

PRE-ANALYSIS PLAN: THE ORIGINS OF TAX COMPLIANCE AND STATE CAPACITY †

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Abstract

How do states in a low-tax, low-capacity equilibrium spur citizens to start paying taxes? This pre-analysis plan describes a field experiment embedded in a property tax campaign in Kananga, a large city in the Democratic Republic of Congo (DRC). In collaboration with the Provincial Government of Kasai Central, we randomly assign the city's neighborhoods to central tax collection, conducted by agents of the provincial tax ministry, or local tax collection, conducted by local city chiefs. We also implement two hybrid collection interventions and cross-randomized information treatments to elicit the mechanisms through which central and local tax collection shape citizen compliance. In addition to tax compliance, we examine a range of other outcomes, such as corruption, engagement with the formal state, and the accountability of city chiefs.

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1. Introduction

There is increasing agreement about the role of state capacity in economic development (Acemoglu, 2005; Besley and Persson, 2009; Fukuyama, 2011). In particular, fiscal capacity is deemed essential for states to provide public goods and enforce contracts (Kaldor, 1965; Besley and Persson, 2009). Moreover, higher levels of tax collection can motivate citizens to exert greater effort in participating in politics and holding the government accountable (Levi, 1988; Tilly, 1985; Bates and Lien, 1985). Indeed, recent empirical work shows that fiscal capacity is strongly correlated with inclusive political institutions (Acemoglu, Naidu, Restrepo, and Robinson, 2013; Besley and Persson, 2009, 2011) and long-run growth (Dincecco and Katz, 2016). But how do states trapped in a low-tax, low-capacity equilibrium spur citizens to start paying taxes?

In a seminal contribution, Levi (1988) notes that rulers have different optimal revenue maximization strategies depending on the strength of the state relative to society, the transaction costs of tax collection, and ruler's time horizons. The two classic modes of revenue generation she examines are centralized tax collection, in which rulers deploy and monitor collectors directly, and tax farming, in which rulers empower local elites to collect taxes at a price. Generally, centralized collection is more costly to rulers, but it can lead to higher revenues if a state is sufficiently strong. Local tax farming is cheaper for the ruler, but opens the possibility of mismanagement by local elites. These two modes of tax collection remain viable alternatives for governments around the world today. Although pure tax farming is rare, local elites play a key role in tax collection in many countries, particularly developing ones (Kasara, 2007; Jibao, Prichard, and Van den Boogaard, 2017; Henn, Paler, Prichard, Samii, and de la Sierra, 2017).

This field experiment investigates this classic tradeoff between central and local tax collection in the context of a property tax campaign in Kananga, Democratic Republic of Congo (DRC).¹ In collaboration with the provincial government, we randomly assign neighborhoods of Kananga to different modes of property tax collection. In neighborhoods assigned to central tax collection, agents of the provincial tax ministry conduct a census of taxable houses and collect the property tax. In contrast, in neighborhoods assigned to local tax collection, local bureaucrats known as avenue or locality chiefs are charged with these same tasks. These local chiefs typically act as intermediaries between citizens and the government, and are often well-known and respected individuals who have lived for a long time in the community. This study will thus provide experimental evidence on the effects of deploying central collectors or empowering local elites to collect taxes on citizen tax compliance, as well as other governance outcomes.

Following Levi (1988), as well as a logistics pilot conducted in Kananga, we posit that local and central collectors each have certain natural advantages. We expect that local chiefs have local knowl-

¹The provincial capital of Kasai Central, Kananga has roughly 1 million inhabitants, only 10% of whom paid the property tax in a door-to-door collection campaign in 2016 (Weigel, 2018b).

edge about citizens' ability and willingness to pay –as well as the timing of income shocks– that they can exploit to target potential tax payers more efficiently. Moreover, we expect that local chiefs will be more trusted as tax collectors, thereby activating citizens' intrinsic tax morale. On the other hand, central collectors are likely to be more credible when threatening state sanctions of tax evaders. Central collectors are also easier for the state to monitor –both in terms of overall effort and the pocketing of bribes– relative to local collectors. In short, central and local collection likely trigger citizen tax compliance through different mechanisms.

Two hybrid treatment arms and six cross-randomized information interventions will help us pin down these possible mechanisms (local knowledge, perceived legitimacy, credible threats of punishment, monitoring). First, in neighborhoods assigned to a third hybrid treatment arm, called “Central Plus Local Information,” central tax collectors are charged with the census and tax collection; however, they also have a half-day consultation with the local chief, during which he shares local knowledge about the ability and willingness to pay of households in the neighborhood. If chiefs have a natural informational advantage, this intervention should neutralize it.

Second, if central and local collectors each have certain relative advantages, then under the assumption that these advantages are complementary, teams of central and local collectors working together may lead to the largest increases in tax compliance. A hybrid central-local team should possess the local knowledge of the chief coupled with the credible threat of state punishment from the central collector. A final treatment arm therefore includes neighborhoods assigned to “Central X Local” collection. Neighborhoods in this treatment arm receive a collector team consisting of one central collector and one local chief. We compare all these treatment arms to control neighborhoods in which citizens are informed about the tax but never receive a visit from a collector (the status quo “declarative” property tax system in Kananga used until 2016).

Finally, flyers with randomized tax messages about trust, public goods, and sanctions are delivered to every household in the city before the tax campaign. These information interventions are cross-randomized at the individual level across all tax collection treatment arms. Importantly, we implement two versions of the public goods and sanctions messages in order to tailor them to local and central tax collection. As described in depth below, the interaction of these information treatments and the main collection arms will shed light on mechanisms through which central and local tax collection trigger compliance. The basic logic is that messages will have largest treatment effects when they are credible given the identity of the tax collector. Thus, if we observe a stronger effect of a state ‘sanctions’ message when delivered by central rather than local tax collectors, then we can infer that the threat of punishment for tax evasion is a key channel through which central collectors engender tax compliance among citizens.

This pre-analysis plan (PAP) describes the intended contributions, experimental design, theoretical expectations, and the intended analysis of this study. We conducted a logistics pilot of the campaign in March-April 2018, which led to the hypotheses declared in this document. The campaign began on

June 15 and is due to finish in early December 2018. We anticipate conducting an endline survey from January to March of 2019.

2. Contributions

This study aims to contribute to the literatures on fiscal decentralization, tax compliance, the role of local chiefs in governance in Africa, bureaucratic performance, and local knowledge in state-building.

2.1 Central versus local tax collection

The canonical theory of fiscal federalism states that local governments can provide an optimal mix of taxes and public goods (Tiebout, 1956; Oates, 1999). According to this theory, interjurisdictional competition is efficient, promoting economic growth (Weingast, 1995). A second wave of studies showed that the assumptions of these models were too restrictive and did not necessarily apply to the developing world. In reality, elite capture of local governments (Bardhan, 2002), soft budget constraints (Rodden, 2006), the lack of a clear demarcation of authority (Liesbet and Gary, 2003), and perverse political incentives (Ardanaz, Leiras, and Tommasi, 2014) demonstrate that decentralization is no panacea.

A crucial dimension of decentralization is who collects taxes. Indeed, a fundamental decision facing governments is whether to deploy their agents to enforce tax collection or to farm out tax collection to local elites. States have faced this tradeoff throughout history (Levi, 1988). Most premodern states also relied heavily on indirect forms of local tax collection, such as tax farming. The main advantage of this technique was that it provided rules with a predictable flow of revenue (Kiser and Karceski, 2017). Because tax agents are residual claimants, tax farming is thought to be efficient (Kiser, 1994). For this reason, tax farming has been proposed as a cost-effective alternative to a centralized tax system (Azabou and Nugent, 1988). However, critics have pointed out that it can lead to overzealous taxation, increasing the need for monitoring, to prevent abuse (Stella, 1993).

In the 21st century, many states—especially low-capacity states—continue to experiment with models of local tax collection in which chiefs and other local elites play a central role (Kasara, 2007; Baldwin, 2015; Jibao, Prichard, and Van den Boogaard, 2017). To date, however, there is little quantitative evidence on when central collection is likely to outperform local collection, and vice versa, as well as over implications for local and central governance outcomes. Khan, Khwaja, and Olken (2015) experimentally vary contracts of tax collectors in Pakistan and find that a tax-farming contract boosts revenues but also increases bribes. However, they do not vary the extent to which central state agents or local elites are charged with tax collection.

To the best of our knowledge, our study will provide the first experimental evidence on this tradeoff between local and central tax collection. Unlike Khan, Khwaja, and Olken (2015), we hold constant the incentives of tax collectors: both types of collectors receive bonuses based on their deposits to the

state account.² Instead, in collaboration with the provincial authorities in Kasai Central, we randomly vary whether neighborhoods receive door-to-door tax visits by agents of the provincial tax ministry or local city chiefs. The reduced-form effect of central and local tax collection on compliance is of theoretical interest given the salience of this tradeoff facing governments throughout history. Moreover, it contributes to a growing literature about the role of local, informal agents in performing services often associated with the formal state in developing countries (Lund, 2006; Cheema, Khwaja, and Qadir, 2006; Binzel, Field, and Pande, 2013; Lust and Rakner, 2018).³ Finally, it is of policy importance for low-capacity states seeking to boost their tax take.

The study will also explore why citizens pay taxes in local and central tax collection arms, which will yield insights about the determinants of tax compliance in a low-capacity state.

2.2 Tax compliance in a low-capacity state

According to standard theories, a taxpayer's decision to evade is determined by the probability of detection, the magnitude of the punishment, and the tax rate (Allingham and Sandmo, 1972). Given that the probability of audits conditional on evasion is typically low, this model predicts low compliance. In contrast, empirical evidence shows that compliance is higher relative to the predictions of workhorse models (Alm, 1999; Torgler, 2002). Different explanations have been proposed for this discrepancy. In particular, some contributions introduce intrinsic motivation or "tax morale" (Traxler, 2010; Frey and Torgler, 2007) and provide evidence that tax compliance is a complex decision involving trust in state institutions, expectations of future public goods provision, and perceptions of corruption (Fjeldstad and Semboja, 2001; Tyler, 2006; Luttmer and Singhal, 2014).

Recent empirical work examines several parameters determining tax compliance. A well-established finding is that an increase in the probability of audits reduces evasion (Pomeranz, 2015; Carrillo, Pomeranz, and Singhal, 2017; Kleven, Knudsen, Kreiner, Pedersen, and Saez, 2011; Blumenthal, Christian, Slemrod, and Smith, 2001). Scartascini and Castro (2007) study the effectiveness of different information treatments: deterrence, public good provision, and equity. Drago, Mengel, and Traxler (2015) find that the effect of letters about tax compliance to potential evaders spills over onto untreated neighbors when treated subjects have higher network centrality. Hallsworth, List, Metcalfe, and Vlaev (2017) modify different features of tax morale messages and find that those referring to local norms—rather than to general norms— elicit higher compliance. Carrillo, Pomeranz, and Singhal (2017) find that third-party reporting for firm income reduces tax evasion. Perez-Truglia and Troiano (2015) implement

²All collectors in the study have contracts analogous to those in Khan, Khwaja, and Olken (2015), in which collectors receive as a bonus a percentage of the funds they deposit to the state account. Such performance-based pay is how the provincial tax ministry in Kananga has typically paid its agents.

³Specifically, in the developing world, taxation and public good provision are often overseen by a mix of state and non-state actors. Highlighting the importance of embedded local actors in fulfilling such functions (usually assumed to be the purview of the formal state), Lust and Rakner (2018) characterize this exchange as "social extraction". In their terminology, our treatment arms could thus be seen as different types of "social extraction".

a “shaming” treatment that emphasizes the online visibility of debtors and find that it increases the probability of repayment only among holders of small debts.

Our study will advance this literature by examining the mechanisms through which local and central tax collection generate compliance among citizens. Varying the identity of tax collectors changes a number of parameters in the citizen’s decision to pay or evade taxes. As noted above, central collectors are more strongly associated with the state and thus might represent a more credible threat of punishment. On the other hand, local collectors may be more trusted by citizens and thus may more easily activate their tax morale. Local collectors also may have knowledge about the ability and willingness to pay of individuals in their neighborhood that they can exploit to collect more efficiently.⁴

We seek to pin down these mechanisms in two ways. First, the Central Plus Local Information treatment arm neutralizes the informational advantage of local chiefs in tax collection, enabling us to estimate the importance of local information in citizens’ decisions to pay in neighborhoods assigned to Local. Second, the Central X Local treatment will reveal if the proposed advantages of each collector type are complementary or not, which lets us test a number of hypotheses about the mechanisms (see section 6.1).

Second, we implement tax messaging flyers with a key innovation: our messages are tailored to aspects of local and central government capacity. We distribute a local and a central version of the standard deterrence message, reminding taxpayers of the penalties they face if they do not pay taxes. The central deterrence message emphasizes punishment in state courts, while the local message emphasizes punishment by the chief.⁵ Comparing the interactions of these messages with the tax treatments will not only provide information about the mechanisms in the main experiment, but also contribute to the broader tax morale literature: small or non-existent effects on previous such treatments could reflect a mismatch between the type of punishment mentioned on tax notices and the means of enforcement or collection. Similarly, we have a local and central public goods messages to evaluate the “fiscal exchange” motivation to pay taxes (Fjeldstad and Semboja, 2001). Finally, to assess if indeed chiefs have higher legitimacy in the eyes of citizens, and this makes them more effective collectors, we implement a flyer reminding citizens that paying taxes is a way of demonstrating trust in the state.

2.3 The role of chiefs in African governance

This study also contributes to a growing literature on the role of local chiefs in governance in Sub-Saharan Africa. Modern African states evolved according to a bargaining process between colonizers and local chiefs (Boone, 2003). Contrary to the predictions of modernization theory, the power of

⁴Particularly if there is a bargaining component to tax collection, as modeled in Khan, Khwaja, and Olken (2015), local knowledge about income shocks may increase the bargaining power of the collector relative to central collectors who likely lack such knowledge.

⁵This is similar in spirit to Hallsworth, List, Metcalfe, and Vlaev (2017), who employ messages containing “general” and “local” norms, finding that the latter are more effective

traditional chiefs has not diminished over time (Baldwin, 2015). A key reason is that chiefs can act as brokers for politicians seeking to build coalitions (Baldwin, 2015) and continue to influence the allocation and use of land in many settings (Goldstein and Udry, 2008; Honig, 2017). Traditional chiefs can also capture local institutions and at times undermine development (Acemoglu, Reed, and Robinson, 2014).

The tax campaign in Kananga does not involve traditional village chiefs but rather city chiefs –an important, if understudied, set of actors in urban Africa. Particularly in Francophone countries, much of local city governance is conducted by bourgmestres, quartier chiefs, locality chiefs, and avenue chiefs. These chiefs are technically local bureaucrats, answerable to the city’s mayor and provincial governor. But, in Kananga (and elsewhere), they are appointed for life, and at times the position passes from parent to child. Individuals are appointed only if they have already lived for an extended period of time and are highly regarded in the neighborhood that they would govern. The positions thus confer social status. Moreover, city chiefs perform many duties that customary chiefs perform in rural areas, such as the organization of weekly communal work (known as *Salongo*), as well as local dispute resolution. City chiefs are therefore analogous to customary chiefs in several key respects, yet they have received little attention in the academic literatures on governance and state capacity.

Beyond measuring the effectiveness of city chiefs as property tax collectors, our study will estimate how tax collection impacts citizens’ views of and engagement with these chiefs. Are city chiefs seen as more powerful potential advocates of the neighborhood after they are charged with tax responsibilities? Do citizens exert more effort to try to hold chiefs to account for the money they have collected in taxes? Do citizens demand more services from chiefs after tax collection? More specifically, does the devolution of tax collection responsibility to chiefs lead citizens to shift certain demands of the central state (e.g. conflict resolution at the state courts) toward local chiefs instead? Finally, we will estimate how tax collection impacts the chiefs themselves. Do they become less accountable to their constituents when working more directly for the state, as Mamdani (1996) might argue? Or do they become more vital advocates for their constituents when charged with local tax collection, consistent with classic theories about the origins of accountable government (Schumpeter, 1918; Tilly, 1985)?

2.4 Bureaucratic performance

There is growing interest in the role of bureaucrats in explaining key governance and development outcomes (Evans, 1995; Kohli, 2004). Across countries, the presence of professional — “Weberian” — bureaucracies is positively correlated with economic growth (Evans and Rauch, 1999). A growing literature focuses on the determinants of bureaucratic performance at the micro level.

Most studies focus on the role of financial incentives. For instance, Dal Bó, Finan, and Rossi (2013) show that higher wages attract higher quality applicants. Financial incentives and monitoring have been shown to play a role in reducing corruption (Di Tella and Schargrodsky, 2003) and teacher

absenteeism (Duflo, Hanna, and Ryan, 2012). However, these interventions may only have short-term effects or cause other unintended consequences when bureaucracies are embedded in dysfunctional political structures (Banerjee, Duflo, and Glennerster, 2008; Dhaliwal and Hanna, 2017). As noted, Khan, Khwaja, and Olken (2015) find that a performance-based bonus system for tax collectors increases revenues but also increases collusion.

Non-financial incentives can also affect bureaucrat behavior. Greater autonomy for bureaucrats, not more powerful incentives, increased project completion in Nigeria (Rasul and Rogger, 2018). Another experiment in Nigeria notes the importance of social recognition (Gauri, Jamison, Mazar, Ozier, Raha, and Saleh, 2018).

A smaller literature examines how personal characteristics of bureaucrats affect outcomes (Rogger, 2017). Hanna and Wang (2017) show that individuals who are more likely to cheat have a preference for public sector jobs and are actually more corrupt on the job. Callen, Gulzar, Hasanain, Khan, and Rezaee (2015) show that bureaucrat performance is predicted by personality traits.

Our study contributes to these literatures on several fronts. First, it studies which individual characteristics of tax collectors make them more effective. We will not focus on this aspect of the study in this document, as the hypotheses, data collection, and estimation approaches have already been described in the pre-analysis plan for Weigel (2018a).⁶

Second, it studies the effects of the experience of collecting taxes on the behavior and attitudes of tax collectors themselves. We noted this in the previous section regarding chief collectors, but we will also explore the effects of tax collection on central tax collectors. Tax collection empowers individuals in charge of it, potentially increasing their identification with state authority and changing their behavior vis à vis citizens. Bureaucrats who collect taxes might thus be expected to become less accountable to citizens. On the other hand, collecting taxes makes salient the quid pro quo social contract at the root of government and could lead bureaucrats to feel more accountable to their citizens, particularly if the citizens begin to participate more in the government as a result. Our study will provide evidence on this question by collecting data on bureaucrat performance after the tax campaign.

2.5 Citizen legibility and state building

States need information about their subjects. As Scott (1998) argued, state control of society requires simplification, legibility, and manipulation. Basic state functions such as coercion and taxation require the production and processing of information about assets and people. Early modern states “were confronted, in effect, with a patchwork of local measurement codes, each of which had to be cracked [...] they represented a mind-boggling problem for statecraft” (Scott, 1998, p. 29).

The information capacity of modern states — as measured by the presence of census, statistical

⁶ Available: <https://www.socialscisearch.org/docs/analysisplan/974/document>. See Section 6 on this topic. We will pool data with that collected from the 2016 tax campaign studied in Weigel (2018a).

agencies, and statistical yearbooks — has been progressively expanding over time (Brambor, Goenaga, Lindvall, and Teorell, 2016). Recent studies document the effect of legibility on other dimensions of state capacity. Lee and Zhang (2017) operationalize legibility as the accuracy of national censuses and find that higher legibility predicts higher taxation. D’Arcy and Nistotskaya (2017) show that states that introduced extensive cadastral registration of land in the early modern period developed higher levels of fiscal capacity. Casaburi and Troiano (2015) show that diffusion of satellite detection of unregistered properties increases property registration and government revenue. In a randomized experiment, Muralidharan, Niehaus, and Sukhtankar (2016) show that a biometric authentication system increases the efficiency of state welfare programs in India.

We contribute to this literature by experimentally examining how rendering citizens more legible to tax collectors increases their tax compliance. Specifically, in the Central Plus Local Information arm, we examine whether detailed local information about the perceived willingness to pay of individual households enhances the ability of tax collectors to collect taxes. We hypothesize that this increase in legibility will enhance the state’s ability to raise revenues. In other words, rather than assuming local knowledge and state information are substitutes, we expect that in this context they can be complements.

3. Research design

3.1 Treatment arms

3.1.1 Mode of tax collection

The mode of tax collection is randomized at the neighborhood level among the following five treatments. In all treatment neighborhoods (not control), a set of agents completes two tasks. First, they go door to door conducting a census and information campaign, during which they map all properties in the neighborhood and inform households the rate they are supposed to pay for the property tax. They also give them a flyer that contains some of this information (discussed in section 3.1.2). If the household can pay taxes during the census visit, they also collect taxes on the spot, issuing receipts with a handheld receipt printer. Otherwise, they complete the second step, which is to return for tax collection according to appointments made with households during the census visit (or just making additional fly-by visits).

The main tax collection treatments vary the identity of the tax collectors who are supposed to complete these steps. While the identity of collectors varies, the training, equipment, and incentives of collectors is held constant.

T1. Central tax collection (C): Agents of the provincial tax ministry (DGRKOC) complete all steps of the property tax campaign (census and tax collection). This treatment arm is similar to

that implemented in [Weigel \(2018a\)](#). Collectors work in teams of two and each team is assigned to two neighborhoods per month. Every month collectors are re-randomized in teams of two.

T2. Local tax collection (L): Local chiefs complete the steps of the campaign. These chiefs act as intermediaries between citizens and the government and can be thought of as the bottom link in the chain of the city-level government bureaucracy. They are typically in charge of: (1) organizing and enforcing weekly public good provision (*Salongo*), (2) communicating citizens’ grievances to government authorities, and (3) mediating in local disputes. This position is appointed for life to an individual who already lives in the neighborhood. Often, it is given to an individual who is well-known in the neighborhood. To make treatments comparable, each chief is asked to pick an assistant, so each neighborhood assigned to local taxation is visited by a team of two.

T3. Central X Local (CXL): Central and local collectors complete all steps of the campaign together. Central collectors are re-randomized to selected chiefs each month.

T4. Central Plus Local Information (CLI): This arm is identical to the central tax collection treatment, except that, after completing the census, the central collectors meet with the avenue chief in the neighborhood to transfer knowledge about the capacity and willingness to pay of all individuals in that neighborhood. As will be specified in Section 6, the purpose of this treatment is to adjudicate between possible mechanisms. One prominent explanation of observed differences between treatment arms is that chiefs have more local information than central collectors. For instance, they might be able to identify low and high compliance types and thus target their effort more efficiently. Alternatively, they might have substantive knowledge about individuals that they can employ to have more bargaining power to convince them to pay. If the effect of this treatment arm is indistinguishable from the combined treatment, this is indicative that the advantage of chiefs is purely informational.

T5. Control: In a small number of neighborhoods, individuals are supposed to pay themselves at the tax ministry (the old system up to 2016). Two agents from the tax ministry visit each household in these neighborhoods, conducting a census that is identical to that administered in treatment neighborhoods except that individuals are informed they should pay at the tax ministry rather than pay collectors themselves.

Table 1 below shows the allocation of neighborhoods across treatments as well as the estimated number of property owners based on data from ([Weigel, 2018a](#)).

Table 1: Treatment allocation

Treatment	Central	Local	CXL	CLI	Control
J (Neighborhoods)	110	110	51	80	5
N (Households)	15,255	14,846	6,846	10,175	832

3.1.2 Information treatments

We cross-randomize six information treatments contained in flyers that are distributed and read out loud by tax collectors during the census stage of the tax campaign. The flyers provide basic information about the tax campaign, including the compound number, the compound-specific tax rate for the year, to whom the tax should be paid (central or local tax collector, or either). In addition, the flyers contain messages that may influence citizens' compliance decisions.

We implement two deterrence messages, two fiscal exchange (public goods) messages, one trust message, and one control message:

I1. Central deterrence. The central version says that refusal to pay the property tax entails the possibility of audit and investigation by the provincial tax ministry.

I2. Local deterrence. The local version of the deterrence message says that refusal to pay the property tax entails the possibility of audit and investigation by the neighborhood chief (*chef de quartier*). Note that this is a higher-rank chief relative to those who are collecting taxes in Local neighborhoods.

I3. Central public goods. The central version of the flyer says that the provincial government will be able to improve infrastructure in the city of Kananga only if citizens pay the property tax.

I4. Local public goods. The local version of the flyer is exactly the same, except that it mentions each citizens' locality instead of Kananga.⁷

I5. Trust. The trust message reminds citizens that paying the property tax is a way of showing that they trust the state and its agents.

I6. Control. The final flyer is the control. It simply says: "It is important to pay the property tax."

In all neighborhoods, we distribute flyers containing each of these messages, randomized at the individual level. Tax collectors distribute and read aloud the flyers during the census stage of the campaign. The flyers are in French (spoken by everyone with some schooling) and Tshiluba (the most widely spoken local language).

The reason why we have a central and local version of the deterrence and public goods messages is that we have different hypotheses for how these messages will interact with central and local tax collection. These interactions will help us study the mechanisms behind any observed differences in the main tax collection treatments. We discuss this in depth in Section 6.

⁷Localities are the smallest administrative unit in Kananga. The neighborhoods (polygons on a satellite map of the city) used for randomization are roughly analogous to localities.

Finally, there is one last cross-randomized element of the flyers: on randomly selected flyers a copy of the receipt appears along with a phrase noting that the payer should receive a printed receipt. On other flyers, there is no copy of the receipt nor mention of the printed receipts. We will use this treatment to measure whether information about the receipts enables citizens to hold tax collectors accountable to following the protocol of the campaign, including the issuance of printed receipts, as a means to reduce corruption. Figure 1 shows the local public goods flyer and Figure 6 in the Appendix shows all the flyers.

Figure 1: Sample flyer: Local public goods for the Lumpungu locality



REPUBLIQUE DEMOCRATIQUE DU CONGO
PROVINCE DU KASAÏ OCCIDENTAL
DIRECTION GENERALE DES RECETTES DU KASAÏ OCCIDENTAL
DGRKOC



Le Gouvernement de Kasai Central lance la campagne de collecte de l'Impôt Foncier 2018.

La parcelle, No. 208005,

appartenant à _____,

est assujettie à un taux de : 3000 FC*

à payer au percepteur de la DGRKOC une fois par année.
Comme preuve de paiement, vous recevrez un reçu imprimé sur place (voir l'exemple à droite).

Rappelez-vous :

Le Gouvernement Provincial pourra améliorer les infrastructures publiques à Lumpungu seulement si ses résidents paient l'impôt foncier

DIRECTION GENERALE DES RECETTES DU KASAÏ CENTRAL

RÉPUBLIQUE DÉMOCRATIQUE DU CONGO
KANANGA

IMPOT SUR LA SUPERFICIE DES PROPRIÉTÉS FONCIERES
BATIES ET NON BATIES

Premiere Copie
Date et Heure : 22-FEB-2018 11 :54 :35
No : KGA2018020000000001-0000016

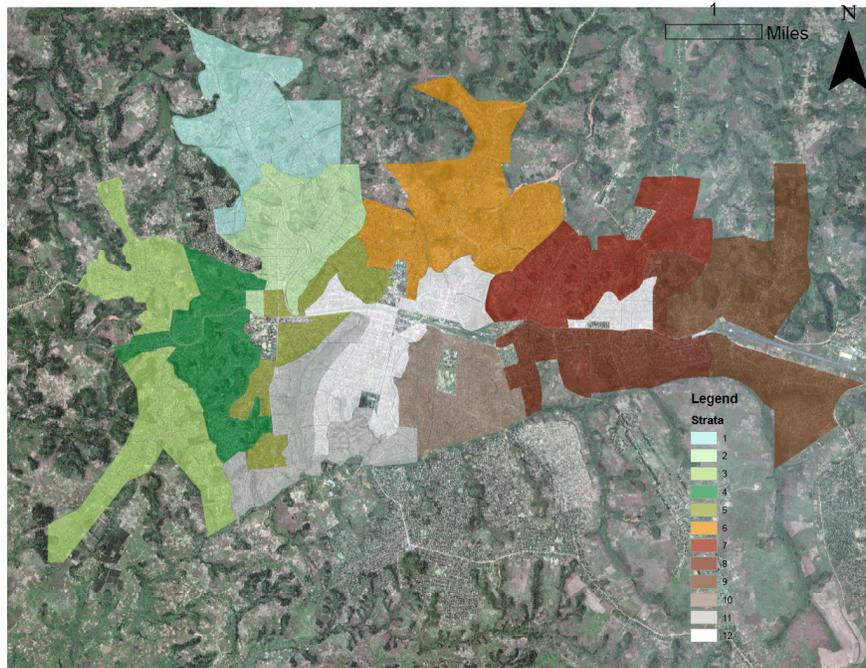
Nom du contribuable : Mutombo
Dikembe Jean-Jacques
Licence d'Exploitation : 202005

<small>Type de taxe :</small>	<small>Perif 3.000</small>
<small>Unite :</small>	<small>Terrain</small>
<small>Quantite/Base :</small>	<small>1</small>
<small>Taux :</small>	<small>1.5</small>
<small>Montant (CDF) :</small>	<small>3000</small>
<small>Nom de l'agent : Kabeya Kabeya Jean (KN20180000000000)</small>	

3.1.3 Logistics pilot

A logistics pilot was conducted in March-April 2018. The pilot had two main goals. First, we wanted to make sure that avenue chiefs –who are often older and less skilled with technology– would be able to work with the handheld receipt printers used on the tax campaign. Second, we wanted to test and optimize the informational flyers that would be distributed during the census visits. The pilot was conducted in eight city polygons in Kamilabi, a remote neighborhood in northwest Kananga. This neighborhood was selected strategically due to its isolated location to minimize potential informational spillovers.

Figure 3: Geographic strata



2. Treatment status in the 2016 tax campaign: This is a dummy capturing whether the neighborhood had been assigned to treatment in the 2016 tax campaign, studied in [Weigel \(2018a\)](#).

3. Past experience of local chiefs collecting taxes: We create temporary strata based on the two variables above and, for each of these, find the median proportion of chiefs (ranked 1-5 according to the chief selection procedure) per neighborhood who ever collected taxes and split each temporary stratum into two additional substrata around the median.

Using data from the baseline survey and [Weigel \(2018a\)](#), we conducted a balance check on the following set of variables: 1) average highest level of education of respondents in a neighborhood, 2) percentage of houses affected by a ravine, 3) percentage of houses with walls in good condition (above the median), 4) whether citizens know the name of their avenue chief, 5) the perceived degree of responsiveness of the local chief, 6) the percentage of houses that paid taxes in the 2016 campaign, 7) whether a neighborhood has been affected by the conflict in the Kasai region, and 8) the number of chiefs per neighborhood (among the top five chiefs according to the ranking described in section 3.3 below).

Table 2: Randomization Balance

	Control Mean	Central	Local	Central Plus Local Info	Central X Local
Education	2.7	0.148* (0.083)	-0.087 (0.076)	-0.065 (0.075)	0.013 (0.061)
% Ravine	0.583	0.004 (0.070)	-0.027 (0.067)	0.014 (0.062)	-0.008 (0.043)
% HH Walls Good Condition	0.9	-0.031 (0.201)	-0.143 (0.208)	-0.007 (0.196)	0.160 (0.135)
Knowledge of Chief	0.845	-0.154 (0.168)	0.177 (0.153)	0.054 (0.154)	-0.052 (0.132)
Chief Responsiveness	2.96	0.036 (0.079)	-0.092 (0.074)	-0.054 (0.067)	0.067 (0.062)
% Paid in 2016	0.12	-0.532* (0.279)	0.508* (0.287)	0.004 (0.244)	-0.142 (0.183)
Affected by Conflict	0.2	-0.151 (0.160)	-0.043 (0.171)	-0.007 (0.132)	0.128 (0.112)
Number Chiefs per Neighborhood	4.4	0.022 (0.028)	-0.025 (0.030)	0.002 (0.025)	0.000 (0.022)
P-val, joint sig.		0.356	0.400	0.993	0.681

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

We randomize 100 times and pick the treatment allocation that has the minimum highest t-statistic of a regression of each variable in the balance set on each treatment status.

3.3 Sampling of chiefs

To select the chiefs in charge of tax collection, we implement the following procedure. For each chief, we take the GPS coordinates of the start- and end-points of each of their avenues. We connect these points with a straight line, create a 20-meter buffer around it, and aggregate these buffers by chief to construct each chief’s “domain”. We overlay these domains with population data drawn from [Weigel \(2018a\)](#). For each city neighborhood, we rank chiefs according to the population count covered by their domains. A neighborhood is assigned to the chief whose domain covers the most population living in that specific neighborhood. If that chief is not available, we select the one ranked immediately below. Central collectors are randomly chosen amongst those DGRKOC agents who completed a collector survey. This survey contains questions concerning a collector’s basic characteristics, their cognitive abilities, as well as their social preferences (i.e., tax morale, progressivity, targeting, preferences about government spending, etc.)

Figure 4: Chief selection procedure. This neighborhood (115) has two chiefs: 11594 (with 3 avenues) and 11511 (with 1 avenue). The procedure picks the former. The orange dots represent population.



4. Campaign mechanics

4.1 Timing

There are 41 central collectors (agents of the provincial tax ministry, DGRKOC) working on the tax campaign and 113 local (chief) collectors. Chiefs in the Local arm also have assistants, of whom there are 71 unique individuals. Each team of collectors in Central and Central Plus Local Information is assigned to work in two neighborhoods per month. Each team of collectors in the Local and Central X Local treatment arms (both in the local and combined treatment arms) is assigned to work in one or two neighborhoods per month (depending on the size of a chief's jurisdiction). The tax collection campaign will run for just over six months.

4.2 Stages

The taxation campaign consists of two stages: census and taxation.

Before the start of the campaign, collectors are trained by the tax ministry and by members of the research team. Training sessions, conducted at the tax ministry, introduce future collectors to the taxation campaign protocol and teach basic aspects of the property tax system in Kananga (rates, exemptions, how to identify different house types, etc). Collectors also learn how to use the handheld receipt printers.

The first step of the campaign is the census. The census is implemented in all neighborhoods (including the five control neighborhoods). Teams of tax collectors visit every house in each neighborhood,

accompanied by enumerators (who work for the research team rather than the government) trained to use tablets with GPS capabilities. The census visit serves three purposes. First, citizens are informed about the campaign. Second, houses are assigned a unique code and are given the flyers containing the tax rate and the information treatment. The codes enable collectors to return to the neighborhood alone knowing its boundaries based on the codes, which begin with the first digits of the neighborhood. This effectively produces a cadastral map of the city. Finally, enumerators fill out a short survey recording details about the transaction that we will use in the analysis.

Table 3: Campaign stages

Stage	Period	Collectors	Enumerators
Stage 1 : Census	First days of each month	Yes	Yes
Stage 2 : Tax collection	Rest of the month	Yes	No

We administer the census in control neighborhoods for two main reasons. First, this helps rule out a purely informational mechanism behind any observed increase in compliance in the other treatment arms (i.e. citizens in treated neighborhoods pay more only because those in control neighborhoods remain uninformed about the need to pay the property tax). The flyers in the control neighborhoods inform citizens how much they should pay and that they are supposed to go to the bank to pay. This was the status quo of tax collection throughout Kananga until the 2016 property tax campaign. Second, it is during the census that flyer messages are randomly assigned. Doing the census in control areas enables us to estimate the effect of our various treatments in a full regression with dummies for all of the different treatment arms and their interactions.

Upon completion of the census, tax collectors begin collection, which lasts for the rest each tax month. During taxation, enumerators no longer accompany tax collectors.

In all treatment arms citizens can pay either during the census or subsequent tax visits. Collectors bring the money to the provincial tax ministry. Collectors are equipped with handheld receipt printers to issue receipts for the taxpayers. Two receipts are automatically printed in the field, one for the taxpayer and one for the collector. Collectors bring the money to the provincial tax ministry, account for the money they deposit, and need to justify any discrepancy between the total sum on their report and the money they have with them.

Importantly, collectors can also tax households during the census. This has the advantage of holding targeting constant, since at this stage collectors are forced to visit every household. Moreover, because of the census survey (discussed in the next section), we observe key details about tax transactions that occur during the census, which allows us to test a range of hypotheses about why citizens pay the property tax.

For the fourth treatment arm (Central Plus Local Information) the two assigned central collectors have a meeting with the chief who would have worked in the neighborhood had it been selected for

the local treatment arm. During this meeting, the enumerator shows the chief one by one photographs of all the compounds in the neighborhood along with the name of the property owner. The chief then indicates if he thinks a given household will pay “very easily, easily, or with difficulty.” The collectors record the chief’s recommendation with a pen. The enumerator also records this information in the survey. After the meeting, armed with this information, collectors resume work.

Consistent with standard practices at the tax ministry, all collectors (central and local) receive a bonus for working on the campaign. First, they receive a bonus for conducting the census, equal to 30 CF per house visited. Second, they receive a bonus that is proportional to the amount of money that they submit to the state account. This bonus is constant across all treatment arms.⁹

5. Data

5.1 Respondent baseline survey

We administer surveys at baseline to 4,343 randomly selected households –12 per neighborhood. Randomization was achieved by having enumerators visit every X th house, where X is determined by the estimated number of houses in the neighborhood to yield 12 surveys per neighborhood. The baseline survey instrument covers a range of topics, including but not limited to: demographics, property characteristics, governance, public goods, experience with taxation and (formal and informal) payments to the state, property taxes, rental taxes, city chiefs, political beliefs and participation, and social networks.

5.2 Chief survey

This survey measures characteristics of local chiefs: their tribal affiliation, level of education, familiarity with technology (tablets), social networks, official duties and tasks, relationship with city authorities, knowledge of the citizens in their jurisdiction, knowledge of the tax system, past experience collecting taxes, preferences for redistribution and public goods, beliefs about state capacity, trust in different institutions, and political affiliation.

5.3 Collector survey

This survey measures characteristics of collectors. All collectors who work on the campaign, be they tax ministry agents, chiefs or their assistants participate in this survey. It includes: a reading and a typing test, questions on their experience collecting taxes and working for the DGRKOC, beliefs about taxation, preferences for redistribution, public goods, state capacity, trust in different institutions,

⁹Details of the bonus, which will be studied in another related project, can be found in the analysis plan for the study “The Elasticity of Tax Compliance: Evidence from Randomized Property Tax Rates.”

tax morale, willingness to pay the property tax under different hypothetical tax rates. This survey is administered before and after taxation in order to measure the impact of taxation on tax collectors.

5.4 Census survey

This survey is conducted during the census. It records the code that is assigned to each household, its geographic coordinates, the name of the property owner, the property tax rate faced by each household (assigned on the spot during the census), and whether a household is exempt from the property tax.¹⁰ It also contains the protocol collectors read informing respondents about the tax campaign.

5.5 Midline survey

This survey is administered to every household in the city by enumerators after tax collection is finished in a neighborhood and its goals are to verify the work of tax collectors in a neighborhood and to measure interactions between respondents and tax collectors. The midline survey covers a range of topics, including but not limited to: whether a household was visited by tax collectors, the number of times it was visited, whether it paid the property tax, whether the respondent was given a receipt, the reasons why the respondent paid taxes, whether the household head and the tax collectors knew each other previously, and whether tax collectors asked respondents for bribes during the campaign.

5.6 Respondent endline survey

This survey will be conducted after the campaign and contains questions about tax compliance and morale, the perceived fairness of different modes of tax collection, property-related disputes, attitudes towards the state, beliefs about the government and chiefs, engagement with the government and chiefs, use of formal and informal sectors, and other outcomes of interest. Enumerators will revisit the randomly chosen sample of respondents for the baseline survey and a set of new randomly sampled households.¹¹

5.7 Administrative data

The handheld receipt printers store each receipt in their memory. This generates administrative data used by the government to track progress in the tax campaign. The printers collect the collector's name

¹⁰The following cases are exempt from the property tax: 1) state-owned properties, 2) schools, churches, and scientific or philanthropic institutions, 3) houses owned by the elderly (55 years or above), widows or disabled people, 4) houses in construction or owned by international organizations.

¹¹We will publish an addendum to this PAP with more specific hypotheses about certain endline outcomes before the launch of the endline survey in early 2019.

and ID number, date and time stamps, neighborhood number, the house category and identification number, the tax rate, and the amount paid. We also have access to these data.

6. Hypotheses and estimation

This section introduces the theoretical expectations and the estimation strategy. The most general estimating equation we use is:

$$y_{ijk} = \beta_1 C_{jk} + \beta_2 L_{jk} + \beta_3 CXL_{jk} + \beta_4 CLI_{jk} + \mathbf{X}_{ijk}\Gamma + \mathbf{X}_{jk}\phi + \alpha_k + \epsilon_{ijk}$$

where i indexes individuals, j indexes neighborhoods, and k indexes strata used for randomization. Standard errors are clustered at the neighborhood level (356 in total). y_{ijk} denotes an individual-level outcome of interest (usually tax payment), α_k denotes strata fixed effects, and \mathbf{X}_{ijk} and \mathbf{X}_{jk} are individual and neighborhood-level covariates. Finally, C_{jk} and L_{jk} , denote the local and central treatments, respectively, and CXL_{jk} and CLI_{jk} denote the two “hybrid” treatments described above. Each of the corresponding coefficients estimate the average causal effect of each treatment arm on the outcome of interest. In an alternative specification, controls will be interacted with treatment. There are two main sets of analysis we will run.

1. Analysis using the universe of taxpayers. For our primary outcome tax payment we will use administrative data to evaluate the effect of the various treatment arms on compliance. For this analysis, we have the universe of compounds in Kananga, approximately 47,122 according to data from Weigel (2018). We will also conduct an analysis of the impacts of the messages contained on tax flyers using this dataset on the universe of taxpayers. For individual covariates, we can use household-level variables collected during the census survey and during the midline survey. In our estimation, we will include one specification with no covariates and additional specifications with the following covariates:

- **Individual-level covariates:** A dummy indicating whether a household paid the property tax in the past, an index of estimated household wealth (an index constructed from household observables, such as roof type, building materials, and condition of the fence), and a dummy variable for government workers, including avenue and locality chiefs.
- **Neighborhood-level covariates:** Distance to city center, population, and past average tax compliance. In addition, we will test for balance across a larger set of individual- and neighborhood-level variables and we will show robustness to controlling for any that are significantly imbalanced.

2. Analysis using endline survey sample. For outcomes not included in the administrative data or in surveys administered to every household in Kananga, we will rely on an endline survey. Our estimated endline sample size will be at least as large as our baseline sample (N= 4,343). Our estimation approach will be similar to that noted above, except that we will have a larger set of possible individual-level covariates. Before administering the endline survey, we will publish an addendum to this pre-analysis plan with more details on our estimation plans using endline survey data.

6.1 Mode of tax collection

The primary vein of analysis concerns the main treatment arms and their impact on tax compliance among citizens. It also pertains to the mechanisms behind observed differences in treatments. In this section and throughout, for hypotheses in which we discuss only comparisons between Central and Local, we will pool data from Central and Central Plus Local Information and exclude data from Central X Local — unless otherwise noted. For this analysis, we will use data on compliance from the universe of taxpayers.

H1: The overall effectiveness of Central vs. Local is ambiguous. The main reason to hypothesize that Central will be more effective ($\beta_1 > \beta_2$) is that central collectors can pose a credible threat of punishment.

In contrast, it could be that Local is more effective than Central ($\beta_2 > \beta_1$). This could be the result of two possible mechanisms:

- **Local knowledge:** Chiefs have information about the capacity or willingness to pay taxes among citizens living in their neighborhood.
- **Legitimacy:** Chiefs are perceived as more legitimate than central tax collectors, which might activate citizens' tax morale and lead to higher compliance.

Ultimately, we believe it is an empirical question which of these factors proves most important in determining tax compliance. We thus do not take a strong stand on this question.

H2: Central X Local will be more effective than Central ($\beta_3 > \beta_1$). Local collectors add local knowledge and legitimacy.

H3: Central X Local will be more effective than Local ($\beta_3 > \beta_2$). Central collectors add credibility to the threat of punishment.

H4: Central Plus Local Information will be more effective than Central ($\beta_4 > \beta_1$). Arming central collectors with local information from the chief about the willingness to pay of households will enable collectors to better target their efforts and collect higher revenues.

H5:

A. If Central X Local is more effective than Central Plus Local Information ($\beta_3 > \beta_4$), this suggests that the legitimacy of local chiefs is an important determinant of compliance, in addition to their local knowledge.

B. If we find no difference between these two treatment arms ($\beta_3 = \beta_4$), this is indicative that the main relative advantage of local collectors is local knowledge.

H6: The comparison between Local and Central Plus Local Information is ambiguous ($\beta_1 \stackrel{?}{=} \beta_4$). Local knowledge is equalized in these two treatment arms. The effect of the remaining factors that differ across these arms is theoretically ambiguous –while local collectors enjoy higher legitimacy, central collectors make the threat of punishment more credible.

6.2 Information treatments

To elucidate the channels behind observed differences in the main treatment arms, we will exploit the cross-randomized information treatments. Each of these information treatments, contained on flyers distributed during the census phase of the tax campaign, was designed to shed light on a mechanism of interest based on its hypothesized interaction with one of the main treatment arms. Specifically, we expect the messages to make salient certain aspects about the tax compliance decision. The unifying logic of the hypotheses that follow is that the effect of the messages will be larger the more credible the collector delivering the message. The sample for this analysis will be the universe of tax payers, unless specified otherwise.

H7: The central deterrence message will be more effective in Central compared to Local.

$$y_{ijk} = \beta_1 C_{jk} + \beta_2 L_{jk} + \beta_3 C_{jk} \times \text{CentralDeterrence}_{ijk} + \beta_4 L_{jk} \times \text{CentralDeterrence}_{ijk} + \mathbf{X}_{ijk}\mathbf{\Gamma} + \mathbf{X}_{jk}\phi + \alpha_k + \epsilon_{ijk}$$

Specifically, in the equation above, we expect $\beta_3 > \beta_4$. The central deterrence flyer emphasizes that failure to pay the property tax can entail an investigation by the DGRKOC. This threat will likely be more credible when delivered by a DGRKOC agent (in the Central arm) rather than by a chief (in the Local arm).

H8: The local deterrence message will be more effective in Local compared to Central.

$$y_{ijk} = \beta_1 C_{jk} + \beta_2 L_{jk} + \beta_3 C_{jk} \times LocalDeterrence_{ijk} + \beta_4 L_{jk} \times LocalDeterrence_{ijk} + \mathbf{X}_{ijk}\mathbf{\Gamma} + \mathbf{X}_{jk}\phi + \alpha_k + \epsilon_{ijk}$$

Specifically, in the equation above, we expect $\beta_4 > \beta_3$. The local deterrence flyer emphasizes that failure to pay the property tax can entail an investigation by the neighborhood chief.¹² This threat will likely be more credible when delivered by a local chief rather than by central agents.

In sum, we expect these messages to have larger additive effects on compliance as a function of the credibility of the collector delivering the message. However, there is potentially a countervailing force, which would point in the opposite direction. The effect of the message could be a function on the extent to which it complements the existing characteristics of the collector. Following this logic, one might expect the central deterrence message to have a larger interaction effect with Local because the message contributes precisely what the avenue chiefs lack: a credible threat of punishment by the state.

This interaction would be larger with Local than with Central because the DGRKOC agents presumably can already credibly threaten punishment by the state because of their direct affiliation with the tax ministry. This “complementation” logic would reverse the predictions of the two previous hypotheses.

However, although we acknowledge this possibility, we still believe the “credibility” logic noted above is more theoretically appealing and we have chosen to register the hypotheses as stated above. Moreover, we can test for the “complementation” logic by comparing the coefficient on $L_{jk} \times CentralDeterrence_{ijk}$ and $L_{jk} \times LocalDeterrence_{ijk}$. If the effect represents credibility, then the coefficient on $L_{jk} \times LocalDeterrence_{ijk}$ should be larger. If the effect represents complementation, then the coefficient on $L_{jk} \times CentralDeterrence_{ijk}$ should be larger. In this way, we will be able to assess the channel behind interaction effects of the information treatments.

In addition, we ask questions in the midline survey about the reasons why people pay taxes and the perceived probability of sanctions. These questions further help investigate these mechanisms. For instance, we can estimate if the Central Deterrence message induces a larger increase in the perceived probability of sanctions in the Central arm than in the Local arm, which would be consistent with the credibility logic — or, whether it induces a larger increase in the Local arm, rather than the Central arm, which would be consistent with the complementation logic.

H9: The central public goods message will be more effective in Central compared to Local.

¹²Again, the flyer refers to the neighborhood chief, who is the superior of the avenue chiefs and locality chiefs working for the campaign.

$$y_{ijk} = \beta_1 C_{jk} + \beta_2 L_{jk} + \beta_3 C_{jk} \times CentralPublicGoods_{ijk} + \beta_4 L_{jk} \times CentralPublicGoods_{ijk} + \mathbf{X}_{ijk}\mathbf{\Gamma} + \mathbf{X}_{jk}\phi + \alpha_k + \epsilon_{ijk}$$

Specifically, in the equation above, we expect $\beta_3 > \beta_4$. We expect the central public goods message will be more credible from central collectors and thus activate the so-called “fiscal exchange” motivation behind tax compliance.

H10: The local public goods message will be more effective in Local compared to Central.

$$y_{ijk} = \beta_1 C_{jk} + \beta_2 L_{jk} + \beta_3 C_{jk} \times LocalPublicGoods_{ijk} + \beta_4 L_{jk} \times LocalPublicGoods_{ijk} + \mathbf{X}_{ijk}\mathbf{\Gamma} + \mathbf{X}_{jk}\phi + \alpha_k + \epsilon_{ijk}$$

Specifically, in the equation above, we expect $\beta_4 > \beta_3$. We expect the local public goods message will be more credible from local collectors and thus activate the fiscal exchange motivation.

H12: The trust message will be more effective in Local compared to Central.

$$y_{ijk} = \beta_1 C_{jk} + \beta_2 L_{jk} + \beta_3 C_{jk} \times Trust_{ijk} + \beta_4 L_{jk} \times Trust_{ijk} + \mathbf{X}_{ijk}\mathbf{\Gamma} + \mathbf{X}_{jk}\phi + \alpha_k + \epsilon_{ijk}$$

Specifically, in the equation above, we expect $\beta_4 > \beta_3$. The logic is that, based on pilot results, chief collectors seem to be perceived as more legitimate than central collectors. By making salient leader legitimacy as a reason to pay the tax, the flyer should trigger a larger increase in compliance when paired with the type of collector who is viewed as more legitimate: local tax collectors. Rejecting the null here would lend support to the legitimacy channel spurring the effectiveness of Local.

In addition to these primary hypotheses about the informational flyers and their interactions with the main treatment arms, building on evidence from the logistics pilot, we predict that the flyers will affect average compliance according to the following order: (1) Central deterrence (highest compliance), (2) Local deterrence, (3) Trust, (4) Local public goods, (5) Central public goods, (6) Control (lowest compliance).

6.2.1 Instrumental variables estimation

Although all households are allocated informational flyers, collector non-compliance means that they might receive the incorrect flyer or they might not be read out the flyer (which matters for illiterate households). Individuals who never received a flyer or never received the verbal read-out treatment are unlikely to respond to the tax messages.

To account for these issues, we will conduct an instrumental variables estimation of the effect of the information treatments using the message the collector read to the household as the endogenous variable and their true treatment status as the instrument. In the census survey, we observe what message, if any, the collector actually read to the household. Since we have five information treatments, there will be five first-stage equations. We are unaware of prior tax messaging studies that are able to observe whether households received the intended message and thus employ a similar two-stage least squares estimation strategy.

6.3 Additional hypotheses about tax compliance

In addition to the main comparisons of treatment arms, we will test a number of related hypotheses concerning tax compliance. The sample for this analysis will be the universe of tax payers, unless specified otherwise.

H13: Central collectors will be most effective in downtown neighborhoods of Kananga, while local collectors will be more effective in the city's periphery. The logic here is that the central collectors will be deemed most legitimate by citizens in more urban parts of the city where the state has a more active presence. Similarly, city chiefs will be deemed more legitimate in more peripheral areas, in which they tend to have greater responsibilities.

H14: Tax compliance will be higher in neighborhoods that were treated in the 2016 tax campaign. Like behavior in other economic and social domains, taxation could be subject to habit formation (Dunning, Monestier, Piñeiro, Rosenblatt, and Tuñón, 2015). We thus expect average compliance to be higher in areas that received the (randomly assigned) 2016 door-to-door collection campaign. Similarly, we expect that individuals who have themselves paid taxes will be more likely to pay again.

H15: People who have better access to public goods will be more likely to pay. We expect this because for the (small) subset of individuals who benefit from public goods like piped water, electricity, or improved roads, the quid-pro-quo nature of taxes for government services may already be clear, therefore promoting tax compliance. We will create an index of access to the following services: (1) piped water (exclusive access in each house), (2) electricity, (3) trash collection, (4) sewage collection, (4) public transportation, (5), paved roads on each street, (6) public street lightning on each street, (7) health care, (8) education, (9) a retirement fund (or pension). We will then test if those households above the 75th percentile in this index are more likely to pay. We will also implement a similar approach

employing self-reported satisfaction with each of these services rather than access. We will conduct these analyses with the baseline survey sample.

H16: People who are more in favor of government intervention will be more likely to pay the tax. The logic is that those who prefer an active government will be more willing to pay for it. We will measure these beliefs by asking citizens to express support for one of the two statements:

Point of view 1: Some people say the government should take more responsibility to ensure that everyone is provided for.

Point of view 2: Other people say that people should take more responsibility to provide for themselves.

We will conduct this analysis with the baseline survey sample.

H17: For neighborhoods assigned to Local, those where the local chief is more active will be more likely to pay relative to neighborhoods with less active chiefs. We expect no such heterogeneity if the neighborhood is assigned to Central. The logic is similar to the above hypothesis: where the government is providing more services, the quid-pro-quo nature of taxation will be more credible and citizens will be more willing to pay. We will measure the average neighborhood-level activity of chiefs using two baseline survey questions:

1. How frequently did your avenue chief help the avenue deal with any of the following issues?
(a) Road maintenance (*Salongo*), (b) Plead to higher authorities on the behalf of the members of the avenue.
2. In the past six months how many times did your avenue chief helped you deal with any of the following issues? (a) Help finding a solution to a problem, (b) Helped a member of your family get a job.

We will test this hypothesis at the individual level (for the baseline survey sample) and at the neighborhood level (by averaging the baseline survey responses).

H18: People with higher self-reported tax morale at baseline will indeed be more likely to pay. This is intuitive, assuming self-reported tax morale is a meaningful proxy for true tax morale. We measure this for the baseline survey sample with the following questions:

1. Now, I would like to ask you if you think it is currently an obligation to pay the property tax for all the citizens of Kananga. With which of these statements do you agree? (a) It is an important obligation. everyone must pay. (b) It is an obligation, but only for those who benefit from government services. (c) It is an obligation, but only for those who have the means to pay. (d) It is not an obligation, the government should get its revenue from other sources.

2. Now, imagine that next week a tax collector comes and visits one of your neighbors. Imagine he absolutely refuses to pay the property tax. In your opinion, how acceptable is this?

We will conduct this analysis with the baseline survey sample.

H19: Individuals who expect others to pay the tax will be themselves more likely to pay. This could be because of three reasons: (1) social pressure to pay the tax, (2) expected strategic complementarities (i.e., citizens think the government will have enough money to provide public goods only if enough people pay), and (3) citizens' opinion of others paying may reflect their latent perception of the probability of punishment which, in turn, affects their own decision. Alternatively, the logic of free-riding would suggest the opposite –compliance is decreasing in the number of taxpayers. However, data from the 2016 tax campaign do not support this view. We will measure this with the following questions:

1. In your opinion, how many of your neighbors will pay property tax if the DGRKOC agents come to your neighborhood next month?
2. In your opinion, how many of your neighbors will pay property tax if the avenue chief comes to collect taxes in your neighborhood next month?

We will conduct this analysis with the baseline survey sample.

H20: Individuals with less secure property rights will be more likely to pay the tax. We expect this because data from the 2016 campaign suggest that the tax receipts of the campaign are perceived as providing further proof of ownership of property in Kananga. Hence, those who are less secure in their ownership may have more demand for a tax receipt. We will measure security of property rights by (1) the presence of formal land title documents, (2) the presence of property demarcating cement blocks (*bornes*), (3) the absence of self-reported history of property-based conflict with neighbors, (4) the perceived security of ownership in response to a hypothetical question regarding whether a household is confident it would be favored by the court in a property dispute. We will conduct this analysis with the baseline survey sample.

6.4 Priors

The next set of hypotheses examine heterogeneous effects by prior beliefs measured in the baseline survey. As such, this analysis concerns the baseline survey sample.

H21: Individuals with more positive priors about the provincial government will be more likely to pay the tax. We measure these priors for the baseline sample with the following questions:

1. To what degree does the provincial government respond to the needs of your avenue's inhabitants?
2. How would you rate the performance of the provincial government in Kananga?

3. Now I would like to ask you what you think the provincial government will do with the money it receives from this property tax campaign. Imagine that the provincial government of Kasai Central receives \$1000 thanks to this campaign. How much of this money will be put to good use, for example providing public goods?
4. I am going to name a number of organizations. For each one, could you tell me how much confidence you have in them: a great deal of confidence, quite a lot of confidence, not very much confidence or none at all? [The provincial government]

H22: People with stronger priors about the capacity of the government to provide public goods will be more likely to pay. For these individuals, the fiscal exchange nature of taxation will likely be more credible (conditional on having a similar distribution of beliefs about the *willingness* of the government to provide goods to the people, separate from its ability to do so). We measure beliefs about capacity with the following survey question: “Imagine that many of the roads in central Kananga have been badly damaged due to bad weather. Do you think the local government would fix this problem within three months?”

H23: Citizens with stronger priors about the probability of punishment by the provincial government will have higher tax compliance in Central. Specifically, we expect $\beta_3 > \beta_4$ in the equation below.

$$y_{ijk} = \beta_1 C_{jk} + \beta_2 L_{jk} + \beta_3 C_{jk} \times \text{Prior}_{ijk} + \beta_4 L_{jk} \times \text{Prior}_{ijk} + \mathbf{X}_{ijk}\mathbf{\Gamma} + \mathbf{X}_{jk}\phi + \alpha_k + \epsilon_{ijk}$$

We measure perceived probability of punishment by the provincial government with this question: “Imagine that next week a DGRKOC tax collector comes and visits one of your neighbors. In this case, what is the probability that the provincial government will pursue and enforce sanctions?”

H24: Citizens with higher prior trust in and evaluation of local chiefs are more likely to pay in Local. Specifically, in the equation below, we expect $\beta_3 < \beta_4$.

$$y_{ijk} = \beta_1 C_{jk} + \beta_2 L_{jk} + \beta_3 C_{jk} \times \text{TrustChief}_{ijk} + \beta_4 L_{jk} \times \text{TrustChief}_{ijk} + \mathbf{X}_{ijk}\mathbf{\Gamma} + \mathbf{X}_{jk}\phi + \alpha_k + \epsilon_{ijk}$$

H25: Citizens with higher prior trust in and evaluation of the provincial tax ministry (DGRKOC) are more likely to pay in Central. Specifically, in the equation below, we expect $\beta_3 > \beta_4$.

$$y_{ijk} = \beta_1 C_{jk} + \beta_2 L_{jk} + \beta_3 C_{jk} \times TrustDGRKOC_{ijk} + \beta_4 L_{jk} \times TrustDGRKOC_{ijk} + \mathbf{X}_{ijk}\mathbf{\Gamma} + \mathbf{X}_{jk}\phi + \alpha_k + \epsilon_{ijk}$$

H26: Local collectors will be more effective than Central collectors in neighborhoods with higher average trust in and evaluation of local chiefs. Specifically, in the equation below, we expect $\beta_3 < \beta_4$.

$$y_{jk} = \beta_1 C_{jk} + \beta_2 L_{jk} + \beta_3 C_{jk} \times TrustChief_{jk} + \beta_4 L_{jk} \times TrustChief_{jk} + \mathbf{X}_{ijk}\mathbf{\Gamma} + \mathbf{X}_{jk}\phi + \alpha_k + \epsilon_{ijk}$$

H27: Central collectors will be more effective than Local collectors in neighborhoods with higher average trust in and evaluation of the provincial tax ministry (DGRKOC). Specifically, in the equation below, we expect $\beta_3 > \beta_4$.

$$y_{jk} = \beta_1 C_{jk} + \beta_2 L_{jk} + \beta_3 C_{jk} \times TrustDGRKOC_{jk} + \beta_4 L_{jk} \times TrustDGRKOC_{jk} + \mathbf{X}_{ijk}\mathbf{\Gamma} + \mathbf{X}_{jk}\phi + \alpha_k + \epsilon_{ijk}$$

We measure trust in and evaluation of chiefs for the baseline survey sample with the following questions:

1. To what degree does the avenue chief respond to the needs of your avenue's inhabitants?
2. Overall, how would you rate the performance of your avenue chief?
3. In general, think of what avenue chiefs do with the money that they collect? Imagine they collect \$1000. How much of this money will they submit to the state account?
4. I am going to name a number of organizations. For each one, could you tell me how much confidence you have in them: a great deal of confidence, quite a lot of confidence, not very much confidence or none at all? [The avenue chief]

We measure trust in and evaluation of the tax ministry for the baseline survey sample with the following questions:

1. How would you rate the performance of the tax ministry in Kananga?

2. In general, think of what the tax collectors will do with the money they collect during this property tax campaign. Imagine the tax collectors collect \$1000 thanks to the campaign. How much of this money will they submit to the state account?
3. I am going to name a number of organizations. For each one, could you tell me how much confidence you have in them: a great deal of confidence, quite a lot of confidence, not very much confidence or none at all? [Tax ministry]

6.5 Targeting

Whom central and local tax collectors choose to target for taxation is likely to be an important reason behind any observed differences in compliance across these treatment arms. Specifically, we expect local collectors to exploit their local information about residents in the neighborhood to target households they expect will be more likely to pay.

The simplest way to measure targeting will be to use the dates written on the wall by collectors each time they visit a house to try to collect taxes. Earlier dates suggest that tax collectors targeted these households first. This is our first measure. However, it may be subject to measurement error if (a) collectors forget to write down dates or (b) collectors try to game the system by writing different dates than the truth.¹³

A second measure is the number of visits reported by households. Although subject to recall issues, it is not likely that there would be systematically different measurement error across treatment arms. However, one problem with this measure is that for paying households it is implicitly censored at the number of visits reported –paying the tax leads households to exit the possible set of households to be visited. Put differently, had they not paid, and were they deemed a likely payer by the collector, then the number of visits would surely be higher than what we observe in the data. To deal with this problem, we will estimate standard censored-normal regressions with maximum likelihood as well as a Heckman selection model.

Note that to remove the targeting component from our estimation of the effects of treatments on compliance, we can limit our analysis to collection conducted during the census visits. For these visits, the collectors go door to door in an arbitrary order, as enforced by a member of the research team who conducts the census survey.

The analysis uses the universe of taxpayers when possible, but several of these hypotheses (noted) require baseline data and will be analyzed in the baseline survey sample. We have the following hypotheses about targeting.

H28: Local collectors will target households at which they have greater legitimacy and, in turn,

¹³Collectors are not incentivized to write dates, so it is not obvious what system they would be gaming. But one could imagine they are concerned about general monitoring of their work and so exaggerate the number of visits.

these households will show higher levels of tax compliance –conditional on being targeted, a household is more likely to pay the property tax.

Anticipating that citizens will pay if they view the chief as legitimate, chiefs will target these citizens. Theoretically, it is not obvious that chiefs would target their “supporters”. For example, [Kasara \(2007\)](#) finds that many African leaders actually tax their own ethnic groups more –because they can better monitor and control voters through brokers. However, evidence from the logistics pilot suggests avenue chiefs have little coercive power over households and are thus unlikely to be able to punish disloyal individuals by taxing them. Instead, tax payment in this setting appears to be more a function of tax morale and the perceived legitimacy of the government and its agents ([Weigel, 2018b](#)). Hence, we are preregistering hypotheses in line with the idea that chiefs will target citizens who view them as legitimate. Measuring the perception of chief legitimacy is challenging, but we propose the following strategies.

- 1. Individuals who had previously sought out a local chief to seek assistance or make a demand.** For the baseline survey sample, we know the self-reported frequency with which individuals sought out the avenue or locality chief to resolve a dispute or otherwise to make a demand. Having done so demonstrates that the household views the chief as a legitimate leader. For this subsample, we can examine heterogeneous treatment effects to test whether individuals who report prior engagements of this type with the chief are indeed more targeted by the chief. We measure this with two questions: (1) “In the past 6 months, how many times has a member of your household gone to the [avenue chief / quartier chief] to discuss a problem or make a demand?” and (2) “I would like to ask you a few questions about the persons or institutions that you go to deal with a conflict with a neighbor, such as disputes about the limits of your compound or unpaid debts. When such a conflict arises, how frequently do you go to the following persons or institutions?”
- 2. Individuals who have paid the chief a fee or tax in the past.** We also expect individuals who have ever paid the local chief for a tax or fee in the past will be more likely to pay in this property tax campaign. Past payment indicates that a given household may perceive the chief as more legitimate. The chief may anticipate that it will be easier to collect from these past households. We can examine this for the baseline survey sample only, using the question: “Have you ever paid the chief money for the property or rental tax in the past?”
- 3. Property owners whom chiefs know personally.** We expect that local collectors will target individuals whom they know personally. We measure this during the census survey: the enumerator discreetly records (1) if the collector and the respondent appear to know each other and (2) if they know each other’s name. Additionally, for a subset of the midline survey, we ask if the respondent knew the collector before they came to the door; this provides another measure of whether the household and chiefs are personal acquaintances. Finally, for the baseline survey

subsample, we can measure the strength of the tie between individuals and the chief using the following three questions: “(1) Do you know the name of your avenue chief? If yes, what is it?” (2) “Do you have the phone number of your avenue chief?”, and (3) “Do you attend the same church as your avenue chief?”

4. **Time chiefs have lived in the neighborhood.** Chiefs who have lived in a neighborhood for a longer period are more embedded in their communities and thus perceived as more legitimate.
5. **Time citizens have lived in the neighborhood.** If property owners have lived in the neighborhood for longer, then they are more likely to view the chief as legitimate. Anticipating that citizens who view him as more legitimate will be more likely to pay the tax, the chief will seek out these individuals. Thus, they are more likely to be targeted by the chief. We expect no differential targeting of veteran inhabitants of neighborhoods by central collectors.
6. **Coethnicity.** If the chief is the same ethnicity as a citizen, he is more likely to be viewed as legitimate. We therefore expect chiefs to target coethnics. Chiefs may target coethnics for this reason or because they may rely on availability heuristics in identifying potential payers and are more familiar with people of the same ethnic group. Alternatively, it is possible that chiefs target non-coethnics to avoid imposing the cost of taxation in-group members. However, we believe that the incentives to tax coethnics, due to the greater ease of generating compliance among this group, are sufficient to override such considerations since the bargaining power of chiefs is unlikely to be sufficient to force citizens to pay but rather to convince them comply with tax obligations in an environment where compliance is essentially zero. Thus, ultimately, we expect chiefs to target coethnics more than non-coethnics. We will likely be unable to meaningfully test this hypothesis using information on “tribe” (the coarsest Congolese ethnic identifier) because the city is over 70% Luluwa and most of the chiefs and tax collectors are also Luluwa. Thus, we will also examine “subtribe” or “groupement”, a finer measure that typically refers to a series of villages from which a family originates. Finally, we will also examine territory. Again, the prediction is that if the chief and property owner align in this dimension, then the chief will target those individuals more than other individuals in the neighborhood. We do not expect ethnic targeting among central collectors.

H29: Local collectors will be more progressive in which households they target and tax compared to central collectors –they will be more likely to target rich households and exempt poor households. This hypothesis is based on the logistics pilot and data collected during surveys with central and local tax collectors before the campaign. We found that chiefs profess support for more redistribution and a more progressive tax system relative to central collectors. We will test this hypothesis by comparing heterogeneous effects of the treatments interacted with household-level estimates of wealth. We will also conduct an analysis with endline data in which we use a richer set of information about wealth and income.

Although this estimation will test the hypothesis that local collectors are more progressive, our measurement strategy is based on household observables that will be clear to central collectors, who may well target these same households just in an effort to maximize their bonus. A better test, then, would be household income, which is difficult to observe, and yet which chiefs might know because of their local knowledge. Although we will lack information on income for the universe of tax payers, we will know the occupation of the property owner. Using endline data, we will estimate the average income of different jobs of individuals in our sample; we will then use these estimates to examine heterogeneous effects by income. We expect chiefs to target households with higher incomes and exempt those with unemployed heads of households.

H30: Local collectors will target conflict-affected households less than unaffected households. If chiefs indeed are more progressive and have stronger social preferences, then we expect them to exempt conflict-affected households. As central collectors likely lack knowledge on which households were affected, we expect no differential targeting on this dimension.

H31: Leveraging their local knowledge, local collectors are more likely to target citizens who are more obedient and citizens who have more positive priors about their local chief. We will measure obedience for the subsample of individuals who completed the baseline survey and answered the hypothetical question: “Imagine your avenue chief asks several members of the community to help fill in the ravine. One of these individuals, named Tshisumbu, refuses to help. How acceptable is this?”

H32: The relationship between targeting by local collectors and social network centrality of citizens is ambiguous. On the one hand, chiefs could target more central people because of availability heuristics. Recent research shows that locals can easily identify individuals who are more central in the village social network (Banerjee, Chandrasekhar, Duflo, and Jackson, 2014). On the other hand, anticipating the potential cost of taxing powerful people (since centrality is potentially correlated with wealth), chiefs might target less central individuals. We will measure centrality as the number of individuals respondents can name when asked the following two questions:

1. Imagine that one day you need to borrow 20,000 FC. Who would you go to for this? Please list the names for all the people you might go to in this situation. If you have already named one or several of these persons please do not repeat their name.
2. Now think about the people with whom you often go to church. Please list the names of the people with whom you go to church most often. If you have already named one or several of these persons please do not repeat their name.

H33: Local collectors are less likely to target citizens with a history of witchcraft practices (measured by their self-reported belief in witchcraft). In Sub-Saharan Africa, witchcraft is usually employed as a form of punishment (Evans-Pritchard, 1937; Platteau, 2000). In addition, recent evidence shows that people who are labeled as practicing witchcraft are excluded from social interactions such as mar-

riage and trade (Mace, Thomas, Wu, He, Ji, and Tao, 2018). Locally embedded chiefs are more likely to know which individuals have reputations of dealing in black magic and witchcraft. To avoid falling prey to such practices, they will likely avoid them.

H34: Local collectors will display higher variance in the number of visits due to their local information. Central collectors are expected to follow a relatively uniform distribution in their visits because they lack strong priors about who is likely to pay –or at the very least, their visits will be highly correlated with observable household wealth. Local collectors will display higher variance in the number of visits across households, since they are likely to target the houses they deem more likely to pay while skipping those unlikely to pay. Additionally, the correlation between visits and household wealth should be less strong for local collectors since they also possess knowledge about unobservables that could affect compliance (such as the timing of individuals receiving their salary payments, or individuals’ unobserved tax morale).

H35: In Central Plus Local Information, central collectors will be more likely to target households the chief has identified as “likely to pay”. In other words, local information will be transferable to central collectors and will change their targeting strategies.

6.6 Corruption

Next, we consider several hypotheses about corruption and bribe-taking, using the universe of taxpayers.

H36: The tax campaign will increase bribes relative to control. We will measure bribes in two ways. Our preferred method is asking people if they paid bribes using local codes for bribes, e.g. the “transport” or “coffee” of the collector. Past work in Kananga has documented that self-reported rates of bribery are highly correlated with other measures (Reid and Weigel, 2017). This may be a lower bound on the true rate of bribes if citizens do not like to report bribes, but there appears to be low measurement error due to the non-taboo nature of small bribes in this context (Reid and Weigel, 2017). A second method that provides a (high) upper bound is to code as bribes all cases in which households say they paid but cannot produce a receipt and cannot be matched with a proven payment in the bank data. This almost certainly overestimates the true rate because many households claim to have paid taxes (for reasons of social pressure or to try to avoid a repeat visit from collectors or because they are confused about the tax) but have not actually paid. We view the measurement error associated with this measure to be considerably higher than that associated with the first measure, but we will report both for completeness.

H37: Informational flyers containing a picture of the receipt will decrease bribes relative to those without a picture of the receipt. This intervention seeks to shock the information asymmetry between bureaucrat and citizen at the root of many bribe-taking scenarios. Empowered by information about the receipt that they should receive, citizens will be better able to demand that a legitimate transaction

occurs.

H38: Fewer bribes will be collected during the census. Although tax collectors are encouraged to collect taxes immediately after conducting the census, we expect they will be loath to accept bribes in the presence of the enumerator. Put simply, the external monitoring of their work during the census will constrain their willingness to collect bribes.

H39: It is ambiguous whether local or central collectors will collect more bribes. On the one hand, in a decentralized tax system it is harder for the state to monitor tax collectors. Knowing this, the local tax collectors might try to collect more bribes. On the other hand, local chiefs are embedded in their communities and face a reputation cost that the central agents do not. Thus, one could also expect central collectors to collect more bribes. Thus, we remain agnostic on which arm will lead to a higher level of bribery.

6.7 Beliefs about the government, collectors, and chiefs

Next, we examine the effects of the campaign on citizens' beliefs about the government, tax ministry, and city chiefs using the endline survey sample.

H40: Both arms will lead citizens to update positively about the provincial government as a whole. We expect these effects will be more pronounced for Local than for Central. This hypothesis is motivated by the finding in [Weigel \(2018b\)](#) that the 2016 tax campaign in Kananga raised citizens' views of the legitimacy of the provincial government. The argument in that study is that the campaign sends a signal of government capacity, which lead citizens to report higher approval and trust in the government. This result is unlikely to generalize in higher-capacity states. But in low-capacity states, it is plausible that a well-organized government campaign –even one seeking to collect taxes– would lead individuals to update positively about the government.

We expect the 2018 campaign to have the same positive effect. We expect this response will be larger in Local than in Central because pilot evidence suggests that the chiefs who are collecting taxes in Local are viewed positively, as legitimate representatives of the community. We therefore think citizens will respond more positively to Local compared to Central and will therefore update more about the provincial government that empowered them to collect taxes.

We will measure views of the government using the following four questions:

1. I would like to ask you what you think the provincial government will do with the money it receives from this campaign. Imagine that the provincial government of Kasai Central receives \$1000 thanks to this campaign. How much of this money will be put to good use, for example providing public goods?
2. Overall, how would you rate the performance of the provincial government in Kananga?

3. To what degree do you think the work done by the provincial government is important for the development of the province and the well-being of the people of Kasai?
4. I am going to name a number of organizations. For each one, could you tell me how much confidence you have in them: a great deal of confidence, quite a lot of confidence, not very much confidence or none at all? [The provincial government]

H41: Each arm will improve citizens' views of the collectors in that arm. Individuals in Central will view, when surveyed at midline and endline, central collectors as less corrupt relative to Control and individuals in other arms –and similarly with individuals in Local estimating the corruption of local collectors. To measure these quantities we ask the same set of questions as above but about the DGRKOC and the locality/avenue chief.

H42: All treatment arms will cause citizens to demand more public goods provision from the provincial government relative to other providers. We expect that this effect will be stronger for Central since DGRKOC collectors are more associated with the provincial government. Local collectors might also stimulate more demand from local providers, i.e. getting the chief to organize more neighborhood activities like *Salongo*. In short, we expect that citizens will demand more from the entity that is taxing them. For Central, this is the government. For Local, it is a mix of the government and the neighborhood chiefs, so we expect the demand of provision from the provincial government to be relatively lower compared to the Central arm. We will measure this using the following question: “I am going to list some services/infrastructure many communities have. Tell me who you think should be primarily responsible for providing each one in our community. This does not need to be the current provider of these services/infrastructure.”

H43: The central and local deterrence messages will cause people to anticipate a higher probability of punishment for tax evaders. We will measure this with the following survey question: “In your opinion, do you think a public authority will pursue and enforce sanctions among households that did not pay the property tax in 2018? With which point of you do you agree?” We expect that the central deterrence message will have a larger effect than the local deterrence message.

Similarly, we expect that payers who had received the central (local) deterrence message will be more likely to note possible state (chief) sanctions as the primary reason why they paid the tax compared to payers who received different flyers. When asked “Among the following options, which was the most important reason why your household paid?” they will be more likely to choose “Because if not I would have problems with the DGRKOC.”¹⁴ This is a way to validate that any estimated effects of this flyer have occurred for the reason that the message changed people’s beliefs about the probability of sanctions.

H44: Individuals in Central will estimate a higher overall probability that tax evaders will be sanc-

¹⁴The analogous response to validate the local deterrence message is: “Because if not I would have problems with the chef de quartier/localité.”

tioned. Citizens in this arm will also be more likely to pay to avoid “problems with the DGRKOC” compared to payers in the other arms. Payers in Local, on the other hand, will be more likely to pay to avoid “problems with the avenue/locality chief” compared to payers in the other arms.

H45: The central and local public goods messages will cause people to estimate a higher probability that the money collected in taxes will be spent on improving public infrastructure. We will measure this with the survey question: “In your opinion, how much of the money collected in property taxes will be spent on public infrastructure, for example the roads in your neighborhood or elsewhere in Kananga?” We expect that the local public goods message will have a larger effect than the central public goods message.

Similarly, we expect that payers who had received these messages will be more likely to note fiscal exchange as the primary reason why they paid the tax compared to payers who received different flyers. As a result, when asked “Among the following options, which was the most important reason why your household paid?” they will be more likely to choose “Because I wanted to contribute to the development of [Kananga/my neighborhood]” for central and local public goods, respectively.

H46: Individuals in Local will estimate a higher probability that money collected in taxes will go toward public goods provision. We expect this because our pilot data suggest that the chief is viewed as a more legitimate leader as well as a more credible advocate for the community relative to the central collectors. Thus, we expect that citizens will expect that taxes will fund public goods in the Local arm more than in the Central arm. However, we acknowledge that there is a credibility-capacity tradeoff here. Citizens might view chiefs as more legitimate and credible, but at the same time doubt that they could influence the public goods provision process (which may well be true in reality). Ultimately, we believe citizens will likely assume the capacity to provide is constant across collector types — since a different part of the government is responsible for government spending. Thus, we have chosen to preregister the hypothesis as specified above. We will test this hypothesis with the survey question: “Now I would like to ask you what you think the provincial government will do with the money it receives from this property tax campaign. Imagine that the provincial government of Kasai Central receives \$1000 thanks to this campaign. How much of this money will be put to good use, for example providing public goods?” We will also examine analogous questions replacing “provincial government” with “DGRKOC” collectors and “avenue chiefs”, respectively.

H47: Individuals in Local will display greater trust in the state after the campaign relative to the Control and relative to Central. Similarly, we expect that citizens in Local will trust the state relatively more. We will measure trust with the survey question: “To what extent do you trust the state and its agents?”

6.8 Substitution with other local and state obligations

Finally, we examine hypotheses about local and central state activities are substitutes or complements, using the endline survey sample.

H48: Individuals in Local will shift toward resolving their conflicts with the chief, while individuals in Central will shift toward the state. In Kananga, the two main ways citizens can resolve local disputes (over property rights, for example) are (1) the formal court system, (2) the intervention of the local avenue/locality/neighborhood chief. Generally, we expect that the campaign will lead citizens to demand more from the formal state –consistent with Weigel (2018a). But in the case of conflict resolution, we expect that citizens in Local will demand more from their chiefs. In the case of conflict resolution, we expect this countervailing force –away from the formal court system and toward local dispute resolution via chiefs– will dominate. We will measure this using the following question: “Imagine that you have a conflict with your neighbor (for example a dispute about the limits of your land plot or an unpaid debt). Imagine that you can only consult the locality chief OR the police/judicial system. Whom would you consult first?”

H49: Local will cause more people to view community public goods (*Salongo*) as an obligation. They will be asked this question: “Imagine your locality chief asks several members of the community to participate in *Salongo*. One of these individuals, named Ntumba refuses to help, saying he is too busy. Do you think Ntumba’s decision is acceptable, acceptable in some situations, or not acceptable?” We expect that people in Local will view such abstaining from *Salongo* as less acceptable compared to other treatment arms. We also expect them to report that household members participate more frequently. The logic is that being charged with tax collection boosts the perceived legitimacy and power of local chiefs, hence enhancing their authority in other domains. However, among payers in Local, we expect them to have contributed to *Salongo* less, suggesting that this informal tax and the formal property tax are substitutes.

H50: Citizens in Central will be more likely to erase their tax codes and to avoid spending time at their houses during the day relative to citizens in Local. This is a more tentative hypothesis, but the logic is as follows. The status quo level of property tax compliance is essentially zero. Weigel (2018b) shows that door-to-door collection by central agents can increase compliance to 11%; however, the vast majority of property owners still avoid tax payment. We expect that our interventions will increase tax compliance relative to the status quo. However, we expect that the norm will still be to seek to avoid taxation. Citizens may comply when visited by local and/or central collectors, but after doing so may be more or less likely to undermine the ability of the state to identify their property in order to avoid future forms of taxation depending on who they encounter in the door-to-door taxation visits. Our clearest measure of this behavior is the erasing of codes assigned during the census. Although these codes are official and necessary for the tracking systems of the property tax campaign, they are written in chalk and citizens can erase them to try to avoid future taxation and remain “illegible” to the state

(Scott, 1998). We expect this behavior to be more frequent in areas where DGRKOC agents collect taxes because the code is the only way to identify the house whereas the chief can more easily identify people absent codes. Another potential measure is the number of visits it takes enumerators to find an adult at home available to conduct the midline survey. Families could strategically stay away from their homes to avoid central collectors who are more likely to visit during work hours. Chiefs, on the other hand, could potentially visit households at any point in the day since they live in the neighborhood. Anticipating this, we expect that households will try harder to become “unfindable” in Central relative to Local.

7. Power analysis

Based on the results of the pilot, the power calculations assume a minimum detectable effect (MDE) of 0.1 percentage points for the Central, 0.12 pp for Local, 0.12 pp for CLI, and 0.14 pp for CXL. We also assume the assignment of neighborhoods to different treatment arms shown in Table 4 and an average of 200 households per neighborhood.

Power is above 0.9 for most hypothesis tests. However, for some of the comparisons –in particular, for detecting the difference between (1) C vs. CLI, (2) L vs. CLI, (3) C vs. CXL, (4) L vs. CXL, and (5) CXL vs. CLI– power is lower than 0.8. Power is low for the comparison between the local treatment and central with information, but this comparison is not of theoretical interest in this study. A test of joint orthogonality of coefficients rejects the null with probability 0.97.

Table 4: Power analysis

Effect sizes	Neighborhoods	Power	
Central = 0.1	Central = 110	Central = 0.988	C vs. CXL = .986
Local = 0.12	Local = 110	Local = 0.997	C vs. CLI = 0.691
CXL = 0.14	CXL = 50	CXL = 1	L vs. CXL = 0.562
CLI = 0.12	CLI = 80	CLI = 0.995	L vs. CLI = 0.044
-	Control = 5	Cvs.L= 0.8044	CXL vs. CLI = 0.557

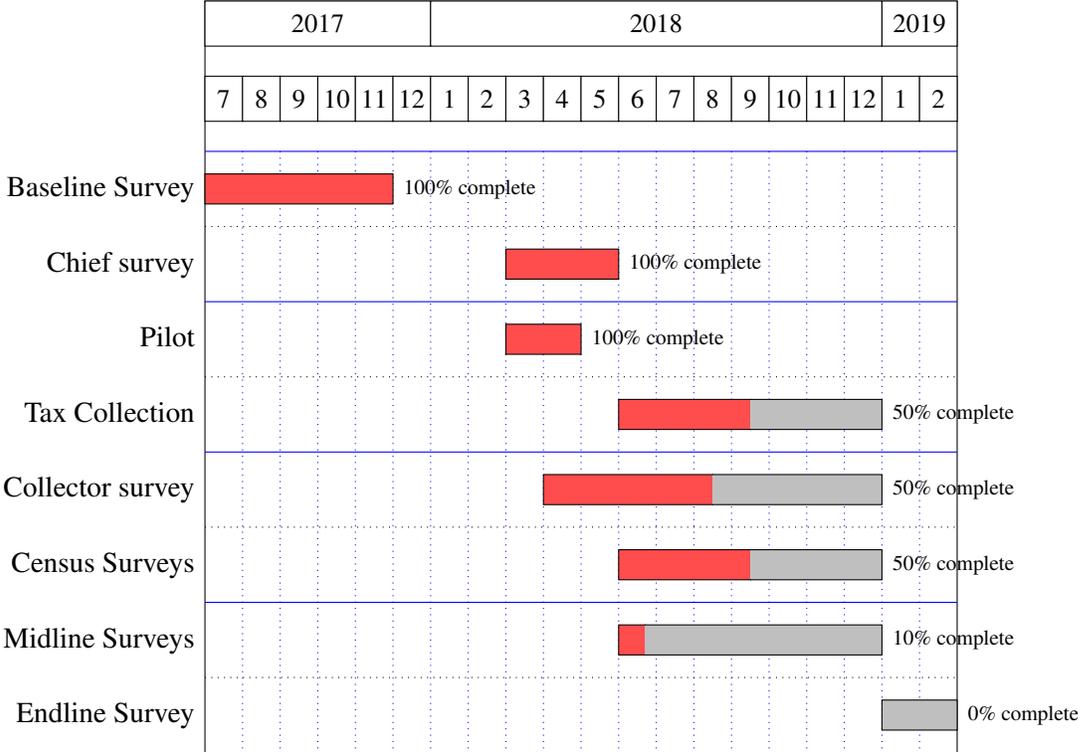
8. Timeline

Figure 5 shows a timeline of the campaign. A first pilot in 4 neighborhoods was conducted in March-April 2018. The property tax campaign started on 15 June and will last for a just over 6 months. Given the number of neighborhoods and collectors involved, the tax campaign will be staggered along neighborhoods.

For Central and Central Plus Local Information, we will employ 15 teams per month. Each team

will be in charge of two neighborhoods, completing a total of 30 neighborhoods per month. This schedule will complete the 190 neighborhoods assigned to these two treatments. For Local and CXL, we will employ 21 teams per month, which should complete the 161 neighborhoods assigned to these two arms in six months.

Figure 5: Timeline



9. Appendix

Figure 6: Information treatments. Top row: public goods: central (left) and local (right). Middle row: deterrence: central (left) and local (right). Bottom row: trust (left) and control (right)


 REPUBLIQUE DEMOCRATIQUE DU CONGO
 PROVINCE DU KASAÏ OCCIDENTAL
 DIRECTION GENERALE DES RECETTES DU KASAÏ OCCIDENTAL
 DGRKOC
 

Le Gouvernement de Kasai Central lance la campagne de collecte de l'Impôt Foncier 2018.

La parcelle, No. 208004,

appartenant à _____,

est assujettie à un taux de : 2000 FC*

à payer au percepteur de la DGRKOC une fois par année.

Rappelez-vous :

Le Gouvernement Provincial pourra améliorer les infrastructures publiques à Kananga seulement si les résidents paient l'impôt foncier.


 REPUBLIQUE DEMOCRATIQUE DU CONGO
 PROVINCE DU KASAÏ OCCIDENTAL
 DIRECTION GENERALE DES RECETTES DU KASAÏ OCCIDENTAL
 DGRKOC
 

Le Gouvernement de Kasai Central lance la campagne de collecte de l'Impôt Foncier 2018.

La parcelle, No. 208005,

appartenant à _____,

est assujettie à un taux de : 3000 FC*

à payer au percepteur de la DGRKOC une fois par année.

Comme preuve de paiement, vous recevrez un reçu imprimé sur place (voir l'exemple à droite).

Rappelez-vous :

Le Gouvernement Provincial pourra améliorer les infrastructures publiques à Lumpungu seulement si ses résidents paient l'impôt foncier.


 DIRECTION GENERALE DES RECETTES DU KASAÏ OCCIDENTAL
 REPUBLIQUE DEMOCRATIQUE DU CONGO
 KASAÏ OCCIDENTAL
 IMPOT SUR LA SUPERFICIE DES PROPRIETES FONCIERES BÂTIES ET NON BÂTIES
 Percevoir Copie
 Date et Heure : 22-FEB-2018 11:04:05
 Doc : KASAÏ0000000000000000000000
 Nom de contribuable : Mwaniso
 Adresse : Kumpungu
 Lieu de l'Exploitation : 208005
 Type de taxe : Droit 1.000
 Taux : 1.000
 Quantité/Base : 1
 Taux : 1.00
 Montant (CDD) : 3000
 Nom et Adresse : Kelsey Kelsey Jean (EN201800000000)


 REPUBLIQUE DEMOCRATIQUE DU CONGO
 PROVINCE DU KASAÏ OCCIDENTAL
 DIRECTION GENERALE DES RECETTES DU KASAÏ OCCIDENTAL
 DGRKOC
 

Le Gouvernement de Kasai Central lance la campagne de collecte de l'Impôt Foncier 2018.

La parcelle, No. 208002,

appartenant à _____,

est assujettie à un taux de : 3000 FC*

à payer au percepteur de la DGRKOC une fois par année.

Rappelez-vous :

Si vous refusez de payer l'impôt foncier, vous pourriez être interpellé à la DGRKOC pour le suivi et le contrôle.


 REPUBLIQUE DEMOCRATIQUE DU CONGO
 PROVINCE DU KASAÏ OCCIDENTAL
 DIRECTION GENERALE DES RECETTES DU KASAÏ OCCIDENTAL
 DGRKOC
 

Le Gouvernement de Kasai Central lance la campagne de collecte de l'Impôt Foncier 2018.

La parcelle, No. 208003,

appartenant à _____,

est assujettie à un taux de : 2500 FC*

à payer au percepteur de la DGRKOC une fois par année.

Comme preuve de paiement, vous recevrez un reçu imprimé sur place (voir l'exemple à droite).

Rappelez-vous :

Si vous refusez de payer l'impôt foncier, vous pourriez être interpellé à vous rendre chez le chef de quartier pour le suivi et le contrôle.


 DIRECTION GENERALE DES RECETTES DU KASAÏ OCCIDENTAL
 REPUBLIQUE DEMOCRATIQUE DU CONGO
 KASAÏ OCCIDENTAL
 IMPOT SUR LA SUPERFICIE DES PROPRIETES FONCIERES BÂTIES ET NON BÂTIES
 Percevoir Copie
 Date et Heure : 22-FEB-2018 11:04:05
 Doc : KASAÏ0000000000000000000000
 Nom de contribuable : Mwaniso
 Adresse : Kumpungu
 Lieu de l'Exploitation : 208003
 Type de taxe : Droit 1.000
 Taux : 1.000
 Quantité/Base : 1
 Taux : 1.00
 Montant (CDD) : 2500
 Nom et Adresse : Kelsey Kelsey Jean (EN201800000000)


 REPUBLIQUE DEMOCRATIQUE DU CONGO
 PROVINCE DU KASAÏ OCCIDENTAL
 DIRECTION GENERALE DES RECETTES DU KASAÏ OCCIDENTAL
 DGRKOC
 

Le Gouvernement de Kasai Central lance la campagne de collecte de l'Impôt Foncier 2018.

La parcelle, No. 208006,

appartenant à _____,

est assujettie à un taux de : 1500 FC*

à payer au percepteur de la DGRKOC une fois par année.

Rappelez-vous :

Payez l'impôt foncier afin de montrer que vous avez confiance en l'Etat et ses agents.


 REPUBLIQUE DEMOCRATIQUE DU CONGO
 PROVINCE DU KASAÏ OCCIDENTAL
 DIRECTION GENERALE DES RECETTES DU KASAÏ OCCIDENTAL
 DGRKOC
 

Le Gouvernement de Kasai Central lance la campagne de collecte de l'Impôt Foncier 2018.

La parcelle, No. 208001,

appartenant à _____,

est assujettie à un taux de : 1500 FC*

à payer au percepteur de la DGRKOC une fois par année.

Comme preuve de paiement, vous recevrez un reçu imprimé sur place (voir l'exemple à droite).

Rappelez-vous :

Il est important de payer l'impôt foncier.


 DIRECTION GENERALE DES RECETTES DU KASAÏ OCCIDENTAL
 REPUBLIQUE DEMOCRATIQUE DU CONGO
 KASAÏ OCCIDENTAL
 IMPOT SUR LA SUPERFICIE DES PROPRIETES FONCIERES BÂTIES ET NON BÂTIES
 Percevoir Copie
 Date et Heure : 22-FEB-2018 11:04:05
 Doc : KASAÏ0000000000000000000000
 Nom de contribuable : Mwaniso
 Adresse : Kumpungu
 Lieu de l'Exploitation : 208001
 Type de taxe : Droit 1.000
 Taux : 1.000
 Quantité/Base : 1
 Taux : 1.00
 Montant (CDD) : 1500
 Nom et Adresse : Kelsey Kelsey Jean (EN201800000000)

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