

THE ORIGINS OF TAX COMPLIANCE AND STATE CAPACITY

PRE-ANALYSIS PLAN *

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Abstract

What are the barriers to raising revenues in developing countries? With the goal of reducing reliance on foreign aid and natural resources, many governments seek to build tax bases among citizens who operate predominantly within the informal sector. Recent research has documented the difficulty of encouraging citizens in these contexts to enter the formal sector and regularly pay taxes. This study explores three understudied determinants of low tax compliance. First, low-capacity states are typically weak at protecting property rights. Second, inefficient methods of tax collection may constrain the effectiveness of enforcement. Third, when citizens face high liquidity constraints, compliance may be elastic to the tax burden. We will assess the effect of these factors on tax compliance with a randomized field experiment that implements interventions affecting each of these margins through a collaboration with the Provincial Government of Kasaï Central in Kananga, Democratic Republic of the Congo, from August 2017 to December 2018. We will vary (1) subsidized access to formal land titles, (2) the method of tax collection—comparing centralized and local collection—and (3) the property tax rates faced by households. This Pre-Analysis Plan presents the research design and introduces the hypotheses pertaining to the land titling intervention. It will be updated after a pilot of the tax intervention in early 2018 to include hypotheses pertaining to taxation before endline data collection.

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1 Outline

A prominent tradition in the social sciences argues that taxation is a key component of state capacity ([Levi, 1988](#); [Tilly, 1985](#)) and a crucial foundation of political and economic development ([Kaldor, 1965](#); [Fukuyama, 2011](#)). When states manage to obtain revenues from natural resource rents or national transfers — instead of taxation — they might be less bound by a social contract to provide services to their citizens. Accountable government emerges, it is thought, only when states are forced to systematize tax collection ([Bates and Lien, 1985](#)). In the words of Oliver Wendell Holmes, "taxes are the price we pay for civilization". Indeed, 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](#)). This study investigates how low-capacity states in developing countries can increase tax compliance among citizens.

According to standard theories of tax compliance, the probability of detection is the primary determinant of a taxpayer's decision to evade ([Allingham and Sandmo, 1972](#)). Recent empirical work in developed and developing countries supports this proposition, showing that increasing 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](#)). However, in developing contexts — where enforcement is imperfect and challenges like literacy present barriers to formal participation — tax compliance is also affected by a different set of factors.

We seek to explore three such factors. First, there may exist barriers to formalization beyond the threat of audit and punishment that constrain extensive margin compliance. Recent contributions extend traditional models to include norms of tax morale ([Traxler, 2010](#); [Frey and Torgler, 2007](#)) and provide evidence that tax compliance is a complex decision involving trust of state institutions and perceptions of corruption ([Luttmer and Singhal, 2014](#)). Second, resource constraints on enforcement capacity may require governments to make difficult choices among second-best policies. Here cost-effectiveness becomes the primary concern: rather than balancing revenue requirements against distortions to taxpayers, states seek to maximize revenues given a constraint on enforcement resources ([Levi, 1988](#)). Third, among low-income taxpayers, liquidity constraints poses barriers to payment. Indeed, recent work in our context suggests that tax compliance is strongly determined by the ability of taxpayers to meet liabilities ([Weigel, 2017](#)).

We explore these three mechanisms in the context of a randomized field experiment in the city of

Kananga, in the Democratic Republic of Congo (DRC). Partnering with the provincial government, we study three interventions. First, by facilitating access to formal land titles, we aim to measure demand for this good and how property tax compliance responds to the holding of a formal title. The second intervention compares tax collection conducted by employees of the tax ministry to collection done by local "city chiefs" who live in the neighborhood in which they will collect taxes. The third intervention is the distribution of tax coupons that vary the household-level property tax rate, enabling us to estimate the elasticity of tax compliance with respect to the tax rate. In addition to their intended theoretical contributions, the findings of this study have the potential to inform land and tax policy in low-capacity settings.

Kananga, a city of roughly 1 million (the fourth largest in Congo), is the seat of the Provincial Government of Kasaï Central. Like many provincial governments in Congo and elsewhere in sub-Saharan Africa, state capacity is weak, and the citizen tax base very small. With nearly 6 million people in the province, one of the poorest in the D.R. Congo, provincial tax receipts from 2010-2015 averaged around \$2 million per year. The majority of government revenues instead come from national transfers and resource rents. The great majority of provincial taxes in Kasaï Central are paid by firms — such as mobile phone and mining companies — located in downtown Kananga.

1.1 Formal Land Titling

The absence of formal property rights can constrain both the ability of economic agents to operate as well as the ability of the state to levy taxes on citizens. Insecure property rights may lead individuals to invest less in developing property holdings or to undertake inefficient measures to secure them. In turn, informal property ownership may limit the ability of the state to impose tax obligations on citizens. The difficulty of identifying the appropriate subject of taxation may present significant challenge for low-capacity governments, and potential for voluntary tax compliance may be severely undermined when the state is unable to provide formal property rights. We detail the existing evidence on each of these channels in more detail below.

Low participation in the formal state sector is an impediment to good governance and economic development in many countries in Africa and elsewhere in the developing world. Governments struggle to raise taxes and deliver public goods to informal economic actors about whom knowledge is scarce. Among citizens, the lack of formal status — including property titles recognized by the state — may undermine the security of land ownership and preclude access to government services. Why might individuals resist formalization? Perhaps the clearest reason is a fear of greater tax liability upon entering the government

database. Yet, even in settings where the link between formalization and tax liability is tenuous, rates of formal participation remain low. Other potential obstacles include lack of information and the high transaction costs associated with formalizing a business or plot of land.

Besley and Ghatak (2009) specify the mechanisms by which property rights may be conducive to development. First, expropriation risk means that individuals are unable to realize the fruits of their investment, leading to lower levels of investment. Indeed, this is the main theoretical rationale for using expropriation risk as a proxy for institutional quality (Acemoglu, Johnson, and Robinson, 2001). Second, insecure property rights imply that individuals fear expropriation and thus undertake costly activities to defend their property. Third, insecure property rights mean that gains from trade will not be realized because agents fear they will be expropriated without compensation. Finally, secure property rights imply that property can be used as a collateral to support other transactions, facilitating access to credit (De Soto, 2000). As a consequence, lack of secure property rights may limit the scope for investment, credit access, and development.

The majority of studies about the effects of property rights come from rural settings. For Africa, several studies show that secure property rights have a positive effect on investment (Besley, 1995; Goldstein and Udry, 2008). For the United States, recent evidence finds that property right protection driven by exogenous variation in the cost of fences led to higher agricultural investments and productivity (Hornbeck, 2010). For urban settings, the bulk of the evidence comes from a series of papers about Peru and Argentina. Exploiting a natural experiment in a slum in Buenos Aires, Argentina, Galiani and Schargrodsy (2010) show that randomly allocated property rights have a positive effect on household investment, a negative effect on fertility, and a positive effect on investment in human capital. Using the same natural experiment, Di Tella, Galiani, and Schargrodsy (2007) find that property rights induce a change in beliefs, boosting trust, individualism, and materialism. For Peru, Field (2003, 2005, 2007) analyzes the impact of a land titling program on squatter settlements. The studies show that the lack of formal titling reduces the total household labor supply, whereas titling allows for the substitution of child labor by adult labor, increases investment, and is associated with reductions in fertility. These findings suggest that formalization in one dimension (property) can induce formalization in other domains, an intuition that informs some of the hypotheses we present in Section 4.

A recent meta-analysis of 20 quantitative studies (none of which are randomized control trials) and 9 qualitative studies finds that tenure recognition generally has a positive effect on land productivity and income (Lawry, Samii, Hall, Leopold, Hornby, and Mtero, 2017). The evidence also shows that the main

mechanisms are tenure security and long-term investment, whereas there is little support for a credit effect. Evidence on other outcomes is less conclusive.

Our study will build on past work by providing the first fully experimental evidence on the effects of land titling in an urban environment.

Moreover, there is little evidence on how formal property ownership affects tax compliance in particular. Providing property rights may raise the willingness of citizens to contribute taxes to the state if property rights are understood as a public good provided by the government, the administration of which is financed through tax revenues. Alternatively, providing formal titles may make citizens less willing to comply with tax obligations if tax payment provides a substitute protection against expropriation risk — either by providing a legal recognition of ownership in the case of dispute or if property taxes represent the cost of avoiding expropriation by state actors. In such cases, formal property rights may reduce tax compliance. Lastly, given the evidence on insecure property rights necessitating costly investments in informal property protection and reducing participation in the labor force, formal titles may alleviate liquidity constraints and increase the share of citizens able to comply with tax obligations. Though existing theory and empirical studies are scarce, we hope to provide novel evidence on the interaction between increased access to formal titles and enhanced tax enforcement to describe how citizens of a low-capacity state respond in their willingness to comply with tax obligations.

Moreover, the study will probe the effects of land titling on a richer set of outcomes relative to those considered in the existing literature. For instance, the titling campaign might be construed as a signal of state capacity that makes citizens update their beliefs about the state, inducing more favorable views (Weigel, 2017). Alternatively, the land titling campaign could be construed as an effort by the state to make society more legible (Scott, 1998), inducing citizens to retreat from the state in other domains. Given that property titles are a valuable asset in the developing world and particularly in our context, we also expect land titles to have some features of status goods (Veblen, 1899) and, as such, may enhance the status and social network centrality of owners. Given the norms of envy prevalent in Sub-Saharan Africa (Platteau, 2000), titling may also induce envy by non-selected neighbors. Since land titling involves clear demarcation of plots, it might also increase the search for legal remedies in the case of disputes on limits, crowding out traditional forms of conflict resolution (Ellickson, 2009). Thus, given the social and normative equilibrium prevalent in our context, we expect the introduction of land titling to have normative and behavioral effects above and beyond tax compliance and investment.

In addition, the study will randomly vary the price of subsidized titles, allowing for the estimation of the elasticity of demand of formal titles with respect to price. We aim to estimate the citizen demand function for formalization in a low-capacity state setting.

Although Kananga is the 4th largest city in the DRC, very few urban plots have an official legal title. According to pilot data, an estimated 11% of property owners in Kananga have official titles. In the context of Kananga, this low rate of formalization reflects the fact that the current procedure for obtaining legal title is difficult and costly. But above and beyond this cost, citizens must navigate considerable red tape and pay bribes to the two ministries charged with the process. Including all administrative fees, citizens can pay up to 1000 USD for the titles with higher legal weight. As a result, official legal titles remain rare. We aim to reduce these costs by deploying teams of surveyors in neighborhoods to conduct on-site appraisals and complete the necessary paperwork. Households will be randomly selected to be offered these home visits. The state surveyors responsible for this process will be accompanied by members of the research team to be sure the work is done in houses selected by the randomization.

1.2 Central vs. Local Taxation

After completion of the land titling intervention, we will study how tax compliance and revenue generation vary with the mode of tax collection. Among other factors, the optimal tax collection strategy is a function of transaction costs, which are high in low-capacity states (Levi, 1988). As a result, many low-capacity states facing low compliance and high costs of monitoring cannot collect universal taxes — such as the income tax and property tax — and often rely on "gatekeeper" methods of raising revenue, such as taxing trade and transportation (Cooper, 2002). Historically, many premodern states also relied heavily on indirect forms of local tax collection, such as tax farming (Levi, 1988). The main advantage of this technique was that it provided rules with a predictable flow of revenue (Kiser and Karceski, 2017). Because agents are residual claimants, tax farming is thought to be efficient (Kiser, 1994). However, it can lead to overtaxation. These observations suggest the existence of a trade-off: while local tax collection involves lower administrative costs, it also introduces the need for monitoring agents to prevent abuse (Stella, 1993).

We will compare two modes of property tax collection in Kananga. In the central tax collection treatment, agents of the provincial tax ministry will go door to door conducting a census and collecting the property tax. This process will be analogous to that studied in Weigel (2017), which found that such a central property tax collection strategy increased tax compliance by 11 percentage points. However, it is

striking that even when tax collectors come to make in-person tax appeals, nearly 88% of individuals manage to evade the tax. For this reason, the provincial government seeks to explore whether other modes of collection are capable of increasing compliance further. They decided to implement what we call “local tax collection,” which forms the second arm of our study.

In the local taxation arm, collection will be conducted by local bureaucrats known as avenue or localité chiefs. These local chiefs typically 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 (known as *Salongo*), (2) communicating citizens’ grievances to government authorities, and (3) mediating in local disputes. City chiefs have private knowledge about citizens that they can exploit to collect taxes (such as knowledge about the timing of neighborhood- or household-level income shocks that may relax the liquidity constraint), granting them an informational advantage over central collectors. They might also be more trustworthy than central collectors. However, city chiefs will be trading off revenue maximization with popularity in the neighborhood and other unobserved elements of their objective function related to the fact that they live in the area in which they must collect taxes. They could therefore be less willing to collect taxes compared to central tax collectors. Alternatively, they might prove more progressive in whom they target for tax collection, since they have the local knowledge to target those who have the means to pay the tax while sparing those for whom the payment would come from essential consumption. Whether local or central tax collection is more effective from the perspective of the government is thus an empirical question with important theoretical and policy implications.

For the tax collection interventions we will (1) pilot the interventions in a small number of neighborhoods in January 2018, (2) conduct a survey in these neighborhoods to understand pilot results, and (3) re-optimize the interventions, possibly adding cross-randomized interventions that may shed more light on mechanisms behind observed differences between local and central tax collection. After steps 1-3, we will (4) publish an addendum to our Pre-Analysis Plan with many more details about the tax treatments, and (4) launch the full intervention. This approach is similar to a sequential testing plan introduced in [Rosenbaum \(2002\)](#).

We plan to pre-register the addendum to this Pre-Analysis Plan before the endline survey. We view this as an opportunity to reflect on the experience of the intervention and add relevant information and hypotheses that we have discovered to be relevant in the interim. We will publish this update before the endline in order

to ensure that the relevant hypotheses are pre-specified before we collect the outcome data.

1.3 Variation in the Tax Rate

Finally, we will study how tax compliance responds to the tax rate. When surveyed in early 2016, fewer than 3% of households in Kananga reported ever having paid property taxes. We will generate random variation in tax rates to measure any perceived cost of tax non-compliance and help to pin down the revenue-optimal rate of taxation, conditional on estimated evasion costs. This is similar in spirit to [Sequeira \(2016\)](#), who studies the elasticity of reporting goods to customs authority in Mozambique and finds that reducing tariffs increases the reported quantities, which helps offset the lower tax rates. This also builds on [Dunning, Monestier, Piñeiro, Rosenblatt, and Tuñón \(2015\)](#) who randomly vary tax holidays to study dynamic effects on future tax compliance. Since governments are rarely able to assess the revenue gains associated with different tax rates levied simultaneous due to legal restrictions, the opportunity to randomize the rates faced by individuals (through discounts, distributed before tax collectors arrive at citizens' households) provides a chance to estimate the elasticity of compliance with regard to the size of the tax burden. While we expect an inverse relationship between compliance and the tax rate, tracing the elasticity of this relationship will provide novel policy-relevant evidence for governments seeking to build tax bases in a low-capacity environment.

2 Research Design

The experiment will begin with the land titling intervention. The sample will consist of individuals who are interested and eligible to purchase a land title. Randomization will occur on the individual household level following a baseline survey. Teams of government surveyors will visit randomly selected property owners and offer them the opportunity to obtain an official title at lower prices and with a simplified procedure. These selected households are simultaneously assigned (with equal probability) to one of three different price levels at which they can buy titles. Households in the control group will not receive such a visit, nor will they be able to purchase titles at discounted rates. However, they will continue to be able to access land titles through the status quo procedure.

Second, upon completion of the land-titling intervention, tax coupons will be distributed in all neighborhoods, entitling selected households to a reduction of the property tax rate. This intervention is randomly

assigned at the household level.

Finally, once the tax coupons have been distributed in a neighborhood, the collection of the property taxes will commence. Properties will be assigned to central or local tax collection. Central and local tax collectors will conduct a census and then solicit payments from property owners. This intervention is assigned on the neighborhood level.

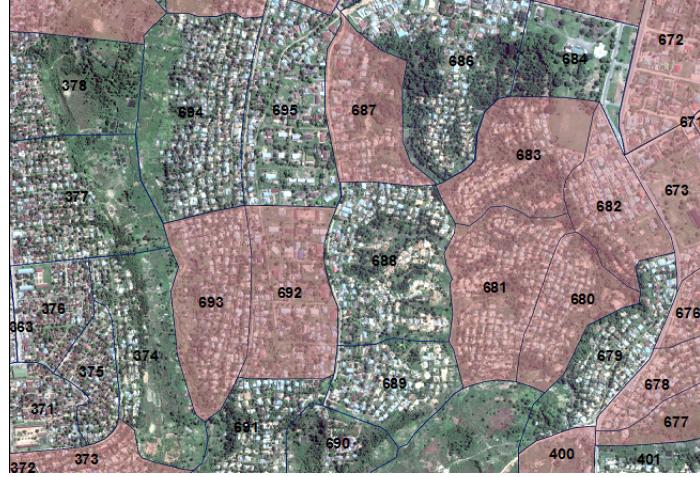
Table 1: Experimental Design

	Central tax (181 polygons)	Local Tax (180 polygons)
Status quo (no titling)	500 CF: N=270 1000 CF: N=270 1500 CF: N=270 2000 CF (control): N=273	500 CF: N=270 1000 CF: N=270 1500 CF: N=270 2000 CF (control): N=273
Land titling	500 CF: N=270 1000 CF: N=270 1500 CF: N=270 2000 CF (control): N=273	500 CF: N=270 1000 CF: N=270 1500 CF: N=270 2000 CF (control) : N=273

2.1 Sampling Strategy

Study units are individuals within neighborhoods, the level at which the land titling and discounted tax rate interventions will be randomized. Neighborhoods were defined for a recent tax collection campaign studied by one of the researchers ([Weigel, 2017](#)) using a satellite map of Kananga and dividing the urban areas into 361 polygons of similar size along naturally occurring boundaries, such as avenues and ravines. These polygons approximate the existing administrative unit called a ‘locality.’ Some neighborhood-level outcomes will be considered along with individual-level outcomes. Figure 1 shows how polygons were defined using satellite imagery. Households within polygons will be randomly selected to participate in the baseline survey and individual-level treatment experiments. Enumerators will follow a polygon-specific skip pattern determined by the estimated population of the polygon. They will walk along street sampling every n th household, where $n = \frac{\text{Population of Polygon}}{\text{Number of Surveys Required in Polygon}}$. We can verify that enumerators follow this protocol using the GPS coordinates collected during each survey.

Figure 1: Geographic Polygon Divisions of Kananga



2.2 Spillovers

Spillovers in our context should be minimal. The individual level treatments will only be provided to individual households, the GPS coordinates of which we will map and track. The titling and rate treatments will only be accessible by the unique households selected into each treatment arm; the information treatment will provide information to individual households during surveying — while this information may be shared with neighbors, we will be able to track proximity of any potential information spillovers through the data collected.

2.3 Implementation

The titling treatment will proceed as follows. In collaboration with the provincial government, we will subsidize the three main land titles in the DRC: Certificat d'Enregistrement (CE), Contrat de Location (CL), and Acte de Vente Notarié (AVN). These are listed in decreasing legal weight. All three titles confer more security to owners. Selected respondents are given a flyer (both in French and Tshiluba, the local language) containing information about each of these titles (Figure 2). If a selected respondent has a title that is no longer valid, he can choose among these three. If a selected respondent already has a title, he can choose one that has higher legal value. The more expensive titles are subject to eligibility requirements. For instance, to obtain a Certificat d'Enregistrement a person must have built on at least 10% of a plot of land. Figure 2 shows a list of the price levels corresponding to each title. Building on this differential legal weight, we will

PROFITEZ DE L'OCCASION: CAMPAGNE SUR LES TITRES DE PROPRIÉTÉ

- Le gouvernement provincial lance une campagne pour encourager l'obtention des titres de propriété à Kananga. Dans le cadre de ses recherches scientifiques, Harvard-RDC voudrait faire la sensibilisation et l'évaluation de la campagne.
- Vous pouvez obtenir un document officiel à un prix promotionnel (une réduction jusqu'à 86% du prix normal).
- Un agent viendra chez vous pour faciliter les démarches, vous accompagnera au bâtiment administratif, et vous remettra le document en main propre.
- Vous gagnerez donc en temps et en argent.
- Vous avez été sélectionné(e) pour cette campagne. Cette offre est personnelle.

ACTE DE VENTE NOTARIE

- L'acte de vente notarié vous permet de rendre votre acte de vente officiel.
- Il a plus de valeur légale que l'acte de vente non-notarié en cas de conflit concernant la propriété de votre parcelle ou la vente de celle-ci.

PRIX PROMOTIONNEL : 20 dollars (Prix fixe. Offre limitée à notre campagne de trois mois.) *Commencez à épargner !*

PRIX NORMAL : 145 dollars

CONTRAT DE LOCATION

- Le contrat de location est un titre de propriété valable 3 ans et renouvelable.
- Il a plus de valeur légale que l'acte de vente notarié ou non-notarié en cas de conflit concernant la propriété de votre parcelle, ses limites, et aussi la vente de celle-ci.
- Nous proposons la réduction du prix du contrat de location et nous offrons un montant fixe au lieu du montant actuel, proportionnel à la taille de votre parcelle.

PRIX PROMOTIONNEL : 52 dollars (Prix fixe. Incluant 4 bornes. Offre limitée à notre campagne de trois mois.) *Commencez à épargner !*

PRIX NORMAL : prix proportionnel.
Exemple : entre 200 dollars et 500 dollars (selon la grandeur de la parcelle.)

CERTIFICAT D'ENREGISTREMENT

- Le certificat d'enregistrement est le titre de propriété par excellence.
- Il est instauration (après deux ans) en cas de conflit concernant la propriété ou les limites de votre parcelle, ou si vous désirez vendre celle-ci.
- Il a plus de valeur légale que le contrat de location ou l'acte de vente notarié ou non-notarié.
- L'obtention d'un certificat d'enregistrement est conditionnée à la mise en valeur (bâti d'au moins 10% de la parcelle en matériel durable).
- Le prix promotionnel remplace l'ancien prix proportionnel.

PRIX PROMOTIONNEL : 87 dollars (Prix fixe. Incluant 4 bornes. Offre limitée à notre campagne de trois mois.) *Commencez à épargner !*

PRIX NORMAL : prix proportionnel.
Exemple : entre 300 dollars et 700 dollars (selon la grandeur de la parcelle.)

Sceau par Tiers Immobilier

	TSHIKONDO TSHIMPE BUEBE Wewe: NDONGAMU WA DIPETA DIA MIKANDA YA MPANGU	
<p>Mbulamataladi wa mu province m'musue kubangisha ndongamu wa dikankamika bantu bua dibapetesha dia mikanda ya mpangu mu Kananga. Nunku kuptishila ku malonga ende, Harvard-RDC idu wenza disolosona le dilondolola dia bulongolodila.</p> <ul style="list-style-type: none"> • Udi muja kupteta mukanda wa lupangu kudi mbulamataladi ku mushinga mutupula (Nebapusekeshe mushinga too ne mu bia lukama 86 bia mushinga wa tshibidilu). • Muena mbulamataladi neku'ebu kuu kubukepesela ditambakanu, neakufile ku batiment administratif ne nekupekeshe mikanda. • Kuakujimija diba diebe to ne neutelle mifraga mikesee. • Udi umue wa mu bantu badi basungudibue mu ndongamu eu. Dipa edi diidu buebe wewe nkayebé. 		
ACTE WA VENTE MUTUE TSHTAMPPI		
<ul style="list-style-type: none"> - Ditsiha tshtampi pa Acte wa vente dia dieriessi ne ale muakanda munanya kudi mbulamataladi. - Udi ne mushinga wa bungi ku mbulamataladi kutamba acte wa vente ud iyi mutue tshtampi bikalau kudi matandu bilimbu bia mpangu idu upejeja dipanshia dia lupangu kudi kumun'ala. 		
MUSHINGA MUPUNKEASHA : 20 dollars (Mushinga eu kawera ushinkulua edd idu obla nhobenga wetu mu rgento istatu). Benglole ditema dia impetu /	MUSHINGA WA TSHTIBIDOLU : 145 dollars	
CONTRAT WA LOCATION		
<ul style="list-style-type: none"> - Contrat wa location udi mukanda wa lupangu. Mushinga wawu udi ujika kunyima kua bidumu bisatu, bidi bilombibue bua kuenzwella. - Udi ne mushinga ku mbulamataladi kutamba acte wa vente mutue tshtampi anyi ayi kaiyut tshtampi diba dia matandu ne bilimbu pa lupangu luebe anyi miyalu nyi, ne kabidi biwiliha musule kulpunyaha. - Tudi tupesha bantu contrat wa location eu ku mushinga mutukete pamutu pa mushingha utuku pa tshibidilu bilondeshole bunene bua pangang. 		
MUSHINGA MUPUNKEASHA : \$2 dollars (Bung) bua kufula tshibidilu. Buda bukubangane ne borne 4. Dipa edd idu ana bua rgento satu thihana anbu bua benni bokila basungula mu bulongolodlu. Benglole ditema dia impetu /	MUSHINGA WA TSHTIBIDOLU : Bilondeshole bunene bua lupangu. Tshieje: Udi mas kutila mushinga wa ndola 200 too ne 100 500 bilondeshole bunene bua lupang.	
CERTIFICAT WA ENREGISTREMENT		
<ul style="list-style-type: none"> - Certificat wa enregistrement m'mukanda wa lupangu idu mutarimbé mikabu yorso - Keduna muu kubofala mukanda eu (kunyima kua bidumu 2) Tshikondo tshta matandu ne bilimbu pa lupangu luebe anyi miyalu nyi, ne biwiliha musule kulpunyaha. - Udi ne mushinga wa wabungu ku mbulamataladi kutamba contrat wa location ne acte wa vente mutue tshtampi anyi udi kaiyut mutue tshtampi. - Bua kupteta certificat wa enregistrement bidi bilombibue bua se lupango luebe lulkale lubaka nasha bia pa lukama 10 mu materialux durus. - Neufies mushinga mupunkeasha pamutu pa mushingha utuku bilondeshole bunene bua lupang. 		
MUSHINGA MUPUNKEASHA : 25 dollars (Bung) bua kufula bukubangane ne borne 4. Dipa edd idu ana bua rgento satu thihana anbu bua benni bokila basungula mu bulongolodlu. Benglole ditema dia impetu /	MUSHINGA WA TSHTIBIDOLU : Bilondeshole bunene bua lupangu. Tshieje: Udi mas kutila mushinga wa ndola 300 too ne 700 bilondeshole bunene bua lupang.	
MUSA SHINDERE AND THES Immobiliers		

Figure 2: Information flyer (medium price tier). French (left) and Tshiluba (right)

construct an intensive version of the treatment, with three levels corresponding to each of the aforementioned titles.

Selected households receive three visits. In the first visit, two interns measure the plot and check the respondent's legal documents. In the second visit, an enumerator accompanies the respondent to the bank to pay for the title, after which titles are produced by the city titling office. In the third visit, the respondent receives the title.

Table 2: Subsidized price of each title

DOCUMENT	GROUP	PRICE
Certificat d'entregistrment	A	100 USD
	B	75 USD
	C	50 USD
Contrat de location	A	50 USD
	B	40 USD
	C	30 USD
Acte de vente notarié	A	25 USD
	B	20 USD
	C	15 USD

We will describe the implementation of the taxation interventions in more detail in the addendum to be added to the Pre-Analysis Plan after completion of piloting and before endline data collection. Tax rates will be randomized by providing discount vouchers to selected households distributed by the enumeration team.

3 Data

Data for the analysis will come from two main sources. First, we will administer surveys at baseline and endline to 4,332 households — 12 per polygon. The baseline survey instrument covers a range of topics, including but not limited to: (1) demographics, (2) property characteristics, (3) governance, (4) public goods, (5) experience with taxation and other payments to the state (formal and informal), (6) property taxes, (7) rental taxes, (8) city chiefs, (9) political beliefs and participation¹, and (10) social networks. Survey data will be used to construct variables with which to measure the effects of formalization on a range of outcomes, including land title adoption, tax payment, views of the government, views of traditional authorities, civic and political engagement at different levels (i.e. local engagement, provincial engagement, national engagement), access to public goods, security of property rights, investment in one's plot of land, access to finance. When possible we will combine groups of survey questions about the same outcome and construct standardized indices to reduce the risk of type 1 and 2 error.

We will also use these survey data to construct neighborhood-level outcomes. Pooling outcomes within sample polygons will allow us to compare how local shares of outcomes respond to the treatments. For

¹Depending on the willingness of the government, we hope also to include quasi-experimental measures of costly participation. For example, following Weigel (2017), we will try to establish a suggestion box and to encourage the government to host more townhall meetings to which attendance might serve as a measure of participation. If the government approves these measures, we will publish an addendum before the endline survey noting which outcomes we will examine.

instance, we will examine the proportion of households within a polygon (neighborhood) holding (baseline) or obtaining (post-treatment) formal land titles (from administrative and self-reported data). We will also consider the proportion of households within a polygon (neighborhood) paying (baseline and post-treatment) property taxes (from administrative data and self-reported).

Finally, we will use survey data to construct covariates including household characteristics, such as physical structure and quality, including the size of structures on the property and the condition of the property and its structures. We will also collect measures of household and individual characteristics, like age, gender, education, wealth, employment status, occupation, formal/informal status, ethnicity, income, and household size and composition that will be used as controls and in heterogeneity analysis.

Second, we will use administrative data from the provincial government. Administrative data will chiefly be used to measure whether participants have formal land titles, whether they have paid property and rental taxes —and if so, how much they paid.

4 Main Hypotheses

This section presents the main hypotheses regarding the effect of the treatment interventions on the primary outcomes as well as secondary outcomes and heterogeneity predictions by individual characteristics.

We will mainly use an intent-to-treat framework.² For individual-level³ outcomes Y_{ip} where i indexes the individual and p indexes the polygon (neighborhood), we will run the following regression:

$$Y_{ip} = \beta_0 + \beta_1 \text{Treatment}_{ip} + \theta X_{ip} + \gamma_p + \varepsilon_{ip} \quad (1)$$

where Treatment_{ip} corresponds to treatment variables shown below. X_{ip} corresponds to individual level characteristics, γ_p corresponds to a randomization polygon fixed effects, and ε_{ip} is the error term. Throughout the analysis, standard errors will be clustered at the polygon-treatment level.

We consider the following treatment variables.

1. *TITLE* (binary): Indicator for individual receiving treatment of subsidized access to formal land titles.

²The following discussion will proceed focusing on the intention-to-treat estimates; however, as some of our treatments involve encouragements (land titling subsidization) and the possibility of incomplete receipt (tax collection and tax rate coupons), in the final analysis we will also consider instrumental variable estimates of treatment-on-the-treated effects, which will have the same directional predictions unless otherwise discussed below.

³For polygon-level outcomes, Y_p will represent outcomes at the polygon-aggregate level. For polygon-level treatments, Treatment_p will represent interventions applied to the polygon unit rather than randomized by household.

2. *TITLE* (intensive): Intensive version of the titling treatment, comprising the three titles subsidized in the campaign: Certificat d’Enregistrement, Contrat de Location, and Acte de Vente Notarié.
3. *CENTRALTAX*: Indicator for polygon (neighborhood) receiving central taxation in which property taxes are collected by agents from the provincial tax ministry.
4. *LOCALTAX*: Indicator for polygon receiving local taxation in which property taxes are collected by the neighborhood chief.
5. *TAXRATE*: Categorical variable corresponding to the tax rate faced by households as adjusted by the tax discount coupons randomly distributed at baseline. Four categories will represent assignment to the 2000 CF (control), 1500 CF, 1000 CF, or 500 CF property tax rate.

4.1 Land Titling

This section presents the hypotheses surrounding the average effect of providing subsidized access to formal land titles. It is important to note that the treatment does not guarantee access to formal titles (nor preclude the control group from obtaining them), but rather facilitates the process by lowering economic and bureaucratic barriers among the treated group. Given the already low rates of holding a formal title in Kananga, we expect the treatment to increase take-up only among those who receive subsidized access.

$$Y_{ip} = \beta_0 + \beta_1 TITLE_{ip} + \theta X_{ip} + \gamma_p + \varepsilon_{ip} \quad (2)$$

[H1: First Stage] The land titling intervention will (on average) increase the rate of receiving formal land titles ($\beta_1 > 0$). This hypothesis is based on the fact that the treatment intervention — which reduces barriers to access to formal titles by offering subsidized titles and simplifying the administrative procedures — will relax the constraints that currently prevent take-up of formal titles. [\[Metaketa\]](#)

[H2]: For each of the three titles subsidized in our campaign, take-up will be higher for the lower price group. [\[Project-specific\]](#)

[H3: Main Outcome] The effect of land titling on tax compliance in our context is ambiguous. While the larger Metaketa study anticipates a positive effect, in our context, we are agnostic about the direction of the effect. This is because pilot evidence suggests that property tax payments could substitute for formal land titling in this context —some individuals may *decrease* tax payment after receiving titles as the formal title might reduce the risk of expropriation previously fulfilled by regular tax payment. As such, we do not

want to take a strong stand on the direction of this relationship in our field site. as they will place greater value on the public services provided by formal property recognition and be willing to contribute more in taxes. [Metaketa]

As explained above, the analysis will include two versions of the titling treatment: a binary version and an intensive version that takes on three values, corresponding to the three titles subsidized in our campaign: Certificat d'Enregistrement (CE), Contrat de Location (CL), and Acte de Vente Notarié (AVN). In particular, for $H2$ and all the following hypotheses, we expect $\beta_1 CE > \beta_1 CL > \beta_1 AVN$.

4.2 Benefits of Formalization

[H4] The titling intervention should increase security in property rights. We plan to measure security of property rights by asking participants a series of questions about the incidence of property disputes, the perceived risks to the plot, and about the owner's current and anticipated future uses of the plot. Following Field (2007), we also expect that land formalization will mean families are less likely to leave members of the families at the compound to supervise when they are away at work or traveling, thus increasing the household labor supply. We similarly expect land titling will trigger more labor migration outside of Kananga. [Metaketa]

[H5] The titling treatment should increase investment in plots as a function of increased security in property rights as legal recognition of ownership should make households more willing to invest in the property. [Metaketa]

[H6] The titling treatment may increase access to finance as households that obtain titles are better able to leverage legal documentation of ownership for use in collateral for loans or lines of credit. Despite the mixed results on this dimension in past studies, we will test this classic theoretical prediction in the context of this RCT. [Metaketa]

4.3 Spillovers on Other Types of Formalization

[H7] The titling intervention will crowd out informal mechanisms of conflict resolution among neighbors and increase demand for (formal) legal remedies. Informal methods of conflict resolution, such as seeking intervention from the customary chief or trying to resolve disputes through violence, are prevalent in contexts where property rights are not well defined (Ellickson, 2009). Consequently, we expect that

increasing the security of property rights will crowd out informal modes of conflict resolution. [Project-specific]

[H8] Consistent with this logic of formality crowding out informal institutions, we expect that people who obtain a property title will invest less in non-state sectors: financial contributions to churches and at funerals and weddings, participation in neighborhood public goods provision (Salongo) and other activities organized by the local city chiefs. [Project-specific]

[H9] The titling intervention will crowd in demand for other types of formalization, such as official permits to sell goods in the market, drivers' license, and voter identification cards. More generally, we anticipate that the intervention will shift individuals more generally from the informal to the formal sector across a number of domains, including health care and lending/borrowing. [Project-specific]

4.4 Political Behavior and Beliefs

[H10] The titling intervention will increase citizens' evaluations of the provincial government, as the treatment provides a useful public service. However, we expect this treatment effect to attenuate for individuals for whom it took a long time to receive a title. In short, the signal of government quality is strongest for individuals who receive their titles rapidly, hence our expectation of a larger treatment effect on these individuals.⁴ [Project-specific]

[H11] The land-titling program intervention will also boost political participation on the provincial level and views of what the provincial government can and should provide to its citizens. We expect this because individuals might update about the capacity and the quality of the government due to the program and thus seek other fruits of engagement with the government. Relatedly, we expect titling to make citizens more averse to change and thus supportive of the current regime, consistent with predictions of investor class theory (De Janvry, Gonzalez-Navarro, and Sadoulet, 2014).

Alternatively, land title may give individuals a stronger sense of citizenship — greater bargaining power, in the Bates and Lien (1985) model — and thus increase their efforts to lobby the government for goods and services. We aim to differentiate these channels in survey questions. We also expect individuals to envision an expanded scope for the government in public goods provision in Kananga. Similar to the previous hypothesis, we expect these effects to be larger on the subset of individuals whose titles were delivered

⁴One might argue that the time of title deliverance is endogenous. However, conditional on household observables, such as wealth, this is much more a product of idiosyncratic factors within the government (not related to respondent characteristics), such as whether the head of the Titling Division was in Kananga (and thus capable of signing finalized titles) or taking a trip to Kinshasa.

promptly. [Project-specific]

4.5 Other beliefs and norms

[H12] In the spirit of Di Tella, Galiani, and Schargrodsy (2007), we expect the titling intervention to increase norms of individualism (relative to collectivism) among individuals in households that obtain property titles because of the program. Survey questions will probe the strength of beliefs in norms of sharing and reciprocity norms—and the probability of community punishment (e.g. shaming or witchcraft) if these norms are violated. [Project-specific]

[H13] Land titling, as a measure of formalization, will crowd out the prevalence of social norms of sharing. In particular, the intervention will crowd out sharing, borrowing, and lending among neighbors and contributions to community public goods projects. Once they have a formal title, citizens may decrease investments in informal insurance against expropriation risk, given that they now have a secure claim to ownership. To measure this, we anticipate a unit in the endline survey about the degree to which households share their land and other assets with their neighbors and contribute to community projects. [Project-specific]

[H14] The titling intervention will affect levels among neighbors. However, we remain agnostic about the net effect. Titling could affect trust via two distinct channels. On the one hand, titling could reduce property-related disputes, thereby simplifying relations between neighbors (Rubenson and Loewen, 2015). On the other hand, if selection into the land-titling program triggers envy, trust levels between neighbors might deteriorate. [Project-specific]

[H15] The titling intervention should increase the perceived social status of individuals living in households that obtain property titles because of the program. There are reasons to believe that formal property titles has features of a status good. The literature has shown that status motivations are relevant in developing contexts. The numerous studies of elite formation in Africa also suggest that those who possess the attributes of modernity can successfully lay claim to high status in many indigenous societies (Bates, 1974). We plan to measure status using social network centrality and other standard survey-based proxies. [Project-specific]

[H16] The titling intervention will increase envy of households who obtained property titles due to the program among households who were not selected to receive the program. Past research documents high levels of envy towards successful individuals in settings with strong norms of sharing and reciprocity, such as sub-Saharan Africa (Platteau, 2000, 2009). We seek to measure if there are such across-neighbor spillovers in envy. [Project-specific]

[H17] Non-selected neighbors will be more likely to think selected households practice witchcraft and black magic. In some parts of sub-Saharan Africa, good fortune is often attributed to the use of black magic, witchcraft, and sorcery (Platteau, 2000, 2009). In Kananga, past data suggests that people believe that about half of the people they know practice sorcery (Nunn, Reid, Robinson, Sanchez de la Sierra, and Weigel, in preparation). The titling intervention constitutes a good luck shock which we hypothesize have spillovers in the perceptions among non-selected neighbors that those who receive titles due to the program are using witchcraft and black magic. [Project-specific]

4.6 Conditional Hypotheses: Heterogeneity by Individual Characteristics

To assess heterogeneous effects by individual characteristics, we estimate the following equation, in which Z_{ip} is a vector of individual characteristics:

$$Y_{ip} = \beta_0 + \beta_1 \text{Treatment}_{ip} + \beta_2 (\text{Treatment}_{ip} \times Z_{ip}) + \beta_3 Z_{ip} + \theta X_{ip} + \gamma_p + \varepsilon_{ip} \quad (9)$$

4.6.1 Heterogeneous take-up

[H18] Households with more wealth and higher incomes are more likely to take up land titles in the titling treatment (and control) groups given that the costs of obtaining a formal title are non-negligible. This includes households with adult individuals who possess formal salaried jobs or who own a business in Kananga. [Project-specific]

[H19] We expect take-up of land titles to be lower among respondents displaying lower levels of trust for the provincial government. [Project-specific]

[H20] We expect take-up of land titles to be lower among respondents who moved because of the recent conflict in the Kasaï region, since the conflict is likely to have changed their expectations about political stability and reduced their embeddedness in the city. Conversely, we expect take-up to be higher among those who did not move because of the conflict. [Project-specific]

[H21] For respondents living in ravine areas, take-up could be higher (if they face high insecurity) or lower (if they feel less attached to their neighborhoods). We are agnostic about the direction of the average effect, but we seek to disentangle the two scenarios in survey questions. [Project-specific]

[H22] Take-up of land titles will be lower among citizens identifying with the opposition, since this group displays lower levels of trust in the government. [Project-specific]

[H23] We expect that, conditional on wealth, individuals who are more embedded in social networks of the neighborhood, will exhibit relatively lower demand for property titles because they have more informal safeguards to ensure their property rights relatively to more marginal members of the neighborhood. This is consistent with the logic and findings put forward by Honig (2017), who argues that individuals with links to the customary land tenure system are less likely to demand titles from the state. In particular, we expect that:

- More central individuals and those with closer connections to the avenue chief will have lower demand for titles.
- Individuals from minority tribes and — consistent with the findings in Honig (2017) — recent migrants will have lower demand for titles.

[Project-specific]

[H24] We expect that people living in polygons with more active chiefs (as measured by chief involvement in dispute resolution and the organization of Salongo) will display lower take-up. **[Project-specific]**

4.6.2 Heterogeneous effects of titling

[H25] Household owners with higher levels of education should display higher take-up as they will better perceive the benefits of formal titling. As education is often correlated with wealth, it will be difficult to disentangle the effects of these mediators separately on the probability of take-up. Better educated owners and also more likely to be better informed about the risks of punishment for tax non-compliance and expropriation — given these probabilities are low in general, it is rational for citizens *not* to pay property taxes; therefore, conditional on income we may expect better educated owners being less likely to pay property taxes. **[Project-specific]**

[H26] We expect the effect of land titling on views on the state (**H10**) to be decreasing in the current level of public goods to which a household has access and the prior level of engagement/familiarity with the government, since for houses with high access the extent of positive updating will be lower than for houses with little or no access to public services. **[Project-specific]**

[H27] We expect the effect of land titling on tax compliance to be more muted among those households that paid the property tax last year. Because they can stop complying with the tax, this margin remains relevant for our study. **[Project-specific]**

[H28] Take-up and tax compliance will be lower for people living in less valuable households, including those that are not easily accessible (i.e., lower in elevation and further in distance from main avenue). **[Project-specific]**

4.7 Conditional Hypotheses: Heterogeneity by Polygon

[H29] We expect land-titling to have larger positive effects on individuals' perceptions of state capacity in neighborhoods with less past exposure to the state and in neighborhoods in which they are less satisfied with public goods provision. **[Project-specific]**

[H30] We expect land titling to have stronger effects on investment, crowding-out social norms, and belief change in peripheral neighborhoods. The intuition is that people living in such neighborhoods have, *ex ante*, less secure property rights as well as less exposure to the formal state. **[Project-specific]**

4.8 Central vs. Local Taxation

To assess the effects of the mode of tax collection, we estimate equations of the form:

$$Y_{ip} = \beta_0 + \beta_1 CENTRALTAX_p + \beta_2 LOCALTAX_p + \theta X_{ip} + \gamma_p + \varepsilon_{ip} \quad (3)$$

As noted earlier, before pre-registering specific hypothesis about the mode of tax collection, we are planning a logistics pilot of these tax interventions with the government in early 2018. We will publish an addendum to this pre-analysis plan after completing this pilot. This will provide more detail about our hypotheses concerning the tax treatments.

4.9 Varying the property tax rate

$$Y_{ip} = \beta_0 + \beta_1 TAXRATE_i + \theta X_{ip} + \gamma_p + \varepsilon_{ip} \quad (3)$$

The main hypothesis is that lower tax rates will lead to higher compliance rates. We will pre-specify interaction effects with the central and local tax arms in the aforementioned addendum.

5 Power Analysis

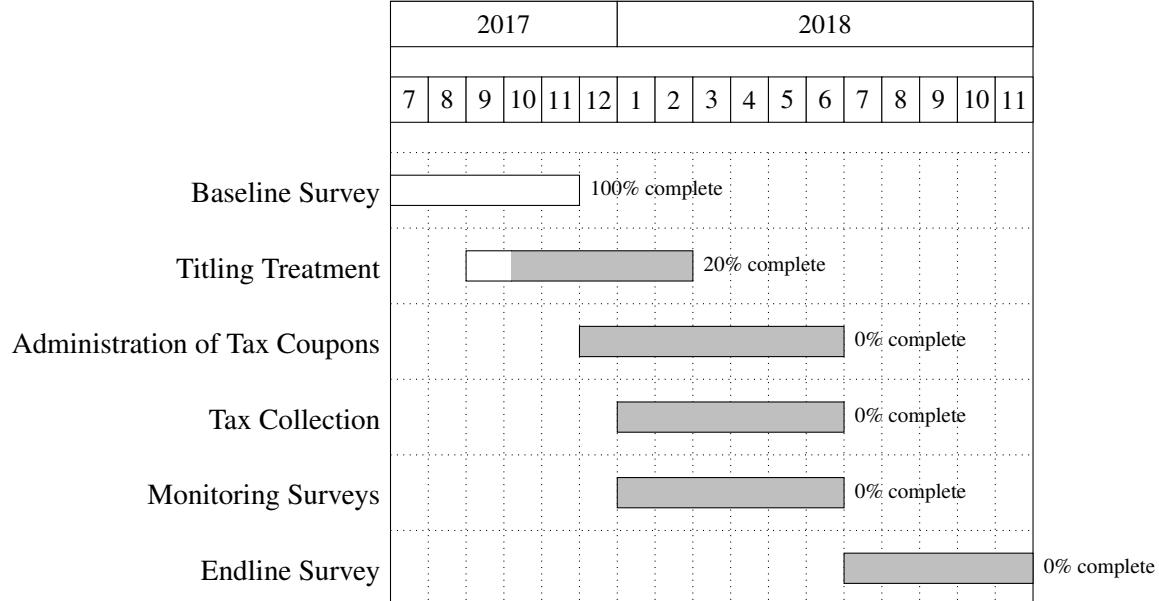
We will estimate effects using an intent-to-treat framework. For outcomes Y_{ip} where i indexes the individual and p indexes the polygon (neighborhood), we will run the following regression:

$$Y_{ip} = \beta_0 + \beta_1 \text{TITLE}_{ip} + \theta X_{ip} + \gamma_p + \varepsilon_{ip}$$

The variable TITLE_{ip} denotes individual exposure to the land titling program. X_{ip} is a vector of individual and polygon specific controls and γ_p is a stratum fixed effect. Clustering is done at the polygon level. In simulations –using 12 interviews per polygon and conventional levels of power (0.8) and significance (0.05) and allowing for a polygon random effect with a standard deviation of 5 percentage points– we find that we can jointly detect a 3 percentage point increase in tax payment.

Power calculations on a normalized index — with which we will evaluate continuous outcomes like degree of public service use, trust, and views of the state — show that we are able to detect a 0.13 standard deviation effect, accounting for an intracluster correlation coefficient of 0.15 (calculated from measures of public services usage in the sample of [Weigel \(2017\)](#)).

6 Timeline



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