaller for high-efficacy types. Since low efficacy types are also those with the lowest ownership, the results suggest that the treatment was most effective for low-ownership types.

Next, we test whether the ownership treatments increased subjects' willingness to demand accountability as measured by the summary index introduced above. These results are reported in Panel B of Table 6. The full-sample treatment effect (Col 1), while positive, is not statistically significant (ATE=0.04 and 0.02 SD for Aid and Oil Ownership, respectively). As Columns 2 and 3 demonstrate, however, the overall effect masks substantial variation by subjects' level of efficacy: among subjects with efficacy at or below the control group mean, the Aid and Oil Ownership treatments produce substantively large and statistically significant increases in accountability pressures ($p = 0.075$ and 0.071 respectively), while for those above the mean the ATE is slightly negative and insignificant.

To test for non-linearity in the treatment effect across the range of our efficacy index, we model the heterogeneous effect of our treatment with respect to efficacy using the kernel

¹²The (pre-treatment) efficacy index measures subjects' internal and external efficacy and their belief about government efficacy. See Appendix A.3.4 for details.

Panel A: Effect of Treatment on Ownership Mechanism			
	Full Sample	Low Efficacy	High Efficacy
Aid Ownership	0.307*** (0.076)	0.373*** (0.109)	0.252** (0.107)
Oil Ownership	0.332*** (0.074)	0.388*** (0.108)	0.305*** (0.102)
Aid/Oil N	574/565	281/270	291/292
Panel B: Effect of Treatment on Accountability Index			
	Full Sample	Low Efficacy	High Efficacy
Aid Ownership	0.037 (0.086)	0.205* (0.124)	-0.116 (0.119)
Oil Ownership	0.024 (0.086)	0.213* (0.125)	-0.124 (0.118)
Total N	845	412	428
Panel C: Ownership Mechanism as Mediator			
	Full Sample	Low Efficacy	High Efficacy
Aid Ownership	0.064*** [0.026, 0.109]	0.083*** [0.023, 0.164]	0.051*** [0.008, 0.120]
Oil Ownership	0.057*** [0.021, 0.102]	0.072** [0.018, 0.149]	0.042* [-0.002, 0.106]
Aid/Oil N	558/557	272/266	284/288

Note: *p<0.1; **p<0.05; ***p<0.01

Table 6: Effect of Ownership Treatments on Accountability Index and Ownership Mechanism. All models use classical standard errors. Covariate adjustment is used in mediation models. For further details, see Appendix C. 95% confidence intervals in brackets.

smoothing estimator implemented in the `Interflex` package in R. The results, presented in Appendix Figure F.2, reveal the same pattern presented here and suggest that, for the least efficacious respondents, treatment effects are more than twice as large as the overall low-efficacy estimates reported here. The pattern is particularly stark in the Aid Ownership condition, where treatment effects in the bottom quartile of the efficacy distribution average 1.08 standard deviations (average $p=0.0004$).

Our treatments are, by necessity, compound treatments. In addition to increasing ownership, it is likely that they also gave citizens new information about the budget and may

have changed other attitudes toward government, such as the perceived costs of taking action. To test this possibility, we use mediation analysis to isolate the ownership mechanism directly, decomposing the overall treatment effect into two parts: the effect of the ownership treatment on punishment *caused by the increase in ownership* (called the Average Causal Mediation Effect, or ACME), and the combined effect of other (unmodeled) mechanisms (the Average Direct Effect, or ADE). Mediation analysis was pre-specified for this experiment. Following the previous two analyses, we conduct mediation analysis on the full sample as well as the high- and low-efficacy subsamples. In Panel C, we report the ACME for each of these subsamples for both the Oil and Aid Ownership treatments. As before, we take the Pure Control condition as the reference group.¹³ Potential threats to inference for the mediation analysis are discussed in the following section.

The estimates of the ACME show that, consistent with Hypothesis 2, subjects' feelings of ownership mediate the relationship between the ownership treatments and the accountability index. As in the lab, the ownership mechanism is a substantively meaningful and highly significant mediator of the overall treatment effect. This pattern persists across both the low- and high-efficacy subgroups. The fact that the ownership mechanism remains significant even in the high-efficacy group—for whom the overall effect of the ownership treatment is slightly *negative*—suggests that the ownership mechanism can enhance accountability pressures even as the informational content of the treatment demotivates subjects.

Discussion and Robustness

In sum, the results imply that psychological ownership is an under-explored mechanism driving accountability pressures. From a policy-making perspective, the findings also suggest that ownership is malleable even for real-world revenue sources. In all five experiments, subjects' feelings of ownership over revenues significantly predicted demands for accountability in substantively meaningful ways. Moreover, across all five experiments, interventions that

¹³Estimates of the Average Direct Effect (ADE) and Total Effect are available in Appendix Table F.4.

prompted subjects to believe that a share of the revenues belonged to them as citizens—i.e., assigning physical ownership in the tax condition or psychological ownership in the aid and oil ownership conditions—augmented subjects’ feelings of ownership and in turn increased their accountability demands.

Nevertheless, multiple concerns might arise over the interpretation of our findings. First, the strong results in our highly controlled lab experiments may not generalize well to citizens’ real-world political behavior. We thus designed the survey-based field experiment to address such concerns. Outcomes measured accountability pressures through typical political actions such as donations to good-government organizations, messages sent to leaders, and requests for further information. Given that we could not control the actual distribution and ownership of public budgets, we designed a field intervention that sought to capture the essence of the lab treatments. We did this by providing detailed, village- and household-relevant information about the amount of the public money in question and by assigning a budgeting task that encouraged subjects to imagine how the money might have affected their households had they physically controlled their per-capita shares. We styled the intervention after canvassing campaigns undertaken by civil-society organizations, and thus we intended it to serve as a basis for future campaigns.

It is important to note here that the average main treatment effects in the survey experiment were not substantively large nor significant statistically. This suggests that political action demanding accountability is difficult to manipulate in the field, even with an elaborate intervention putting subjects strongly in mind of the potential personal effects of public money. Surprising information about huge national budgets with personal implications may dishearten citizens in ways that offset ownership effects on action—a finding to which future research should attend. However, the intervention did show marked ability to increase psychological ownership over revenues. Moreover, to the degree the treatments manipulated ownership, as seen in the mediation results, the interventions also augmented accountability demands. Direct effects were also present for the low-efficacy subgroup, perhaps because the

experiment presented these subjects with opportunities they typically lack to demand accountability and request additional information. As many experiments have demonstrated, it is difficult to increase public demands for accountability generally (Olken 2007; Raffler et al. 2019; Dunning et al. 2019). In that context, the combined results from the four lab experiments plus the findings of the survey experiment regarding the effects of treatment on ownership, ownership’s mediation of accountability pressures, and the direct effects for the low-efficacy subgroup, all point to promising directions for future studies.

Second, the lab experiment outcome of expressive punishment—paying monetary costs to fine greedy leaders—appears distinct from the survey-experiment outcomes involving donations to a transparency organization, messages to leaders, and requests for information. Can both measures capture accountability pressures? In our lab orientation for subjects we explicitly linked the costs paid for punishment to examples of actions that citizens take in the real world, such as voting or protesting. But the perfect efficacy of citizens’ punishment of leaders in the lab does not reflect real-world political contexts, especially in low-income countries. Thus, in designing our survey experiment, we used behavioral outcomes that required subjects to pay costs in the pursuit of greater government accountability. The opportunity cost of foregoing donation to a health-care NGO in favor of a transparency organization, the inconvenience and potential exposure of contacting leaders, and the payment of SMS fees to receive relevant information all are steps citizens take when motivated to seek more accountable governance. Both the lab and survey behavioral outcomes were thus designed to capture the same underlying concept of tangible costs for accountability. The overall consistency in results between the lab and survey-based field experiments despite the distinctive outcome measures ought to be read as a notable strength in the findings. That results cohere across such distinct settings and outcomes speaks to their robustness.

Third, while our mediation analysis suggests that ownership is driving the effect on citizen action in our experiments, we cannot preclude the possibility of a confounding mediator. We address this in two ways. First, for both the lab and survey experiments we designed

and deployed survey modules measuring plausible alternative mechanisms that could be activated by our treatment. For the lab experiments we measure beliefs about fairness; for the survey-based experiment we measure beliefs about the composition of government revenues, levels of corruption, and post-treatment personal efficacy (as compared to the pre-treatment efficacy measure used in the heterogeneity analysis above). We model each of these alternative mechanisms as potential mediators in the same vein as our ownership measure above. In the lab games, we find that our ownership treatments have a small, *negative* effect on the importance of fairness norms that is statistically significant only in Experiment 1, and that our ownership and fairness measures are weakly, negatively correlated. This pattern eliminates the possibility that it may act as a confounding mediator.

In the survey experiment we find no evidence that our treatments moved the corruption or efficacy measures at all and, by extension, find no mediation effects. Although we do find that our ownership treatments increase citizens' perceptions of the relative importance of aid (oil) to the Ugandan budget, which implies subjects may have thought the budget was larger in those treatment groups, we find no evidence that this increase is causally related to subjects' accountability demands as measured by our summary index. These results are available in Appendix C.2, along with a more thorough discussion of alternative mechanisms and identification concerns. Appendix C.3 also includes sensitivity tests to evaluate the likelihood that a generic unmodeled mediator could account for our results. In both the survey and lab experiments, results suggest that the unmodeled mediator would need to explain approximately two to four times as much variance as all the right-hand side variables combined. We view this possibility as unlikely but discuss it in more detail in Appendix C.3.

Fourth, we acknowledge that all study outcomes were measured shortly after treatment, so the results reported here should be read to reflect treatment effects in the immediate term. While we can only speculate about whether the effects might persist, evidence from one recent study suggests that the effects of a single information intervention can persist for at least one month (Bhandari et al. 2019). In future research, it would prove informative to conduct

medium- and long-term follow-ups to learn about treatment persistence, particularly in the survey experiment. It would also be fruitful to combine long-term follow-up with “booster” doses of the treatment, which would help the treatment more closely resemble a large-scale NGO campaign to remind citizens of their meaningful claims on aid and oil funds and their ability to demand accountability for leaders’ use of the money.

Fifth, concerns may arise that social-desirability bias is driving the ownership treatment results. The same enumerators inform subjects that aid funds and oil money belong to them, observe accountability demands, and administer surveys. At least two elements of the studies counter our worries here. First, the main outcomes measure behavior, which—in the lab games especially but also in the survey experiment—is costly to subjects and thus their self interest should mitigate against social desirability. Second, any bias driven by researcher demand should have similar effects across the oil and oil-framing conditions in the lab experiments. However, as shown above, the oil framing condition did not have the same effect on outcomes as the oil ownership manipulation. These considerations ought to diminish concerns about social desirability.

Sixth, some may worry that all of our experimental manipulations and measurement took place between enumerators and subjects one-on-one and in relative privacy, but real-world accountability pressures inherently require public collective action. As Olson’s classic work argued at the topic’s inception, initiating and sustaining collective action usually requires some kind of individually focused selective incentive (Olson 1965). Our study identifies and provides compelling evidence for such a selective incentive built into many citizens’ psychologies: the expressive benefit of punishment, which is heightened by a sense of ownership. When people believe that public money in some sense belongs to them, they gain measurable utility from punishing leaders they believe to be corrupt.¹⁴ Such expressive punishment, as with selective incentives generally, sows the seeds of collective action.

Finally, the evidence presented thus far does not shed light on what factors, other than

¹⁴The positive utility of expressive punishment is documented in Section E.1 of the appendix.

revenue source, might drive variation in individuals' sense of ownership. To address this, Appendix F uses covariates from our nationally-representative sample to examine the demographic and economic factors that correlate with ownership over aid, oil, and tax revenues.¹⁵ We find that men have higher ownership than women over all revenue sources, as do wealthier respondents and those with more education.¹⁶ Other factors—including age and whether the respondent is from an urban or rural area—do not appear to impact ownership. More research is needed to understand how individual factors give rise to ownership, and the extent to which these factors vary across contexts.

Conclusion

The results from the five experiments reported here present compelling evidence that psychological ownership—the subjective sense that public money belongs to citizens—significantly predicts accountability demands. These results are substantively large and highly significant statistically. Moreover, our experiments demonstrate that relatively simple interventions making public money appear to belong to citizens appreciably boosts their sense of ownership over the revenue. To the degree the interventions manipulate ownership, mediation analysis indicates that heightened ownership leads to greater accountability pressures on leaders.

The present study thus gives shape to an under-explored causal mechanism linking citizen psychology to demands that political leaders be held accountable for their spending. It defines ownership and distinguishes it from related concepts, offers a tractable conceptual measure, and employs the measure across multiple countries and experimental designs. Our theory provides an alternative to previous accountability-enhancing mechanisms, such as the provision of information or the securing of free and fair elections. Our finding that ownership is key to accountability pressures thus suggests fruitful avenues for both researchers and

¹⁵This analysis was not pre-registered and should be viewed as exploratory.

¹⁶Overall levels of wealth and education in our sample are relatively low; high education or wealth in this context is relative, not absolute; we have no actual political or economic elites in our sample.

activists as they seek interventions capable of encouraging citizen engagement.

Large shares of citizens feel a sense of ownership over public revenues, and as those feelings of ownership strengthen, citizens increase their expectations for good governance. They are more likely to ask, “what are you doing with my money?” When leaders fall short of the heightened expectations held by citizens with high budget ownership, those same citizens seem increasingly willing to demand accountability. This willingness appears expressive rather than instrumental, and the related psychological benefits generate selective incentives central to collective action needed for more accountable governance.

The results suggest possibilities for future research. First, our results point to avenues for practical interventions by academics and activists seeking to increase citizens’ willingness to monitor and sanction governments who misuse windfall revenues. Simple and straightforward treatments encouraging citizens to consider revenue as belonging to them may well prove effective in heightening accountability pressures. Second, as discussed above, if ownership mediates action, then this has implications for politicians’ behavior. More work is needed to determine whether, and how, politicians attempt to manipulate citizens’ ownership, and how ownership affects who benefits from state resources and redistribution. Some politicians may seek to dampen public perceptions of ownership through personal claims or repression, others might strategically seek to heighten it by invoking “your tax dollars,” and still others could skew policies toward high-ownership populations. Finally, while we show that revenue source is a key driver of ownership, and provide initial evidence on what individual factors correlate with ownership, more work needs to be done to better understand how citizens develop a sense of ownership.

The findings should prove especially informative to those interested in the resource curse, which portends dire political consequences for countries receiving substantial revenues from mineral wealth and foreign aid (Ross 2004; Morrison 2009). Citizens’ sense of ownership over aid and oil may begin to reverse the curse to the degree that their heightened ownership motivates accountability pressures. Indeed, it is tempting to speculate that just such a sense

of ownership underlies the relative immunity to the resource curse in mineral-rich countries such as Norway, the United Kingdom, and arguably even Botswana. Citizen ownership over revenues cannot cure all political ills, but our findings suggest that it could provide an essential component in motivating greater citizen pressure toward accountability.

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