Do Indirect Taxes Promote Accountability? Testing The Effects of Revenue Modality on Citizen Behavior*

Brandon de la Cuesta†   Lucy Martin‡   Helen V. Milner§   Dan Nielson¶

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Abstract

Governments that rely on taxation, rather than non-earned revenues such as aid or oil, are believed to attain better outcomes across a range of governance measures. Yet this positive tax effect may fail to apply to all forms of taxes. In particular, indirect taxes such as VAT are less visible than direct taxes and, further, indirect taxes may not “bite” in the way that direct taxes do because individuals typically receive a valued good at the moment of paying the tax. This has led to a perception that any accountability gains from taxation may hold more strongly for direct taxes. Yet, there is little evidence on whether this is indeed the case, or if so which mechanisms predominate. This paper addresses these concerns. We first use lab-in-the-field experiments, conducted in Uganda, to show that when an indirect tax is less visible, it has a smaller effect on citizens’ demands on leaders. We then use survey experiments from Uganda to show that indirect taxes are typically not visible to consumers when purchasing. Finally, we use cross-national data to show that while direct taxes are associated with lower corruption, indirect taxes are not.

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†PhD Candidate, Department of Politics, Princeton University, Princeton NJ 08544. Email: brandon.delacuesta@princeton.edu
‡Assistant Professor, University North Carolina, Chapel Hill, Email: lucy.martin@unc.edu
§Director, Niehaus Center for Globalization and Governance, Princeton University, Princeton NJ 08544. Phone: 609-258-6601, Email: hmilner@princeton.edu
¶Professor, Brigham Young University, Provo, Utah 84602, Email: dan.nielson@byu.edu
1 Introduction

“Perhaps...the money which [the taxpayer] is required to pay directly out of his pocket is the only taxation which he is quite sure that he pays at all. ... If all taxes were direct...there would be a security...for economy in the public expenditure.”” – Mill, 1848

A central question in the study of state development is the extent to which a government’s funding sources influence governance. A number of studies have found that greater government reliance on taxation (relative to windfalls like aid or oil) is associated with lower corruption; higher levels of democracy; and higher public goods provision (Ross 2004; Timmons 2005; Baskaran and Bigsten 2013; Brollo et al. 2013; Gadenne 2015; Prichard 2015). Likewise, some studies have found that taxation increases citizens’ accountability demands, making them more willing to monitor government performance and to engage in costly political behaviors (Paler 2013; Martin 2014; Weigel 2017). Yet, debate remains. The results in cross-national studies of taxation and accountability are extremely sensitive to different specifications or the particular country-years used, and some micro-level studies find no evidence that taxation increases accountability pressures (de la Cuesta et al. 2017).

One possible explanation for these mixed findings is that some forms of taxation are more effective at generating accountability pressures than others. One potential distinction is between direct taxes such as income and property taxes, and indirect taxes such as the value-added tax (VAT), trade taxes, and excise taxes. If accountability varies depending on the form in which taxes are collected, then it is possible that governments with similar levels of tax reliance may face very different accountability pressures from citizens. Existing evidence that taxation increases citizens’ accountability demands is entirely based on lab, survey, and field experiments that examine income and property taxes, both forms of highly-visible direct taxation (Paler 2013; Martin 2014; Weigel 2017). Cross-national data analysis, with a few exceptions, has relied on aggregated tax data. The lack of research on indirect taxes, or on the effects of tax modality more generally, thus risks missing a major source of variation in the responsiveness of governments.

This is especially important given that taxation in modern developing countries looks very different than in the early European states that form the basis for much of the taxation and accountability literature (Tilly 1990; Bates and Lien 1985; North and Weingast 1989; Levi 1989).
Direct taxes, especially income taxes, are usually paid only by a small, urban elite; poorer citizens typically pay far fewer, if any, direct taxes. Instead, developing countries rely heavily on indirect taxes. While developing countries have long relied on trade taxes—a tax levied on goods at the border—the 1990s saw the rapid proliferation of the Value-Added Tax (VAT), which is assessed at each stage of a good’s production and is typically passed on in part or in full to consumers. Most countries also levy excise taxes on specific goods often justified on social grounds. VAT in particular has been promoted by the World Bank and other development experts as a relatively easy way for low-capacity states to expand their tax base and increase tax revenues without unduly distorting economic incentives. As developing country governments come to rely ever-more-heavily on indirect taxation, it is important to understand how this may affect the extent to which taxation promotes good governance.

A common intuition is that indirect taxes are much less visible than direct taxes, which will in turn mute any effect of taxation on accountability. However, there is no existing theory that explains why visibility might affect accountability pressures, or demonstrating that it actually does so. Indeed, it is not obvious that there should be differential accountability pressures at all, or that indirect taxes are not visible to consumers. Poor citizens are extremely sensitive to prices, and leaders who eliminate subsidies or otherwise increase prices frequently face to protests, riots, and other unrest (Ballard-Rosa 2016). There is also some evidence indirect taxes do produce accountability pressures. At the cross-national level, proximity to an election decreases government tax effort for both direct and indirect taxes (Prichard 2016), and (Timmons 2005) shows that regressive consumption taxes are associated with more pro-poor policy in a panel dataset, implying at least some accountability pressures for indirect taxation. There is also evidence that the introduction of a VAT can spur protests and tax bargaining Prichard (2015).

This paper develops and tests a theory of tax modality and accountability that reconciles this conflict between intuition and evidence. To understand how visibility mediates taxation’s effect on accountability, we examine how it affects the two proposed mechanisms through which taxation affects citizens’ accountability demands: ownership and loss (De La Cuesta et al. 2018; Martin 2014; Paler 2013). The loss aversion mechanism states that taxation increases citizens’ willingness to

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1As of 2015 the World Bank shows that Uganda relies on its VAT and excise taxes for 48% of total government revenues.
punish because, by removing earned income, activates loss aversion and thus increases the degree to which citizens care about poor government performance (Martin 2014; Paler 2013). The ownership mechanism argues that, because taxation explicitly transfers citizens’ income to the government, it increasing the degree to which citizens view the government budget at “theirs” and thus are upset if they do not benefit from government spending (De La Cuesta et al. 2018; Paler 2013). When a tax is highly visible, citizens feel the loss from payment, and see the transfer of funds to the government. This will generate increased accountability pressures. When either condition is not met, the effect of taxation on citizens’ accountability demands will be muted.

We argue that a particular tax’s visibility can change over time: while both direct and indirect taxes will generate accountability pressures when they are first introduced, only direct taxes will increase accountability pressures in the long run. Direct taxes are highly visible even years after introduction: individuals transfer their earned income directly to the government, creating a sense of loss and increasing ownership over the budget. When an indirect tax (for example a VAT) is first introduced it is highly visible; consumers observe significant price increases, see their utility decrease (due to reduced purchasing power), and understand that the tax revenue is part of the budget. This activates both the loss and ownership mechanisms. As time passes, however, citizens adjust to higher prices, much as consumers adjust to normal rates of inflation. Moreover, because the tax is collected by the seller, rather than the government, the link between the tax and the budget is further weakened. Combined, this will reduce the sense of loss from paying the tax, and will reduce ownership over the budget. This in turn will make it less likely that indirect taxes stimulate higher accountability demands from citizens.

We test our theoretical predictions using both experimental and observational data. We first use a set of lab-in-the field experiments, conducted in Uganda, to examine the effects of tax modality and visibility at the time a tax is introduced. The lab experiments show that, when a direct and indirect tax are equally visible, both taxes have an equally large impact on a citizen’s willingness to pay to punish low transfers from a leader. However, we also find that when the indirect tax is made less visible, it has a smaller impact on willingness to punish. Mechanism tests show that the main reason for this is that visibility affects citizens’ perceived ownership over the tax.

2Even when taxes are withheld from paychecks, the process of filing an annual tax return increases the visibility of the tax.
group budget. We then use a survey to provide evidence that indirect taxes that have been in place for several years are typically not visible, and that increasing the visibility and salience of indirect taxes affects citizens’ perceived utility from purchasing. Together, the survey experiment and lab-in-the-field results provide strong micro-level evidence that indirect taxation, by virtue of its relatively low visibility, produces weaker accountability pressures than direct taxation; we find evidence that visibility affects both the ownership and loss mechanisms. To address potential external validity results with the laboratory and survey experiments we then use an imputed panel dataset of 175 countries to show that similar patterns hold at the country-year level: while countries that level more direct taxes are less corrupt, there is no such correlation between corruption and indirect taxation.

Our paper makes three major contributions to existing literature. First, we introduce a novel theory that explains why the lower visibility of indirect taxation may produce significantly weaker accountability pressures than direct taxation. Using two different experimental research designs, we also provide what is to our knowledge the first micro-level evidence that this relationship holds empirically, and that our proposed mechanism—declining visibility due to acclimation and an obscured connection to government budgets—is responsible for this difference. In testing the primary theoretical prediction of our theory at the macro-level, we also make a contribution to the cross-national literature on taxation and accountability. While there is a robust literature on the relationship between taxation and accountability, there is relatively little work, either theoretical or empirical, on what kinds of taxation drive this relationship. Our results suggest that the taxation-accountability relationship may be less straightforward than is currently thought.

2 Theory

Governments typically raise taxes through a number of revenue instruments. These can be broadly classified into direct and indirect taxes. Direct taxes are collected from the taxpayer by the government, and are typically applied to a certain form of income or assets. They may also be paid by an entire class of individuals; the graduated tax in Uganda, for example, was a fixed sum paid by all adult men. Indirect taxes are levied on particular goods or services and are paid at the time
of purchase, manufacture, or trade. The seller or producer then remits the tax to the government. Indirect taxes include sales or value-added taxes, excise taxes, and trade tariffs.

To date, much of the work on tax modality comes from economics, and focuses on how tax modality affects economic efficiency and consumer behavior. Indirect taxes are typically seen as less distortive than direct taxes, making them preferred (Keen and Lockwood 2010; Agha and Haughton 1996); they are especially attractive in developing countries as a way to substantially broaden the tax net when widespread income tax collection is not feasible. There is also work on how the visibility of a tax affects consumer behavior; Chetty, Looney and Kroft (2009) show that when a tax on goods or services is incorporate into the “shelf price” of a good, the tax is more visible and has a larger effect on consumption behavior. The fiscal illusion literature argues that indirect taxes may lead to higher than optimal government spending, as citizens fail to internalize the costs of indirect taxes (Blumkin, Ruffle and Ganun 2012; Finkelstein 2009), but does not address accountability more specifically.

A more limited literature in political economy has provided some suggestive evidence on tax modality and accountability. Prichard (2015) shows that the introduction of a VAT in Ghana was accompanied by widespread accountability demands from citizens. As part of a broader article on political business cycles—in which governments lower tax effort in election years—Prichard (2016) shows that competitive elections depress tax collection for both direct and indirect taxes in a cross-national sample. Timmons (2005) finds that while progressive income taxes are associated with policies favored by the wealthy, namely stronger property rights, countries that rely on consumption taxes (which are typically indirect) have better health outcomes, including lower infant mortality and higher immunization rates. Timmons argues that these are policies favored by the poor, suggesting that governments are responsive to those for whom the tax burden is highest. Both pieces of evidence suggest that both indirect and direct taxes may affect accountability.

However, other researchers have cast doubt on whether indirect taxes should affect accountability; a common intuition is that citizens may not even know that they are paying indirect taxes, or that they somehow “bite” less than direct taxes, lowering the extent to which they generate accountability demands from citizens. The rest of this section first details the known mechanisms through which taxation may affect accountability, then introduces a theory of how tax modality
Previous research has focused on two main channels through which taxation can affect accountability: tax bargaining and behavioral effects. The tax bargaining literature argues that citizens will use their ability to evade taxation to gain leverage over government; this will induce tax-reliant leaders to grant policy or institutional concessions in order to generate quasi-voluntary tax compliance (Bates and Lien 1985; Levi 1989; North and Weingast 1989). Tax bargaining has been documented in many settings and for several types of taxation, including indirect taxes.³ We assume that tax bargaining will take place for some types of taxes, and may be affected by a tax's visibility and other characteristics, but testing this mechanism is outside the scope of this paper. For tax bargaining to undermine the results shown here, it would have to be the case that tax bargaining is more likely for indirect taxation relative to direct taxation. Given that indirect taxation has been promoted precisely because it is easier to collect, it is unlikely that citizens would be more able to bargain over a tax that is more easily implemented and less easily evaded than a direct tax, reducing this concern.

The second proposed channel is that taxation makes citizens more likely to monitor government performance and to engage in costly political actions when they are dissatisfied (Paler 2013; Martin 2014; Sandbu 2012; Weigel 2017). Existing work suggests that this is because taxation increases the psychological benefits citizens receive from punishing poor government performance. These psychological benefits are higher due to two related mechanisms: ownership and loss aversion. In the loss aversion theory (Martin 2014), citizens feel ownership over their pre-tax income, and this sets their expected utility (reference point); direct taxation pushes citizens below their expectations, into the realm of losses. Due to the shape of loss-averse utility functions, this makes citizens more sensitive to the economic utility lost due to any corruption or other non-optimal government policy.⁴ If a citizen’s willingness to engage in political action is linked to the degree poor government performance hurts them personally, taxation will then increase citizens’ willingness to engage in costly political behavior.

³Prichard (2015) describes how the introduction of a VAT led to tax bargaining in Ghana, but not Kenya.
⁴If citizens are loss-averse, their utility functions are concave above their reference point, and convex below the reference point. The rate of change below the reference point is also steeper by definition; this means that a loss of a dollar is felt more keenly than a gain of a dollar.
The ownership mechanism is a complement to the loss aversion mechanism. Work in psychology has shown that individuals demand more from a resource or item that they view as “theirs” (Wu et al. 2012). De La Cuesta et al. (2018) argues that, in addition to removing earned income, taxation transfers that income to the government, where it is incorporated into the budget. This creates a stronger sense of ownership over the budget. That paper uses survey and laboratory experiments to show that citizens do indeed feel higher ownership over tax funds; that higher ownership predicts higher willingness to punish; and that higher ownership mediates a significant fraction of taxation’s effect on citizen behavior.

The ownership and loss aversion mechanisms require three assumptions to hold. First, citizens must set their reference point as their income or consumption utility with no taxation. This ensures that paying the tax will send an individual below his or her reference point. Second, citizens must be aware that they are paying the tax; otherwise they may not feel the loss of their earned income. Finally, taxpayers must link the taxes they pay to the government’s budget. The ownership mechanism in particular requires that taxpayers observe legal ownership of their income being transferred to the government.

One way to understand how tax modality affects accountability pressures is therefore to examine how strongly these three assumptions hold for a given tax. Direct and indirect taxes differ in a number of ways that might affect how well they generate accountability pressures. In this paper we focus on one key difference: visibility. We define visibility as the extent to which a citizen clearly sees each step of the tax process, including both the payment of the tax itself and its incorporation into the government’s budget. When a tax is highly visible, citizens are aware that the tax is removing earned income and that their post-consumption utility would have been higher if the tax was not levied (not accounting for any public goods or redistribution funded by the tax). They can also clearly see that the amount they are paying in tax is transmitted to the government, thus strengthening their ownership over the budget. This should lead to a strong link between taxation and citizens’ accountability pressures. When a tax is not visible, citizens may not be aware that they are paying the tax, or they may not link the tax closely to the government’s budget; this will weaken the taxation-accountability link.

\[5\text{Below we discuss potential alternative mechanisms and how we rule this out in our experimental design.}\]
A common intuition is that indirect taxes are less visible than direct taxes. Yet, existing evidence shows that citizens are often extremely politically engaged when government introduce a VAT or other indirect taxes, and that poor consumers react strongly to changes in prices of critical goods (Prichard 2015; Ballard-Rosa 2016). We reconcile this apparent contradiction by arguing that a particular tax’s visibility may change over time. When a new tax of any type, direct or indirect, is introduced, it is typically highly visible. For direct taxes, citizens see their earned income removed and passed to the government. This will tend to activate both the loss and ownership mechanisms, increasing accountability pressures. Indirect taxes such as a new VAT, excise tax, or tariff typically lead to significantly higher consumer prices. To see how the loss-aversion mechanism works when a new indirect tax is introduced, assume that a citizen’s reference point before the introduction of the tax is her pre-direct-tax, post-consumption utility given the current prices of consumer goods. Introducing a VAT increases prices and noticeably decreases citizens’ purchasing power. As a result, citizens will experience significant utility losses relative to their reference point. In the short term, this can lead to increases in the accountability pressures citizens make as they attempt to recoup their losses from the new tax in the form of additional public goods provision. The link between these higher prices and the government budget may also be more salient when a tax is introduced due to extensive media coverage.

We argue that, over time, the visibility of direct and indirect taxes will diverge: direct taxes remain visible, while indirect taxes become less visible. Consider a direct tax such as an income tax. Citizens expect to receive their pre-tax income: a percentage of that, however, is taken and then directly paid to the government. Even when an individual has income taxes withheld from her normal salary, and a tax has been in place for many years, filing income taxes once a year ensures that she sees the total tax payment clearly. The income tax is also paid directly to the government, making the link between tax and budget clear. Likewise, property taxes and inheritance taxes are highly visible. In developing countries, few individuals pay traditional income taxes, but there are a variety of other direct taxes that apply to many citizens, such as daily fees or annual registration fees for small shopkeepers or taxi drivers. In Uganda, for example, the daily fees paid by market vendors have frequently spurred accountability demands from vendors.6

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6See Martin 2015 for a discussion.
Indirect taxes, in contrast, become less visible over time. In the long run, individuals may adapt to the higher consumer prices caused by VAT and adjust their expected post-consumption utility accordingly. This would be similar to a sudden inflation or other price shock that may create temporary unrest, but to which consumers ultimately adjust. Governments may even try to help this process, for example by phasing in VAT rates. Indirect taxes become less visible for a number of reasons. Value-added taxes, for example, are incorporated into the listed price of a good. While receipts do often list the tax separately, and consumers may be aware of the official VAT rate, tax-inclusive pricing will have the effect of making the tax less visible. VAT is also less visible because, even if citizens are aware of the tax amount, it is paid to a merchant instead of directly to the government. Some forms of indirect taxation are even less visible: import tariffs and excise taxes are levied before a consumer even purchases a good, and so they pay the tax only in that firms pass the cost along to consumers.

This lower visibility has the potential to lessen the extent to which citizens feel the losses from taxation, or feel higher ownership over the budget. This in turn will dampen—or even eliminate—taxation’s effect on citizen accountability demands. If an indirect tax is not visible, individuals may consider the tax-inclusive purchase price as the base price of a good, and will not consider that, if the tax did not exist, the good will cost less. This implies that indirect taxes will be unlikely to send citizens into the realm of losses. Because they do not see the tax transmitted to the government, it is also likely that they will not have high ownership over the government’s tax revenues. There is some limited evidence that visibility affects political outcomes; Finkelstein (2009) demonstrates that when tolls in the northeastern United States were made less visible through the introduction of E-ZPASS, politicians became more willing to raise tolls rates in election years. There is also evidence that indirect taxes are systematically underestimated by consumers relative to direct taxes (Sausgruber and Tyran 2005; Blumkin, Ruffle and Ganun 2012).

This process of what we term acclimation to a new tax can explain the apparent contradictions in the literature. There are numerous examples of protests and demands for better governance when new indirect taxes are introduced. For example, Prichard (2015) describes large protests in Ghana around the time of the VAT’s introduction. The government was eventually forced to reduce

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7 Chetty, Looney and Kroft (2009) find the opposite for purchasing behavior: when tax is included in the sales price, it is more visible and has a larger effect on consumption.
the tax rate, exempt some goods, and bargain with citizens over spending in order to win citizen support. In several countries, VAT was introduced gradually in order to avoid sharp utility changes for citizens. In Uganda, outrage over the introduction of VAT in 1996 took the form of protests by small-scale vendors rather than citizens: vendors were concerned about the effects sharp price increases would have on their business. More generally, VAT introduction is often associated with tax bargaining by citizens or small businesses and by initial resistance. We characterize the time of introduction as the “partial equilibrium” of a new tax: at this point both direct and indirect taxes should be highly visible, and should generate accountability pressures from citizens.

However, over time these demands fade away. In the long run, citizens begin to view tax-inclusive prices as the “real” price of a good. They may be aware on some level that these prices include taxes, but the tax loses its salience. Meanwhile, direct taxes remain highly visible. This leads to a divergence, where citizens who pay direct taxes demand more from government, but those who only pay indirect taxes do not.

2.1 Alternative Mechanisms

Direct and indirect taxes differ in many ways. While we focus on visibility, it is possible a priori that some of these other differences could also generate differential accountability pressures across the various tax modalities. This section describes these alternative mechanisms. In Section 5 we discuss in more detail how our research design isolates the effect of visibility from these potential alternative mechanisms.

First, indirect taxes are often described as more “voluntary” than direct taxes. Direct taxes are involuntary in that they target entire classes of individuals or types of incomes: income taxes apply to everyone who earns wages of any kind. Indirect taxes are technically voluntary in that an individual can choose to simply not buy clothes if he does not wish to pay sales tax, or not buy alcohol if she wishes to avoid excise taxes. The actual extent of voluntariness of direct taxes is debatable, as avoiding all taxed consumer goods would be punishingly difficult in most settings. However, even if indirect taxes simply make individuals feel that they have more choice about the amount of tax they pay, this could potentially decrease accountability pressures, it if decreases the
sense of loss citizens feel from paying taxes.

Another potential difference between direct and indirect taxes is exchange. In contrast to direct taxes, a citizen who pays an indirect tax by definition receives something of value in return at the same time, namely the purchased good or service. This could substantially reduce the degree to which paying the tax generates a sense of lost income to the citizen, thus dampening accountability pressures.

Finally, direct and indirect taxes often differ in the frequency with which they are paid. Direct taxes are typically due once a year, or withheld from monthly or biweekly paychecks. In contrast, indirect taxes are paid as frequently as an item is purchased; most consumers likely pay some form of indirect tax almost every day. Theoretically, this could either increase or decrease the salience of indirect taxes, relative to direct taxes. Higher frequency of payment could decrease accountability pressures if frequently paying a small amount makes overall tax burdens seem lower. We argue that this is in fact part of the visibility mechanism: frequent payment makes taxation less visible. However the opposite could also be true: if citizens are constantly aware that they are paying taxes, it may make the burden seem higher. If this is the case, indirect taxation should actually create higher accountability pressures than direct taxation. For this to be the case, citizens would have to feel a loss from taxation every time they purchase a good. We test this explicitly in our survey experiment (Section 6).

2.2 Empirical Implications of Visibility and Acclimation

To test the theory introduced above, we consider its main assumption and the implications that follow from it.

First, our theory’s central claim is that when a tax is less visible, this will translate into a smaller, or even null, effect of taxation on citizens’ willingness to engage in costly political behavior to demand accountability.

**Hypothesis 1** The degree to which paying taxes increases citizens’ willingness to engage in costly political behavior will be increasing in the visibility of a tax.
Second, our theory argues that, once citizens have acclimated to a new tax regime, indirect taxes are not visible. One key implication of this is that consumers should not feel a loss from paying a tax when it is incorporated into the price of a good.

**Hypothesis 2** *In equilibrium, indirect taxes are not visible and paying an indirect tax does not generate utility losses.*

Finally, we argue that the differences between direct and indirect taxation matter not only at the micro-level but in aggregate as well: when we look at country-level outcomes, direct taxation should be associated with higher government accountability, while indirect taxation will not exhibit the same relationship. This is an especially hard test: it implies that even when indirect taxes like the VAT exhibit tax bargaining initially, in the long run they will not lead to higher government accountability.

**Hypothesis 3** *A country’s level of or reliance on direct taxes will be associated with higher accountability.*

**Hypothesis 4** *A country’s level of or reliance on indirect taxes will not be associated with higher accountability.*

### 3 Empirical Approach

To test our hypotheses, we combine laboratory experiments and survey experiments in Uganda with observational cross-national data. Section 5 introduces a set of laboratory experiments conducted in Uganda. These experiments consist of four treatments in which a “Leader” has to allocate a group fund between himself and a “Citizen,” and the Citizen can choose whether to punish the Leader for his allocation. In three treatments, the group fund comes from a new tax that is either highly visible and direct; highly visible and indirect; or less visible and indirect. In the fourth condition, which serves as a control, the group fund comes from a windfall and there are no taxes. Combined, the four treatment groups allow us to make several key comparisons. Testing citizens’ willingness to punish when the tax is highly-visible and indirect, as opposed to less visible but still indirect taxes allows us to test the effect of visibility on citizens’ willingness to punish,
holding all other aspects of the tax constant. A similar comparison of a highly-visible direct tax to a highly-visible indirect tax condition tests whether, controlling for visibility, citizens are equally willing to punish a direct and indirect tax; this helps to rule out several alternative mechanisms. Our measurement strategy also allows us to test the ownership and loss mechanisms in each treatment.

Section 6 then uses a survey experiment, embedded in a large national survey in Uganda, to test our hypothesis that visibility of indirect taxes is low once citizens have acclimated to them. In the survey experiments, we have citizens purchase real goods using earned income, and measure their utility before and the purchase is made. We randomly vary whether a citizen is reminded of the amount of VAT and excise tax they actually pay on that item. If taxes are visible, then reminding a citizen of the tax they pay should not affect their post-purchase utility. If taxes are not visible, then reminding a citizen of the tax should lower post-purchase utility.

While survey and laboratory experiments are excellent ways of pinning down causal mechanisms, they are open to concerns about external validity. In Section ??, we address these concerns by examining whether the effects of tax modality on visibility and punishment also persist observationally. To do so, we build a panel dataset of 175 countries that disaggregates taxation into its direct and indirect components. While it is not possible to make causal claims using our cross-national data, we can use it to test whether there are correlations between direct and indirect taxation and measures of government accountability.

4 Case selection: Uganda

Our lab and survey experiments both use data from Uganda. We chose Uganda as a case for several reasons. To test our hypotheses, we needed a setting where taxation was salient and where accountability is currently relatively low, and thus any findings that might increase accountability pressures would be directly relevant. We also sought a country where our findings might reasonably generalize to other African countries. This is especially important as previous work has found significant cross-national differences in experimental results (Henrich et al. 2006; Dunning et al. 2018). Finally, we wanted to test our theory in a country where forms of non-earned revenue, such as aid and oil, are salient and therefore can be compared to each form of taxation.
Uganda meets all of these requirements. As a quasi-authoritarian African state with low levels of development, Uganda is a particularly apt location to test the effects of different revenue sources on accountability pressures.\(^8\) Taxes, foreign aid, and oil revenues are all salient revenue sources in Uganda. All citizens pay value-added taxes and excise taxes; indeed, in 2015 they accounted for almost half of total tax revenues. 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). Thus, Uganda is an example of a country that has focused on increasing indirect taxation at the expense of direct taxation, similar to many other developing countries. Other sources of non-earned revenue are also salient, allowing us to compare them to each type of tax revenue. Significant oil reserves were discovered in 2006, and while oil production has not yet ramped up 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.

To improve the likelihood that subjects in our sample had exposure to all sources of revenues, our laboratory experiments sampled respondents from Uganda’s main urban center, Kampala.\(^9\) Urban citizens often have higher exposure to taxation through their greater participation in the money economy and formal trade; we expect taxation to be more salient in a lab setting among citizens who have experience paying taxes. Urban citizens are also cognizant of the debates over the use of oil revenues and of recent aid scandals, and thus non-earned revenues will be salient. Survey data from our sample shows that an average respondent thought that the government’s budget consisted of 35% taxes, 25% aid, 17% oil and 22% debt. The high perceived percentage of oil revenues is especially noteworthy, as the country discovered oil only in 2011, and the government projected that only 0.6% of 2016 revenues would come from oil.\(^10\)

\(^8\)Uganda has a per-capita GDP of $1,634 and development indicators that are at or near the mean for the continent (World Bank, 2016).
\(^9\)Data from the survey experiments reported in Section 6 draws on a national sample.
\(^10\)The approved budget for 2016/17 anticipated that funding would be 61.5% tax revenues; 0.6% oil, 7.4% grants, and 30.5% debt, with half of the loans coming at concessionary terms (Government of Uganda 2016).
We designed a set of laboratory experiments, conducted in Uganda, to test how the visibility of a tax affects the accountability pressures it generates. Testing the visibility hypothesis in the lab setting allows us to isolate the effect of a tax's visibility on citizens’ willingness to punish poor leader behavior, and to carefully measure how visibility affects the loss and ownership mechanisms. The experimental design also allow us to rule out many of the alternative mechanisms described in Section 2.1.

Our experimental design is based on the experiments in Martin (2014). Those experiments consisted of strategic interactions between two players, a Citizen and a Leader.\textsuperscript{11} In the first stage the Citizen receives an endowment. The leader then receives a budget called the “group fund”. The Leader and Citizen then make simultaneous strategic decisions. The Leader must allocate the budget between his own salary and a transfer to the Citizen. The Citizen must decide, for each possible transfer the leader could make, whether he would wish to pay a portion of his wages to punish the Leader. Finally, the strategic choices are revealed and payoffs accrue. If the punishment is enacted, the Citizen pays a small cost and the Leader pays a fine; the money lost in punishment is not received by either player. The key outcome of interest is the threshold transfer level below which Citizens will pay to punish the Leader; Martin (2014) shows that average punishment thresholds are higher when the group fund comes from a tax on the Citizen’s wages, rather than an external windfall. A critical element of the experimental design is that, at the time strategic decisions are made, the tax and windfall treatments are structurally identical, allowing clear causal inference.

We used this design as the basis for a set of four new experimental treatments designed to test the effects of tax modality and visibility on citizens’ willingness to punish. In three treatments the Leader’s budget was derived from a tax on the Citizen; we further varied whether the tax was direct or indirect, and its visibility. In the fourth treatment, which served as a control, the Leader’s budget was an exogenous windfall and there was no taxation.

Our key innovation is to include a new “purchasing phase” to each treatment, in which respondents use a part of their wage to buy a real item that they get to keep. This allows us to

\textsuperscript{11}Both roles are played by ordinary citizens.
implement a new indirect tax on the purchased good in the indirect taxation conditions; including the purchasing condition in all treatments ensures that we can control for any other effects of purchasing. While purchasing a good was mandatory, respondents always had a choice of 5 common goods to buy; we choose goods that were highly valued by our population of respondents, and that had well-known prices. This was critical for realistically simulating the introduction of a new tax, as respondents in the indirect tax conditions were aware that they were paying more than the street price for the good.

Table 8 reports the stages of each experimental treatment. Consider first the Direct Tax treatment. In this treatment, the Citizen first earns a wage of 15 monetary units (MU). She is then asked to spend 5 MU of this wage to purchase one of 5 small consumer items: rice, soap, cooking oil, candles, and maize meal. Each good cost 5 MU, and the price in Ugandan shillings matches the actual local market price for that good. The Citizen then must pay a tax of 5 MU; this is doubled and given to the Leader as his budget. At this point in the game the Citizen has 5 MU remaining, plus the purchased item, and the Leader has the 10 MU budget. Each player then makes a strategic choice as in Martin (2014): the Leader chooses how to allocate the group fund, and the Citizen decides whether to punish each possible allocation. This treatment mimics an income tax which is payed by all citizens.

The next two treatments mimic the introduction of a new indirect tax. In the “Visible VAT” condition, the Citizen begins with a wage of 15 MU. He then purchases a good, but now the good costs 10 MU: 5 MU for the good itself, and a tax of 5 MU. Once the 10 MU cost of the good has been transferred to the “shop” (represented by a tile on the enumerator’s table), the tax of 5 MU is taken from the purchase price, doubled, and given to the Leader as the group fund. Thus, the tax amounts are identical across the Visible VAT and Direct Tax treatments; the only difference is how the tax is levied and whether it passes through the shop before being given to the Leader. Once the group fund is created, all steps are identical to the Direct Tax condition.

The third condition is the “Hidden VAT” condition. The mechanics of the game are identical to the Visible VAT condition, with one exception. In the Visible VAT condition the Citizen is reminded of the existence of the tax via the name of the group fund, which is labeled

12Piloting confirmed that our target population had accurate information about the shop price for each good.
Table 1: Timing of VAT treatment with Simulated Purchasing. Note that while the Leader’s allocation decision, and Citizen’s punishment decision, are described here as sequential, during enumeration they occur simultaneously. In the Visible and Hidden VAT treatments, the mechanics of the game are identical but the Citizen’s knowledge of the size of the tax and its connection to the group fund differs. In the Hidden VAT condition, the connection between the tax and the group fund is made only in the group training and the size of the tax is obscured; Citizens know only that they pay a tax and the final cost of the good is 10 MU. In the Visible VAT condition Citizens know the size of the tax and the connection between it and the group fund is made in a one-on-one example in addition to the group training.
“Taxes,” and sees a portion of the good’s purchase price as a tax and passed to the Leader via the “Shop” tile from which the good is purchased. In the Hidden VAT condition, this process is rendered less visible. When the game is introduced during enumeration, all respondents are told that “the Government has decided to introduce a tax on goods, similar to VAT, so now the goods cost 1000sh.” They therefore know that the total price of the good includes a tax. When the game is introduced respondents are also told that the group fund over which the Leader allocates comes from the tax they pay when purchasing the good. During the subsequent rounds subjects continue to pay the tax-inclusive price, but are no longer reminded of the tax they pay, nor do they observe the tax being transferred directly to the group fund via the “Shop” tile. Likewise, when the group fund is given to the Leader, they are not reminded in each round of the source of the group fund via a “tax” label on the group fund tile. Thus, the mechanisms of the Hidden VAT condition are identical to the Visible VAT condition, but the tax is made less visible and thus less salient.

The final treatment, which serves as a control group for the experiment, is the Windfall condition. There is no indirect or direct tax in this treatment. In the first stage of the Windfall condition the Citizen earns a wage of 10 MU. The Citizen then purchases a good for 5 MU, and the Leader is given a group fund of 10 MU. In the Windfall condition, this group fund comes from an exogenous windfall, rather than a tax on the Citizen. We ran three different windfall conditions. In one the group fund was described as foreign aid; in the second it was described as from Uganda’s oil revenues, and in the third the source was left ambiguous. These three Windfall conditions are pooled for analysis, as there are no significant differences across them.

The experimental design has several desirable qualities. First, at the time that the Citizen and Leader make their strategic decisions, the games are structurally identical across all treatment conditions: in all cases the Citizen has 5 MU plus the purchased item, and the Leader has the 10 MU group fund. This ensures that any differences across treatments are due only to the tax manipulation. Second, the single-shot nature of the game means that punishment is never strategically rational for the Citizen: in all treatment conditions for our experiment, if the Citizen receives no expressive benefit for punishment, the unique subgame-perfect Nash equilibrium occurs when the Leader offers 0 MU to the Citizen, who does not sanction the Leader. This allows us to test the desired mechanisms, namely whether the loss aversion and ownership mechanisms are affected by
changes in taxation.

Third, the design allows us to capture the main comparisons of interest while ruling out alternative mechanisms. In all three tax conditions, the tax is one third of the Citizen’s wage, thus holding the level of taxation constant. The frequency of tax payment is likewise constant across tax treatments, and thus cannot drive any differences in gameplay. By making the purchasing phase mandatory, we eliminate the possibility that any differences between direct and indirect taxes are due to the voluntariness of indirect taxation. By comparing Citizens’ willingness to punish in the Hidden and Visible VAT conditions, we can compare the effect of visibility on punishment, holding constant the fact that in both cases paying the tax also implies gaining a good (the “exchange” mechanism).

5.1 Implementation

Because the differences between the treatments are relatively subtle, especially the Visible VAT and Hidden VAT conditions, the structure of enumeration is a critical component of the experimental design. Enumeration consisted of 73 sessions, each including 16 respondents; there were 3 sessions each day. Within each session each respondent plays the same single-shot game 5 times, but with different pairings of Citizens and Leaders; this process is described more fully below. Enumeration was conducted in rented sites around Kampala, and volunteers were recruited from the area surrounding each site. Moving sites frequently ensured minimal contamination of the sample from knowing others who had taken part in the experiments. Treatment assignment was at the session level.

During each session, following obtaining consent from each respondent individually, respondents were given a group training in which the rules of the game were explained. Enumerators then met with each respondent individually to go over the rules of the activity again and answer any questions. Respondents were then told whether they were randomly assigned to be Citizens or Leaders, and played a practice round of the game. After the practice round, each respondent met

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13See Section B.2.2 in the appendix for more information about enumeration sites.
14Each sessions consisted of 12 Citizens and 4 Leaders. Respondents were not told what the ratio of Citizens to Leaders would be, only that it would be randomly assigned. To avoid deception, each Leader played with 3 citizens in each round. All thresholds and resulting punishment decisions were communicated to the Leader, such that Leaders
with the enumerator for 5 more single-shot rounds. In each round, the enumerator went over the results from the previous round. They then reminded the respondent that they were in a different citizen-leader pairing in the next round, and went through the decision for that round. All pairings were strictly anonymous, and the single-shot nature of each round was stressed repeatedly.\footnote{Evidence from the post-treatment survey confirms that most respondents knew that the group they were in changed each round, with 84.5\% respondents reporting that they did not believed they had played with the same leader twice.}

Additional characteristics of the enumeration protocols were used to make each treatment salient to the subjects. The source treatments are built into the game scripts used by the enumerators as well as illustrated on the game boards used during enumeration. During both training and actual gameplay, enumerators state the revenue source each time the group fund is mentioned (with the exception of the Hidden VAT condition). In order to emphasize the treatment, enumerators place the coins representing the group fund on the source tile, and verbally state the source, before moving the group fund to the leader’s tile (See the appendix for two examples of the game boards).

On paper the experiments seem very abstract. During enumeration, a number of steps were taken to make the games meaningful to respondents and ensure that the games captured the relevant preferences about political behavior. First, to make the financial aspect of the game clear, all treatments were enumerated using real Ugandan coins: for enumeration 1 MU was set equal to 100 UGX, and so 100 UGX coins were used. Second, respondents completed a short task to earn their endowment in each period, giving them ownership over their “wage”.\footnote{This took the form of a short marketing survey; a different short survey was used before each round. Piloting confirmed that respondents felt that they had earned a fair wage for the work, and seemed to enjoy the task.}

Third, the implementation protocols directly linked each component of the game to the desired theoretical concept. To make the group fund seem more like a government budget, respondents were told that the money the Leader keeps is “his own personal salary, and is not for the citizens or for the community.” In contrast, they were instructed to think of the transfer to the Citizen as “money that politicians send to a community for development or other services that benefit the people living there.” To draw a connection between punishment in the game and real accountability, the group training explained punishment as similar to taking part in a protest or voting – it can impose costs on a politician but is also costly for the citizen. Results from a set of debrief questions effectively played three sub-rounds, one for each Citizen pair. One of these sub-rounds was then chosen for the Leader’s payout, so all pairings were potentially payoff-relevant.
confirm that these elements were successful in making the game represent political behavior.\textsuperscript{17}

All protocols and analysis were pre-registered with EGAP prior to data collection beginning. The next section presents our initial analysis; additional specifications from our pre-analysis plan will be included in future drafts of the paper.

5.2 Results

In each round of the game, each Citizen had to choose which allocations of the group fund he or she would wish to punish. Our main outcome variable of interest in the experiments is a given Citizen’s “punishment threshold” in a given round of the game. This is defined as the smallest transfer made by the Leader at which the Citizen does not punish. For example, if a Citizen reports that she would punish the Leader if he passed back 3 MU or less of the 10 MU group fund, but not 4 MU, her punishment threshold for that round is 4 MU. For clarity, our analysis translates the punishment thresholds from Ugandan shillings to MU (100 UGX = 1 MU). As Leaders do not set punishment thresholds, they are not included in the analysis; future versions of the paper will include results for Leader behavior. Because the punishment threshold occurs in each round, our unit of observation for analysis is the subject-round. We have 847 citizen-respondents in our sample, so in total we have 4235 observations.

Our theory makes several predictions regarding the effect each treatment should have on citizens’ punishment thresholds. First, we expect to replicate the original (Martin 2014) results: citizens in the Direct Tax condition should have higher punishment thresholds than citizens in the three Windfall conditions. Because we have replicated the original Martin result twice in related work, we consider this a test of successful implementation of the protocol, one designed to ensure that the addition of the purchasing phase of the game did not make the tax payment less salient.

Second, as our Visible VAT condition models the situation wherein a highly visible indirect tax is introduced, we predict that here punishment thresholds should be equal to those under Direct Taxation. If this is not the case, then factors other than visibility may be driving any differences.

\textsuperscript{17}For example, in a post-treatment item that asks subjects to characterize the Leader’s transfer, 86% of Citizens correctly identified the transfer made by the Leader as more akin to “services like health and education” than “a small something you get from a local leader or candidate” or “a job or other benefit you get from a local leader you know.” In another survey measure, 85% agreed with the statement that they had “earned their wage.”
between direct and indirect taxes. This comparison is possible to make because, in both the Direct and Indirect tax treatments, citizens pay the same proportion—33%—of their original wage in taxes.

Finally, our main hypothesis is that making the tax less visible in the Hidden VAT condition should have a downwards pressure on punishment: punishment thresholds should be higher in the Visible VAT condition, relative to the Hidden VAT condition. This tests whether, for the same tax, reducing visibility affects the extent to which it limits accountability pressures. Note that this tests variation in visibility at the time a tax is introduced: the prices in the VAT conditions are significantly higher than respondents pay in their normal lives, and thus we do not expect respondents to acclimate to the higher prices over the course of the rounds of the experiment. As discussed above, any difference in these conditions cannot be attributed to alternative mechanisms such as exchange, voluntariness, or frequency of payment; these are all held constant across the two treatments.

Table 2 reports the main results from the lab experiments. All analysis is run using OLS, and unless otherwise noted all models include fixed effects for each enumerator, each round, and the item the respondent purchased in that round. While these models are preferred to more minimal specifications due to their increased precision, all results are robust to the use of simple difference-in-means estimates. This is because subjects’ purchasing behavior as well as changes in subject thresholds by round varies little across treatment conditions.18

The results show support for all three of our core hypotheses. Column 1 uses the Windfall condition as the baseline category.19 First, this analysis replicates Martin (2014) in that we find significantly higher punishment thresholds in Direct Tax, relative to the Windfall conditions. This confirms that our protocol is able to pick up differences between taxed and non-taxed subjects. Second, as predicted, we find the Visible VAT condition also significantly increases Citizens’ punishment thresholds; while the coefficient is in fact slightly larger than the Direct Tax coefficient, the difference is small in substantive terms and not statistically significant. Finally, punishment in the

18 The use of enumerator fixed-effects corrects for imbalance in the enumerator-treatment distribution produced by the need to use on-call enumerators if our primary enumerators fell ill or had to attend to family obligations. Of the three sets of fixed-effects, enumerator fixed-effects have the largest influence on estimated coefficients, but still do not change the statistical significance of the comparisons reported in our analysis.

19 We show in a related paper that there are no substantive or statistically significant differences between the three windfall types of aid, oil, and grant.
Hidden VAT condition is also significantly higher than in the Windfall conditions.

To test whether punishment is significantly different in the Visible and Hidden VAT treatments, Column 2 replicates Column 1 but uses Hidden VAT as the baseline category. As predicted, punishment is significantly higher in the Visible VAT condition. This means that making a tax less visible reduces the degree to which it increases citizens’ accountability pressures. It is critical to remember that the games are structurally identical: in both the Visible and Hidden VAT conditions, the respondent pays a tax of 5 MU on the purchased good (10 MU instead of 5 MU). This is strong evidence that the visibility of a tax affects the extent to which it generates accountability pressures. Next, we examine mechanisms that could account for the effect of visibility on punishment.

<table>
<thead>
<tr>
<th>Reference Group</th>
<th>Windfall</th>
<th>Hidden VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct Tax</td>
<td>0.392***</td>
<td>0.107</td>
</tr>
<tr>
<td></td>
<td>(0.112)</td>
<td>(0.111)</td>
</tr>
<tr>
<td>Visible VAT</td>
<td>0.550***</td>
<td>0.265**</td>
</tr>
<tr>
<td></td>
<td>(0.106)</td>
<td>(0.106)</td>
</tr>
<tr>
<td>Hidden VAT</td>
<td>0.285***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.106)</td>
<td></td>
</tr>
<tr>
<td>Windfall</td>
<td>−0.285***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.106)</td>
<td></td>
</tr>
<tr>
<td>Reference Mean</td>
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<td>5.873***</td>
</tr>
<tr>
<td></td>
<td>(0.0453)</td>
<td>(0.0454)</td>
</tr>
<tr>
<td>N</td>
<td>4235</td>
<td>4235</td>
</tr>
</tbody>
</table>

**Table 2: Effects of Treatment on Subject Thresholds.** Coefficients are from OLS regressions and show the change in punishment thresholds relative to the baseline condition. Column 1 reports the change in thresholds relative to the Windfall condition, demonstrating that all forms of taxation cause a significant increase in subject thresholds. Column 2 reports the change in thresholds relative to the Hidden VAT condition, such that Row 1 gives the effect of increasing the visibility of the indirect tax. Consistent with our theoretical predictions, increasing visibility causes a large and statistically significant increase in subjects’ punishment thresholds. Reported estimates are from a specification that includes enumerator, item and round fixed-effects with standard errors clustered by subject. All results hold at equivalent levels of significance in unadjusted models. Unadjusted reference group means are also reported in the second to last row to facilitate the interpretation of the estimated effect’s substantive magnitude.
5.3 Mechanism testing

In designing the Hidden and Visible VAT conditions, we varied visibility along two dimensions: the extent to which subjects were reminded of the tax’s existence and the precise rate, and the connection between the tax payment and the Leader’s budget. These sources of variation in visibility were designed to simulate the two primary ways in which indirect taxes may become less visible over time and are tied to the two mechanisms proposed for taxation’s effect: ownership and loss. If the payment of the tax is less visible, then citizens may not feel the loss from taxation so keenly. Even if the loss is felt, if citizens do not connect the tax with the government’s budget, they may not feel ownership over government funds to the same extent. This section uses additional data from the laboratory experiments to test both causal pathways.

5.3.1 Visibility and Loss

First, consider the losses citizens may experience from paying a tax. In the lab experiments, we model the introduction of a new tax on respondents subjective utility. To test whether citizens were in the realm of gains or losses at different stages of each treatment, we designed a novel measurement tool, the utility ladder. At the start of the first round, citizens were shown a ladder with 21 rungs (ranging from 0 to 20). The enumerator explained that a ladder position of 0 corresponds to someone who is “not at all happy/well off,” while 20 represents someone who is “very happy/well off.” At the start of each round, each Citizen was anchored at rung 10 of the ladder. This effectively set their reference point at the ladder’s mid-point.

At four points throughout the intervention, the enumerator asked each Citizen to update their position on the ladder, allowing us to track how discrete events influence subjects’ well-being. The first ladder update occurs immediately after the Citizen purchases their chosen good in each round, but before the group fund has been created or any taxes paid (or transferred from the shop in the case of the VAT treatments). The enumerator said “Now, look at the ladder again. Now that you have bought the [ITEM], where are you on the ladder?” The respondent uses a marker to update her ladder position, and this is recorded by the enumerator. We refer to this value as “Ladder 1.” It allows us to measure whether purchasing the good pushes each respondent into the
realm of gains (if they move up the ladder) or the realm of losses (if they move down the ladder). We can compare changes in ladder values across the four different treatment groups to see how paying a consumption tax affects citizen utility.

Column 1 of Table 3 reports the results of OLS regressions of Ladder 1 on each treatment taking the Windfall condition—in such subjects purchased a good at the prevailing market rate—as the reference category. The results show that the higher prices induced by the tax in the two VAT conditions lead to significantly lower Ladder 1 positions compared to the Direct Tax and Windfall conditions. These differences are substantively large: while only 19% of the Direct Tax and 22% of the Windfall group was in the realm of losses (i.e. Ladder 1 values of less than 10), for the Hidden and Visible VAT conditions these numbers are 81% and 82%, respectively; the VAT group, in other words, experiences losses from the higher cost of the good, regardless of whether taxes are visible as the cost of the high price.

However, we do not find significant differences between the Visible and Hidden VAT conditions. Ladder 1 positions for the Visible VAT group are slightly lower (by 0.31 points), but the difference is neither substantively nor statistically meaningful. This suggests that the high price of the good in each VAT condition is inducing losses in citizens, regardless of what, precisely, they attribute the high price to. This makes sense if losses are determined relative to the expected purchase price; we might expect that inflation, or other prices shocks, should have a similar effect on citizen utility as taxation.

The next three columns of Table 3 show how Citizen utility evolved over the rest of each round. The next ladder measurement (Ladder 2) was taken after any taxes—either direct or indirect, depending on the treatment—are paid and the Leader is given the group fund; Citizens were reminded of their Ladder 1 position and asked to update their utility again. Ladder 3 is taken after the Leader’s actual transfer is revealed to the Citizen, but before any punishments have been enacted. Ladder 4 is taken at the very end of the round once punishment has occurred, and final payoffs have accrued.\(^{20}\) Columns 2-4 of Table 3 regresses the change in an individual’s ladder value from the previous ladder against each treatment condition. For example, if a respondent had a Ladder 1 value of 11, and a Ladder 2 value of 8, that individual had a value of -3 for the regression
in Column 2.

The results show that there are no significant differences between the Hidden and Visible VAT conditions across all four ladder measurements: the visibility of a new tax does not appear to affect whether respondents are in the realm of loss or gains. Indeed, all three tax groups actually converge in terms of ladder values: by the time that the Leader’s allocation is revealed, all three tax groups have significantly lower ladder values than the Windfall group, even controlling for respondents’ previous ladder values, their own punishment threshold, and the Leader’s transfer. This suggests that losses are a critical component of taxation’s effect, but are not driving the differences in punishment between the Visible and Hidden VAT groups in our experiment.\footnote{In a related paper, we show that the degree of loss is a significant mediator of taxation’s effect on punishment. We also show that the ladder reproduces the canonical S-shaped utility curve in which transfers below subjects’ thresholds produce a larger decrease in utility than the positive gain of an equivalently sized transfer above their threshold. The positive and significant coefficient on $\text{PunishedLeader}$ is also consistent with research in cognitive psychology that suggests punishment of bad behavior—in this case, a low transfer from the leader—relieves negative emotions. Further validation of the utility ladder as a measurement tool in lab and survey experiments is the subject of ongoing methodological work.}

5.3.2 Visibility and Ownership

Our second proposed mechanism was that citizens will have weaker ownership over the government’s budget when taxes are less visible. After each respondent completed the final round of the game, they completed a short survey that included questions about their in-game behavior. In one of these questions, we asked respondents how strongly, on a 10-point scale, they agreed with the statement “I feel strong ownership over the group fund.”\footnote{A 10 indicated high ownership. The question phrasing was chosen to facilitate accurate translation of the desired construct into Luganda, the language in which the experiments were conducted.} In a related paper, we show that ownership is a significant mediator of the effect of direct taxation on citizens’ punishment thresholds. Thus, we expect that if visibility affects ownership, this will translate into lower punishment.

Table 4 shows the results of OLS regressions in which the 10-point ownership scale is regressed against indicator variables for each treatment condition, with the Windfall condition as the omitted category. Column 1 shows the baseline results without respondent-level covariates, and Column 2 adds covariates and enumerator fixed effects. We find that ownership of the group fund is significantly higher in the Visible VAT and Direct Tax conditions, relative to the Windfall conditions.
### Table 3: Changes in Subject Utility Across Stages of the Game

Each column reports the estimates of changes in subject utility at each of four distinct stages in the game: after purchasing but before the group fund is created; after the group fund is created but before subjects observe the leader transfer; after the subject has observed the leader transfer; and after subjects have observed leaders being punished for low transfers. All models include enumerator, round and item fixed effects but are omitted here for presentation purposes. Results are robust to the removal of these fixed effects. Standard errors clustered at the subject level. Decrease in observations in Columns 3 and 4 occur because post-transfer ladder values are not taken in the final (fifth) round. Due to inclusion of the previous ladder value as a lag, coefficients on treatment indicators should be interpreted as the change in ladder value as a result of the treatment. Table 6 in the appendix reports the same results but without a lag for previous ladder value.

<table>
<thead>
<tr>
<th></th>
<th>Ladder 1</th>
<th>Ladder 2</th>
<th>Ladder 3</th>
<th>Ladder 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visible VAT</td>
<td>−4.724***</td>
<td>−0.279</td>
<td>−0.453***</td>
<td>−0.719***</td>
</tr>
<tr>
<td></td>
<td>(0.232)</td>
<td>(0.288)</td>
<td>(0.204)</td>
<td>(0.182)</td>
</tr>
<tr>
<td>Direct Tax</td>
<td>0.282</td>
<td>−1.606***</td>
<td>−0.530***</td>
<td>−0.637***</td>
</tr>
<tr>
<td></td>
<td>(0.226)</td>
<td>(0.259)</td>
<td>(0.203)</td>
<td>(0.169)</td>
</tr>
<tr>
<td>Hidden VAT</td>
<td>−4.413***</td>
<td>−0.046</td>
<td>−0.671***</td>
<td>−0.654***</td>
</tr>
<tr>
<td></td>
<td>(0.236)</td>
<td>(0.277)</td>
<td>(0.202)</td>
<td>(0.169)</td>
</tr>
<tr>
<td>Previous Transfer</td>
<td>0.045*</td>
<td>0.094***</td>
<td>0.045</td>
<td>−0.030</td>
</tr>
<tr>
<td></td>
<td>(0.024)</td>
<td>(0.022)</td>
<td>(0.036)</td>
<td>(0.027)</td>
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<tr>
<td>Subject Threshold</td>
<td>−1.550***</td>
<td>−0.078</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>(0.061)</td>
<td>(0.060)</td>
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<td></td>
</tr>
<tr>
<td>Leader Transfer</td>
<td>2.070***</td>
<td>0.721***</td>
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<td></td>
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<tr>
<td></td>
<td>(0.039)</td>
<td>(0.049)</td>
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<td></td>
</tr>
<tr>
<td>Previous Ladder</td>
<td>0.639***</td>
<td>0.429***</td>
<td>0.405***</td>
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<tr>
<td></td>
<td>(0.032)</td>
<td>(0.027)</td>
<td>(0.019)</td>
<td></td>
</tr>
<tr>
<td>Punished Leader</td>
<td></td>
<td></td>
<td></td>
<td>1.124***</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0.204)</td>
</tr>
<tr>
<td>Constant</td>
<td>12.151***</td>
<td>2.339***</td>
<td>5.452***</td>
<td>6.787***</td>
</tr>
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<td>(0.537)</td>
<td>(0.588)</td>
<td>(0.587)</td>
<td>(0.455)</td>
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<td>Enumerator FE</td>
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<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Purchased Item FE</td>
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<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>N</td>
<td>4235</td>
<td>4235</td>
<td>3487</td>
<td>3468</td>
</tr>
</tbody>
</table>

***p < .01; **p < .05; *p < .1
In contrast, the difference between the Hidden VAT condition and the Windfall conditions is not significant. While the coefficient is positive, it is less than half the size of the coefficients on the two visible forms of taxation; in the adjusted covariate model, the difference between ownership in the Hidden and Visible VAT conditions is also significant at the 10% level \((p=.09)\). This provides suggestive evidence that altering the visibility of a tax changes the extent to which citizens feel ownership over government budgets, altering the extent to which they demand accountability for how revenues are spent.

<table>
<thead>
<tr>
<th></th>
<th>Reference Group: Windfall</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Baseline</td>
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<td>Visible VAT</td>
<td>0.434*</td>
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<tr>
<td></td>
<td>(0.240)</td>
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<tr>
<td>Direct Tax</td>
<td>0.521**</td>
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<td></td>
<td>(0.250)</td>
</tr>
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<td>Hidden VAT</td>
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<td></td>
<td>(0.224)</td>
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<tr>
<td>Enumerator FE</td>
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<tr>
<td>Subject Covariates</td>
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<tr>
<td>N</td>
<td>827</td>
</tr>
</tbody>
</table>

***\(p < .01\); **\(p < .05\); *\(p < .1\)

Table 4: Effect of Tax Visibility on Ownership, Windfall as Reference. Reported coefficients are the effect of treatment on a 10-point ownership measure. Column 1 reports estimates with a model that includes only treatment condition indicators. Column 2 reports estimates including enumerator fixed-effects and following subject-level covariates: age, gender, education, quality of local public services, and whether subject was registered to vote. Because ownership measures are taken only once per subject, data used is subject-row and standard errors clustered at the game session level. The rank ordering of the treatment effects by visibility suggests that decreasing visibility reduces subjects’ ownership over the group fund, with ownership in the Hidden VAT condition less than half of that in the Visible VAT condition in the minimal specification, dropping to approximately one-third the size in the adjusted model.

5.4 Discussion

The laboratory experiments generate several key findings. First, we find that, when Citizens pay a new indirect tax, and the tax is highly visible, its effect is very similar to that of a direct tax. This is supported by qualitative feedback from participants: our sample of lower-income Ugandans is extremely price conscious, and in piloting responded strongly to even small changes
in prices. However, when the amount of the tax and the link between the purchase and the group fund were obscured, this muted the effect of taxation on Citizens’ willingness to punish the Leader, as measured by the punishment threshold. Additional tests suggest that ownership is a key part of the mechanism behind this result: because indirect taxes are paid to sellers, rather than directly to the government, citizens do not make the connection between the taxes they pay on goods and the budget, even when they feel the losses from paying higher prices. However, our lab experiments model the introduction of a tax, rather than the payment of a long-established tax. We next use a survey experiment to test whether citizens feel a loss from paying a tax that is well-established, rather than one that is only recently introduced.

6 Testing Tax Visibility

Our second hypothesis was that, while taxes such as VAT may be visible when first introduced (and thus citizens observe the sharp increase in prices), once the tax has been in place for some number of periods it is typically less visible to citizens.\textsuperscript{23} If taxes are fully visible, paying an indirect tax should send a consumer below his or her reference point: the consumer will realize that, in the absence of taxes, they could have purchased more and been better off. If, however, taxes are less visible, citizens’ reference point is built around the tax-inclusive price of the good. Our contention is not that consumers are unaware that taxes exist, simply that the tax is not salient when they consider their utility from purchasing.

To test the loss hypothesis, we designed a survey experiment that was embedded into a large national survey of Ugandan citizens in 2018. This section presents the initial results of that experiment: as data collection is still ongoing, these results are based on a partial sample and thus should be treated with caution. The experiment has the following structure. In stage 1, respondents completed a brief task to earn an endowment of 2,600 Ugandan shillings (UGX).\textsuperscript{24} We had respondents earn the money to make it more closely resemble earned wages rather than a windfall. Respondents were then presented with a purchasing decision: they had to purchase either

\textsuperscript{23}We seek here to identify whether this process occurs, rather than determine how quickly this process occurs.
\textsuperscript{24}The task took place earlier in the survey, and consisted of a conjoint survey experiment that was unrelated to taxation or consumer behavior. Because in expectation all subjects receive the same treatment in a conjoint experiment, we do not need to control for assignment to treatment in the effort task in our main analysis.
a bar of soap or an airtime voucher, each of which cost the actual amount that the good was sold in that part of the country, typically ranging from 500 UGX to 700 UGX.25

Once the respondent picked which good to purchase, he or she saw one of three possible treatment conditions: Control, Hidden Tax, or Visible Tax. In the Control group, the respondent was told “This is ITEM that costs AMOUNT,” where Item and Amount were filled in with the relevant information for that subject. In the Hidden Tax condition, they were told “This is ITEM that costs AMOUNT Sh. Remember that this price includes taxes levied by the government.” This condition primes respondents to think about the taxes they pay, but does not specify the amount. In the Visible Tax condition, they were told “This is ITEM that costs AMOUNT Sh. If there were no taxes on ITEM, it would cost BLANK– you could buy it and have BLANK Sh left over. But, because there is BLANK the total cost of the ITEM is BLANK Sh." For each item, we used the actual indirect taxes levied on that good in Uganda. For the soap, this included 18% VAT. For the airtime, this included 18% VAT as well as an excise tax of 12%.26

To measure the visibility of the tax, we used a version of the utility ladder introduced in the laboratory experiments. At the start of the experimental module, we showed the respondent a 21-rung ladder than ranged from 0 to 20, and explained that it represented wellbeing.27 The enumerator then placed the respondent on rung 10 to anchor their utility at the midpoint. This effectively sets each respondent at a pre-purchase reference point. Following the purchase and treatment script, we reminded respondents that they had been on rung 10 of the ladder, then asked the respondent “Now that you have bought ITEM, where are on you on the ladder?” This measurement is our main outcome.

We expect respondents’ final ladder position to be above 10 if they value the good purchased more than the money spent on the purchase. While the purchase was mandatory in the survey,

25We chose to use local prices, rather than setting one price for all respondents in Uganda, because we are specifically interested in the utility individuals receive from purchasing goods in their day-to-day lives. If prices in the experiment do not match local prices, this introduces heterogeneity in the treatment that is not desirable. In practice, variation in purchase price is infrequent, with 98.7% of goods purchased for 600 shillings. For this reason our main specification does not control for good price, but doing so alters estimated coefficients only at the hundredth decimal point.

26So, if a respondent purchased soap for 500 Sh., in the visible tax condition, they would be told “This is soap that costs 500 Sh. If there were no taxes on the soap, it would cost 424 Sh– you could buy it and have 76 Sh left over. But, because there is VAT of 18%, the total cost of the soap is 500 Sh.”

27We explained that “someone at the bottom rung is very poor or unhappy, and someone at the top rung is very wealthy or happy.
respondents had a choice between two valued goods. In general, we therefore expect respondents to have a final ladder value of at least 10 in the control condition. If value-added and excise taxes are visible, then there should be no difference between the control and two treatment conditions in the final ladder position. If, however, indirect taxes are not visible or salient, then reminding respondents that they pay taxes on the purchases should reduce the perceived benefit of purchasing the good. We expect our “hidden tax” condition, which prompts respondents to think about taxes but does not mention the amount, to have a small negative effect on post-purchase utility, while explicitly reminding respondents about the specific taxes paid, and how much the good would cost without the tax, will have a larger negative effect on utility.

Figure 1 shows the initial results of the experiment, based on the 644 observations we have collected so far; our full sample size will be 2400. Each dot shows the average post-purchase utility ladder position for respondents in each treatment condition, while the bars show confidence intervals. The estimates are produced by fitting a simple no-intercept model with the treatment as the only independent variable. Controlling for good type and purchase price has almost no effect on estimated treatment effects and thus we focus here on the simpler model for easier interpretation. The top line in each treatment group shows average utility for all respondents in that condition; the middle line shows averages for respondents who purchased soap; and the bottom line shows respondents who purchased airtime. The vertical line at 10 shows the initial, pre-purchase ladder position of all respondents.

The results show significant, and substantial, differences between the three treatment conditions. On average, respondents in the Control condition are in the realm of gains following their purchase, with ladder values of about 11. In the Hidden Tax condition this drops by a full point to around 10, meaning that simply reminding respondents that their purchase includes a tax is enough to wipe out nearly all the gains from purchasing. In the Visible Tax condition this is even more pronounced; on average respondents who were reminded of the specific taxes they pay have now actually lost utility from purchasing and are below their reference point in a manner similar to direct taxes. This loss is more pronounced in the airtime condition, where taxes are higher than in the soap condition. Thus, both VAT and excise taxes appear to be typically invisible to Ugandan

Soap and airtime were chosen because of the high value respondents placed on them during piloting and because prices for both goods are relatively constant across localities.
citizens, supporting the main contention of this paper.

![Figure 1: Effect of Visibility on Subject Utility.](image)

**Figure 1: Effect of Visibility on Subject Utility.** Estimates give the effect of varying visibility on subjects’ ladder position. Horizontal line at Rung 10 denotes the position at which subjects are anchored at the start of the experiment. Effects are estimated on the full sample (black) as well as separately depending on whether subjects chose to purchase airtime (blue) or soap (red). All point estimates are significantly different from each other in the full model. Total sample size is 644. The rank ordering of the estimates indicate that reminding subjects of the existence of a value-added tax (Hidden Tax) causes a small decrease relative to the condition in which they are unprompted (Control), but does not push subjects below their reference point. Providing subjects with the exact amount of the tax paid and the “true price” in the absence of taxation (Visible Tax), on the other hand, produces a large decrease in subject utility.

7 External Validity using Cross-National Data

Thus far, we have shown evidence on tax modality at the time a new tax is introduced, and once citizens have adjusted to a new tax. have examined how tax modality, and visibility, affect citizens’ accountability demands at the time in in Uganda, indirect taxes are less visible than direct taxes, and that this has the potential to reduce the effect of taxation on citizen behavior, relative to the effect of direct taxes. However, there may be concerns that this pattern is unique to Uganda, or that the findings from the laboratory experiments—which model a simple polity consisting of two actors—are too far from “real-world” political behavior to be informative. This could occur if, for

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29 Ideally, we would also be able to estimate the effect of altering the visibility of direct taxes such as income or business licenses. However, the fact that no good is exchanged during the payment of these taxes means that it is not feasible to simulate the payment of these taxes in an externally valid within a survey experiment of this kind. We are, however, able to simulate direct taxation in our lab-in-the-field experiment, as discussed above.
example, respondents in our games do not view their decisions as similar to those they make about politics in their daily lives. It could also be the case if the games do capture political preferences, but outside of the lab citizens face repression, collective action problems, or other barriers that mute the effects of taxation in the real world.

We explore these issues systematically by looking at cross-national data. If our lab and survey experiments give us meaningful results about the real world, we should expect that direct and indirect taxes have different effects on equilibrium levels of government accountability at the national level. Our lab findings suggest that accountability pressures should be substantially lower when citizens primarily pay indirect taxes, and higher when direct taxes are levied. However, it is possible that the micro-level results are correct, but we may still see similar accountability pressures for direct and indirect taxes at the country level. This could occur if, for example, citizens can still engage in tax bargaining for indirect taxes, and this drives higher accountability. It could also occur if we are correct that only direct taxation makes individuals more likely to demand accountability, but outside of a lab setting there are too many barriers for citizens to be able to increase equilibrium accountability levels, and thus taxation is simply not associated with accountability more broadly. This makes it important to test the equilibrium effects of each type of tax on accountability.

If direct and indirect taxes have different effects on citizens’ accountability demands, then we should observe that the degree to which a government relies on direct taxes should be positively correlated with overall levels of accountability, while reliance on indirect taxes should have a smaller effect or even no effect at all. To provide an initial test of this hypothesis, this section reports the results of cross-national analysis from an imputed panel dataset of 175 countries from 1989 to 2015. In this paper we focus on one key measure of accountability pressures: corruption. In developing countries corruption has a large negative impact on the provision of public goods and services, is associated with lower economic growth, and is a central concern of citizens. It is also a variable that has relatively high levels of variation, relative to institutional measures of accountability such as democracy. For this reason it has been a focus of much accountability research and is a good fit for testing the theory presented in this paper. It is also an outcome that we could reasonably affect citizen pressures to affect.

Given the well-known inferential concerns when using cross-national data, we do not seek to
test a causal relationship using this data. We aim instead to test whether there are strong, consistent correlations between our variables of interest, even controlling for key potential confounders. We test the effect of tax modality on accountability by looking at correlations between different corruption levels and two measures of taxation. First, we consider tax reliance, measured as the percent of a country’s budget that comes from each type of tax. Second, we consider the raw percent of GDP that a country raises from a particular tax in a given year. Tax reliance captures the extent to which a government may need to negotiate with citizens in order to fund itself and, thus, the amount of leverage citizens may have over government. The tax/GDP measure captures the tax burden citizens actually face. Within each category we consider overall taxation and taxation broken down by whether taxes are direct or indirect. We expect that, on average, direct taxation will be negatively associated with corruption, while indirect taxation will have little effect.

Our tax data are from the ICTD’s GRD database; this is the most comprehensive dataset of government revenues and includes disaggregated data on tax modality. The tax reliance measures is on a 0 to 1 scale, while the tax/GDP measure ranges from 0 to 100. Corruption is measured using data from the Varieties of Democracy project (V-Dem) and ranges from 0 (least corrupt) to 1 (most corrupt). In all regressions, we use 1-year lags of all variables, including our controls: ODA as a percent of GNI, resource rents, logged GDP per capita, logged population, whether there is an active conflict in the country, and three binary variables indicating whether the country is high-income, and whether it is in sub-Saharan Africa or the Middle East.

Table 5 reports the results of the analysis. All regressions are OLS, include country and year fixed effects, and cluster standard errors by country. Columns 1 and 2 report the tax reliance results. While overall tax reliance does have a negative effect on corruption, the relationship is not statistically significant. However, this conceals substantive heterogeneity in the effect of taxation. Column 2 shows that while reliance on direct taxes has a negative and significant effect on corruption, reliance on indirect taxes has a slightly positive (although not significant) effect. These results are replicated in the tax/GDP results (Columns 3-5). As in the tax reliance models, there is no significant overall relationship between overall taxation and corruption, but this again conceals differential effects of direct and indirect taxation in Column 4. As expected, only direct taxes have a significant effect on corruption.
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Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 5: Cross-national Results: Taxation and Corruption. This table reports the results of OLS regressions testing the relationship between taxation and corruption. All specifications include year and country fixed effects, and cluster SE by country. All specifications include the set of controls described in the main text. Columns 1 and 2 show the effect of tax reliance, measured as the fraction of the country’s budget that came from that type of tax in that year. Columns 3 and 4 show the same analysis for tax/GDP ratios.
These results suggest that the individual-level evidence in the previous sections has real, significant implications for the relationship between taxation and accountability. While there are cases in which tax bargaining does occur for indirect taxation, in general indirect taxes are unlikely to lead to lower corruption: only visible taxes that citizens pay directly to the government are likely to have that effect. These results are robust to numerous alternative specifications, such as including a time trend instead of year fixed effects, and the inclusion of different sets of controls.

8 Conclusion

A growing body of work suggests that taxation matters for accountability, at least in part because it increases citizen engagement and citizens’ accountability demands. However, this work has focused on direct taxes, which are less prevalent in developing countries than indirect taxes. This paper presents a theory linking tax visibility to the extent to which taxation will increase citizens’ demands for accountability. We show that, once citizens have acclimated to tax-induced higher prices, indirect taxes are not visible when citizens purchase consumer goods. Lower tax visibility appears to lower the extent to which citizen behavior is affected by taxation. We then use cross-national data to show that there are significant differences between the correlations between direct and indirect taxes, and average levels of corruption in a country. Future drafts of this paper will include additional analysis for all three empirical pieces, including subgroup analysis and additional mechanism tests for the survey and laboratory experiments, and additional robustness checks for the cross-national results.
References


### A Additional Results

Reference Category: Windfall

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$^{***} p < .01; ^{**} p < .05; ^{*} p < .1$

Table 6: Changes in Subject Utility Across Stages of the Game. Each column reports the estimates of changes in subject utility at each of four distinct stages in the game: after purchasing but before the group fund is created; after the group fund is created but before subjects observe the leader transfer; after the subject has observed the leader transfer; and after subjects have observed leaders being punished for low transfers. All models include enumerator, round and item fixed effects but are omitted here for presentation purposes. Results are robust to the removal of these fixed effects. Standard errors clustered at the subject level. Due to absence of the lagged ladder value, coefficients on treatment indicators should be interpreted as the average effect on ladder position in the current round. An indicator for whether citizens observed punishment of the leader in Column 4 is omitted in this model because the effect can only be correctly estimated when a lagged ladder value for Ladder 3 is included. Drop in observations between Ladder 2 and Ladder 3 is driven by the fact that subjects were not asked post-transfer ladder values in the final round of the experiment.
B Lab-in-the Field Design

B.1 Experimental Design

The experimental framework follows the design in Martin (2014), which analyzed microlevel effects of taxation on citizen behavior. The basic game proceeds in three stages. In the first stage, two players, one Citizen and one Leader, each receive an endowment. The citizen’s endowment represents a wage, while the Leader’s endowment represents a government budget; the key source of variation in the game is the way the budget is funded. In the second stage, the Leader is asked to allocate the government budget between his own salary and a transfer to the Citizen, which represents a public good. In the final stage, the Citizen observes the Leader’s allocation and decides whether or not to pay a portion of his wages to punish the Leader by taking a portion of what the Leader allocated to himself. The money paid by the Citizen and taken from the Leader when punishment occurs proxies for the economic or is not recoverable by either party.

The structure of the game is driven by a desire to balance ecological validity against a clear, intelligible game that captures the core trade-offs facing citizens as they evaluate government spending behavior: that political action is costly, but so are the losses from rent-seeking by leaders. The lack of bargaining between the Leader and Citizen reflects a stylized vision of taxation as seen by an individual citizen, namely that they are both exogenous and mandatory. Perhaps more controversially, budgets in the game are constant and observable. While transparency is variable (and quite low) in practice, the effect of uncertainty over budget size is not the focus of this project; because introducing such uncertainty would complicate the game substantially, we opt instead to simplify the game for respondents.30 We introduce the variations of this basic game below, after which we discuss the modifications needed to implement a VAT treatment. 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. As in Martin, we will use single-shot interactions to avoid the possibility that citizens will use punishment in earlier rounds as a form of signaling about future behavior. All subjects play 8 rounds. Leaders are paired with three citizens in every round, such that Leaders effectively play three instances of the game in each round—one for each Citizen.

30Our VAT extensions do vary visibility of the source of the group fund, but not visibility of the size of the fund.
Citizen-Leader pairs are built such that, while a Citizen may play with the same Leader more than once, he never plays with the same Leader two rounds in a row. The game is also double-blind in the sense that neither Citizens nor Leaders are aware of whether they have played with their counterparts previously.

B.1.1 Baseline Games

There are two main versions of the basic game: Tax and Windfall. Table 7 summarizes the stages of the two conditions. In the Windfall game, the Citizen receives a wage of 5 MU. The Leader then gets a non-earned group fund of 10 MU. The Leader chooses how much of the group fund to keep as his own salary, and how much to transfer to the Citizen; this transfer represents public goods or other transfers governments make.\footnote{Below we discuss alternative ways of framing the transfer to better approximate public goods provision.} Before the Citizen observes the Leader’s decision, she must make an ex-ante decision rule regarding which levels of transfer she would punish. If the Citizen decides to punish the Leader, she pays 1 MU and 4 MU is removed from the Leader. In previous work we have run experiments with three versions of the Windfall condition: one in which the source of the group fund is not specified; one in which respondents are told it comes from foreign aid; and one in which it comes from oil revenues. The only difference between these treatment is the framing effect caused by identifying the source of the windfall.\footnote{The source treatments are built into the game scripts used by the enumerators as well as illustrated on the game boards used during enumeration. During both training and actual gameplay, enumerators state the revenue source each time the group fund is mentioned. In order to emphasize the treatment, enumerators place the coins representing the group fund on the source tile, and verbally state the source, before moving the group fund to the leader’s tile (See the appendix for two examples of the game boards).}

The Tax game differs only in the first stage of the game. The Citizen’s wage is now 10 MU; she then pays a 5 MU tax that is doubled and passed to the Leader as the 10 MU group fund. The two games are identical after this point: the Citizen has 5 MU remaining, the Leader has the 10 MU group fund, and the strategic decisions are the same as in the Windfall games. Thus, any difference in gameplay must be a function of taxation.

In both the Tax and Windfall games, if the Citizen receives no expressive benefit for punishment, the unique subgame-perfect Nash equilibrium occurs when the Leader offers 0 MU to the Citizen who does not sanction the Leader (see Appendix). Thus, punishment is an expressive
Stage | Direct Tax Game | Windfall game
--- | --- | ---
1 | The citizen is given a wage of 10 MU. | The citizen is given 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 5 MU between himself and the Citizen. |  
4 | The Citizen observes the Leader's decision and decides whether to pay 1 MU to have enumerators remove 4 MU from the Leader. |  

Table 7: Timing of Original Direct Tax and Windfall 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. The unspecified grant, aid and oil conditions are all subsets of what we term the “Windfall” game.

action rather than economically rational. This feature of the game is critical: because punishment is never economically rational, differences in how Citizens punish Leader transfers across the Direct Tax and Windfall game can only be driven by changes in the expressive benefit of punishment.

Martin (2014) and de la Cuesta et al (2016) use data from Ghana and Uganda to show that, in these baseline games, citizens' willingness to punish is significantly higher in the Direct Tax game relative to the Windfall game.  

B.1.2 VAT Modification

Since VAT is levied on purchases, testing the effect of direct versus indirect taxes requires the addition of a purchasing phase of the game. To avoid conflating the effect of purchasing from the effect of paying VAT, we also add a purchasing phase to the Direct Tax and Windfall treatments. In each round, respondents choose one of four real items to buy: soap, posho, sugar and rice. These items were extensively pre-tested, and are all staple items that most households buy. Piloting revealed that respondents have extremely accurate priors on the true market price of these goods, and that the market prices varies minimally or not at all across Kampala. All items are worth the equivalent of 5 MU (approximately 500 shillings) in actual markets and shops in Kampala. This yields a modified version of the basic Martin game in which subjects purchase a good regardless of their treatment condition. This modified game is given in Table 8 below. Note that the Citizen

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33 Additional games in Martin (2014) suggest that the mechanism is loss aversion, rather than the proposed alternative of fairness norms. This test uses third-party punishment games, which are often used to differentiate between fairness norms and loss aversion.
purchases a real item that they take home with them at the end of the game; in the next section
we discuss the purchasing phase in more detail.

The VAT treatments are designed to test the two primary mechanisms thought to differentiate value-added taxes from direct taxation: loss aversion and visibility. The loss aversion mechanism is tested through the introduction of purchasing, while the visibility mechanism is tested by varying the Citizen’s knowledge of the amount paid in tax and the extent to which the group fund comes from taxes. Table 9 breaks down how much each player has at each stage of the game, for the different treatments.

**Direct Tax and Windfall.** These treatments are identical to those in the Basic games, except for the initial phase. Now the Citizen’s wage is 15 MU (not 10) in the Direct Tax game, and 10 MU (not 5) in the Windfall game. In both conditions, the Citizen gets her wage, then pays 5 MU to purchase a small item. Stages 3-5 of each treatment are unchanged from the Basic games.

**Visible and Hidden VAT.** In both VAT conditions, the Citizen receives a wage of 15 MU. She then purchases a small item for 10 MU. Of that 10 MU, 5 MU represents the base cost of the item, and 5 MU is the VAT. For both VAT conditions, Stages 4 and 5 are identical to the Direct Tax and Windfall conditions. The only difference between the two VAT treatments is the way the tax is handled in Stage 3.

In the Hidden VAT condition, the Citizen buys the good, and the 10 MU paid is placed on a “shop” tile on the gameboard. Subjects are told during group training that half of the cost of the good is a VAT, and that the group fund over which allocation occurs is built from this tax. In the one-on-one example, subjects (both Citizens and Leaders) are also told that the group fund comes from tax money.

In the Visible VAT condition, the Citizen is told only the final price of the good and that there is a tax; they are never told the exact amount of the tax. Moreover, the connection between the group fund and the tax is made explicit only in the group training and not in the one-on-one example that all subjects receive before actual play begins. After the group training the tax is levied much as it is outside the lab: Citizens know they pay a tax but they do not know the exact amount, and its connection to the group fund (government budget) is obscured. In both Hidden
### Table 8: Timing of VAT treatment with Simulated Purchasing

Note that in the and Visible VAT treatments, the mechanics of the game are identical but the Citizen’s knowledge of the size of the tax and its connection to the group fund differs. In the Visible Hidden condition, the connection between the tax and the group fund is made only in the group training and the size of the tax is obscured; Citizens know only that they pay a tax and the final cost of the good is 10 MU. In the Hidden condition Citizens know the size of the tax and the connection between it and the group fund is made in a one-on-one example in addition to the group training.

<table>
<thead>
<tr>
<th><strong>Direct Tax</strong></th>
<th><strong>VAT (and Visible)</strong></th>
<th><strong>Windfall</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Citizen gets wage of 15 MU.</td>
<td>Citizen gets wage of 15 MU.</td>
<td>Citizen gets wage of 10 MU.</td>
</tr>
<tr>
<td>Citizen pays 5 MU for a small item.</td>
<td>Citizen pays 10 MU for a small item.</td>
<td>Citizen pays 5 MU for a small item.</td>
</tr>
<tr>
<td>Citizen pays 5 MU direct tax, which is doubled and given to Leader as group fund.</td>
<td>Citizen pays 5 MU VAT to shop. Leader gets group fund of 10 MU.</td>
<td>Leader gets group fund of 10 MU.</td>
</tr>
<tr>
<td>Leader decides how to allocate the 10 MU group fund.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Citizen decides whether to pay 1 MU to fine the Leader 4 MU.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
and Visible VAT, Leaders have full information about the source of the government budget and the size of the tax.

The key difference between the Visible and Hidden VAT treatments is that of visibility: in the Hidden VAT game, subjects are told the amount of the tax implicitly because they receive information about both total cost of the good and the relative percentage of the tax (50% of the total cost). In the Visible VAT treatment they are told only the total cost of the good and that there is a tax. Because the base price of all goods is the market price, they can (but may not necessarily) infer the size of the tax. To control for such inferences, our post-game survey includes measures of respondents’ beliefs about the true market price of each good, and about the amount of VAT they are paying in the game. The Visible VAT is thus designed to imitate as closely as possible the general equilibrium phase of VAT in which citizens are aware of they pay a tax but are forced to infer a good’s "true price"—and thus the effective amount of taxation—based on their priors about what the good cost previously.

The second way in which visibility is altered across the games is the degree to which the connection is made between the taxes a citizen pays and the group fund that the Leader receives. In the Direct Tax condition, citizens see real coins taken as a tax on their wage and transferred directly to the group fund, which is then given to the Leader. Thus, the link between taxes and the government’s budget is clear. This replicates what actually happens when a citizen pays income or property taxes. In the two VAT conditions, this link is less obvious, again matching the real-world situation in which a citizen pays VAT as part of a purchase, but never sees that money transmitted to the government. The Visible and Hidden VAT treatments both obscure this connection to some extent; the ly Hidden VAT still tells the citizen that the group fund comes in part from the taxes they paid on goods, (although the citizen does not observe this process), while in the Visible VAT the citizen is aware that the group fund is from taxes, but is not explicitly told whether there is a connection between the tax they paid on the good and said budget.

Note that, as in the base games presented above, the Windfall game will have variants in which the group fund also comes from aid and oil. This yields three non-tax versions of the game and 6 total treatment conditions: Direct Tax, Visible VAT, Hidden VAT, and our three non-Tax conditions, collectively referred to as the Windfall game. To preserve power for analysis of the VAT
Table 9: Citizen Endowments. Each cell shows the total endowment possessed by Citizens at each stage of each revenue treatment prior to decision-making. The goal of the design is that Citizens should have identical final endowments in Stage 3 (i.e. before the Leader makes his allocation) despite differences in the initial endowment. Differences between the Direct Tax and VAT games in Stage 2 are driven by the VAT paid on the purchase. This difference is equalized in Stage 3 when subjects in the Direct Tax game are forced to pay a direct tax of 5 MU on their wages.

and Direct Tax games, the three non-tax conditions will together be allocated the same portion of the sample as the remaining 3 treatments. The difference in the starting wages across the conditions are driven by the need to assess a tax either during purchasing (Visible and Hidden VAT) or on Citizen wages (Direct Tax). The higher starting salaries for these conditions ensure that at the allocation stage of the game all subjects have equivalent amounts of remaining resources. Table 9 gives an overview of the endowments possessed by both Citizens and Leaders at each stage of the game in our three main treatment conditions.

One of the key theoretical explanations for why indirect taxation might work differently is that direct taxes provide no immediate compensation—whatever public goods are provided using this money are realized only years after the tax is paid, if at all. Indirect taxation such as VAT, however, occurs at the time of purchase, giving rise to the possibility that the disutility from paying the tax is either partially or completely offset by the purchase. This dynamic implies differential subjective utility after the purchasing decision, and is one of the key theoretical differences between direct and indirect taxation.

Whether citizens actually experience differential utility is an empirical question, however, and as such it is necessary to measure utility as precisely as possible. To measure subjective utility, we intend to use a “utility ladder” to capture participants’ subjective utility at four distinct points in the game. We set the citizen’s reference point mid-way up the ladder when the wage for the round
is received. We then ask the citizen to update their ladder (1) once the citizen purchases a good, (2) when the leader is given the group fund, (3) after the Citizen observes the Leader’s allocation, and (4) at the end of the round (e.g. after any punishment has occurred and final payouts realized). The utility ladder is included below in Figure 2. The ladder is a 21-point scale ranging from 0 to 20. At the beginning of the round, subjects are anchored at a value of ten by the enumerator. The explanation script is as follows:

Now, this is a picture of a ladder with 21 rungs. Someone at the bottom rung is very unhappy or not well off. Someone at the top rung is very happy or well off. Now, suppose that after you get your wage, you are here at rung 10.

After the Citizen observes the Leader’s allocation, he is asked the following:

Now that you have seen the Leader’s decision, where are you on the ladder?

This version of the utility ladder was run in Uganda in a prior experiment. Our analysis indicates that subjects’ ladder position increases monotonically (in an approximately linear fashion) with the Leader’s transfer. It is also responsive to taxation: once the size of the transfer was controlled for, Citizens in the tax condition had lower ladder values than those in the non-tax condition. Finally, it is able to pick up psychological benefits from punishment.
B.2 Implementation

B.2.1 Subjects

Within each game session, we randomly assign subjects to the role of Citizen or Leader at a ratio of 3 Citizens per Leader. In the first round, each Citizen is randomly assigned to a play with a Leader, resulting in three Citizen-Leader pairs for each round. During the game, each citizen receives the transfer decided by the Leader to whom he or she is assigned. Leaders thus make transfer decisions for each Citizen separately. In each subsequent round, the subjects’ roles remain the same, but Citizen-Leader pairs are re-randomized. Citizens never play with the same Leader two rounds in a row. Though Citizens may be paired with the same Leader more than once throughout the activity, neither Citizens nor Leaders know in any given round whether they have played with their counterpart in earlier rounds. The randomization algorithm used to generate Citizen-Leader pairs also minimized the average number of repeated pairings.

B.2.2 Sampling

Enumeration was conducted at field sites located in high-density, lower-income areas around Kampala. Each day, a local political (“LC1”) unit was identified by the enumerators for mobilization. A convenience sample was then recruited from the LC1 unit. Because of natural attrition and no-shows, recruiters were instructed to obtain 20 confirmed attendees for each session of 16. Subjects were recruited one day prior to their participation and told which session to attend. Based on the results in Martin (2014), we only recruited participants who were age 20 and older, as these respondents are more likely to have exposure to taxation and to understand the political nature of the games. Our target sample is 1152 respondents, consisting of 864 Citizens and 288 Leaders.

B.2.3 Outcomes of Interest

Game Outcomes. Our key outcome of interest is the smallest transfer made by the Leader at which the Citizen will not punish the leader. This quantity represents what the subject
considers the acceptable transfer, and thus by extension the acceptable level of rent-seeking from the Leader. Because Leader transfers below this threshold will result in punishment, which is costly for the Citizen, higher average thresholds represent a greater willingness to punish rent-seeking. If the visibility hypothesis is true, we should observe higher thresholds in the Visible VAT condition relative to the Hidden VAT condition.

**Debrief Questions.** In addition to the game, subjects are administered a short survey after the completion of the 8 rounds. Included in this questionnaire is an open-ended debrief question that is hand-written and an additional set of close-ended questions that ask the degree to which the respondent agrees several statements about motivations for playing the game. Subjects received slightly different version of the close-ended question depending on whether they were citizens or leaders. Leaders were asked how important each of the following were in determining how they set transfers to the Citizen:

1. Whether the money was split fairly
2. Whether the citizen(s) had enough money
3. How much money [the Leader] was earning
4. Whether or not [the Leader] would get punished
5. Whether payouts were equal

Citizens got a similar battery with one exception: certain items were contingent on the treatment condition. These items were as follows:

1. Whether the group fund was split fairly
2. Whether the leader passed back enough money for me and my community
3. Whether payouts were equal
4. How much money I was earning
5. Getting back some of the money I’d lost in taxes (*Tax Source*)
6. Whether I would lose money in punishment
7. Whether the Leader had enough remaining for his responsibilities

Citizens also received two additional questions to gauge their degree of ownership over the group fund. The answer options were a 10-point Likert scale. The questions read:
1. How much do you agree with the following statement: I feel strong ownership over the group fund.

2. How much do you agree or disagree with the following statement. The group fund belongs to me.

We expect that, averaging across conditions, ownership will be higher for Citizens in both the direct and indirect tax treatments relative to those in the Windfall condition. We expect further that ownership will be highest where the connection between the tax and the group fund is most explicit—in other words, in the Direct Tax condition.

**Manipulation Check.** Subjects also received a manipulation check that asked them the source from which the group fund in the game was derived. Enumerators were instructed not to read any of the answer options and to select the source reported by the subject. Answers were then coded as correct or incorrect *ex post*. Their primary purpose will be to make sure that a potential null result is not driven by poor comprehension.

**Utility Ladder.** The utility ladder will serve as both a manipulation check and as a dependent variable in its own right. Because the utility ladder is sensitive to the size of transfers from the Leader, it should behave in predictable ways that allow us to evaluate whether subjects correctly understood the game. The ladder will also be used in tests of the loss aversion mechanism. Our theoretical framework predicts that the VAT treatments should not activate the loss aversion behavior that is present in the Direct Tax arm. The implication is that subjects in the VAT conditions should have higher ladder measurements at the same measurement point.

### B.3 Game Boards
Figure 3: Example Game Board, Oil as Source. After giving the Citizen his or her wages for the round, the enumerator places the coins representing the group fund on the source condition—oil in this case—and then moves the group fund to the Leader’s tile. For the tax condition, the enumerator removes 2.5 MU from the Citizen and then doubles it to create the group fund. In the unspecified grant condition the graphic for the upper right tile (the source tile) is left blank and titled “Group Fund”.