Department of Geography and Environment

Papers in Economic Geography and Spatial Economics

Eliciting demand for title deeds:

Lab-in-the-field evidence from urban Tanzania

Martina Manara and Tanner Regan

Paper No. 19
Geography and Environment Discussion Paper Series

November 2020

Editorial Board

Published by
Department of Geography and Environment
London School of Economics and Political Science
Houghton Street
London
WC2A 2AE

geog.comms@lse.ac.uk
www.lse.ac.uk/Geography-and-Environment

Eliciting demand for title deeds: Lab-in-the-field evidence from urban Tanzania*

Martina Manara† Tanner Regan‡

November 13, 2020

Abstract

Many African cities face extremely high rates of informal land ownership. Governments implement land titling projects to alleviate poverty and facilitate urban development in these unplanned and rapidly urbanizing cities. However, these programs often register low uptake. We suggest addressing this problem with a pricing strategy that elicits local demand for titles from community leaders. We study the demand for title deeds in Dar es Salaam, Tanzania, where the fixed costs of surveying and planning have been covered, conducting two lab-in-the-field experiments with 90 local leaders and 146 property owners. Demand for property titles, as elicited by the Becker-DeGroot-Marschak (BDM) method, while largely below current fees, is substantial. We then ask if local leaders can help predict this demand ex-ante. We find that leaders have accurate information about both the aggregate demand curve in their neighbourhoods, as well as, the ability to distinguish variation in willingness-to-pay across owners in their neighbourhood. Predictions of aggregate demand deteriorate under an environment where the responses of leaders are used to allocate subsidies, but an incentive scheme of cash prizes is able to mitigate this. To keep leaders from misreporting, an appropriately designed policy will compensate leaders for accuracy.

Keywords: Property rights; Willingness-to-pay; Subsidy targeting.
JEL codes: O12; O17; H41; R22; D82

*This project has passed review by the LSE Research Ethics Committee in October 2018 under the project name "Leveraging Informal Institutions to Raise Land Formalisation" [REC ref. 000770]. The project was approved by the Tanzanian Commission for Science and Technology (COSTECH) [REC ref. 2019-135-NA-2019-37]. We acknowledge the financial support of the International Growth Center. We thank Palmon Martin Rwegoshora and Temu at the Ubungo Municipal Office, our team of surveyors, and field Managers Denis Ngole and Robi Kisiyombe. We are especially grateful for discussions with Gharad Bryan and Vernon Henderson. We also thank Nava Ashraf, Clare Balboni, Amanda Dahlstrand-Rudin, Simon Franklin, Maitreesh Ghatak, Matt Lowe, Margarida Madaleno, Guy Michaels, Niclas Moneke, Jamila Nigmatulina, Erica Pani, Jon de Quidt, Capucine Riom, Di Song Tang, and participants in the Economic Geography WiP, Department of Geography inter-cluster seminar, and EC501 WiP helpful comments. Any findings and conclusions are those of the authors and do not necessarily reflect the view of the individuals and organisations mentioned here.

†London School of Economics and Political Science, Department of Geography and Environment, Houghton Street, London, WC2A 2AE, UK. Email: M.Manara@lse.ac.uk.

‡London School of Economics and Political Science, Center for Economic Performance and Department of Geography and Environment, Houghton Street, London, WC2A 2AE, UK. Email: T.Regan1@lse.ac.uk

1 Introduction

Much of urban land in Africa is allocated low values of built capital, remains unplanned, and is settled under informal property rights (UN Habitat 2016, Lall et al. 2017). The development of these cities depends on the formalisation of property rights (Henderson et al. 2020). Formalisation creates transparency in prices enabling functional urban land markets, and improved property records facilitating taxation (Collier et al. 2017). More generally, property rights can reduce expropriation risk, lower the cost of property protection, and remove barriers to credit (Besley & Ghatak 2010).[1]

Establishing property rights is key for the development of cities, but the process is costly for cash-strapped governments in sub-Saharan Africa.[2] To recover program costs once neighbourhoods are surveyed and entered into a town plan, plot-specific fees are charged for title deeds. This stage of formalisation (the uptake of title deeds) remains a bottleneck in many African cities (Omar 2017, Sheuya & Burra 2016, Moses & Chiwambo 2018, Bezu & Holden 2014). This is observed in Dar es Salaam where formal titles account for only 20-25% of residential surveyed plots.

Integrating traditional local leaders in the formalisation process has the potential to raise the uptake of title deeds. Institutions in Africa have long relied on traditional local leaders (Michalopoulos & Papaioannou 2013). While formalisation can be seen as eclipsing their role in the land tenure system, these leaders are complementary to state capacity when they are formally integrated (Henn 2020). For instance, property tax collection by local leaders raises more revenue than collection by state agents because of their knowledge of local individual's payment propensities (Balan et al. 2020).

If leaders know and will reveal information on the willingness-to-pay for title deeds, it can be used by the state to better target fees, i.e. by charging less to owners with lower willingness-to-pay. This can raise uptake while still covering project costs. However, extracting this information accurately can be difficult if leaders have private reasons to favour some property owners in their neighbourhood. Two obvious questions arise which are the focus of our paper; are leaders informed about the willingness-to-pay for title deeds? and if so, will they share this information accurately when they are able to influence the prices faced by their neighbours?

This paper is related to a literature that studies the use of agents to target subsidies for

[1] There is empirical evidence that property rights have a positive impact on investment in rural Africa (Besley 1995, Goldstein & Udry 2008). For urban land, evidence is concentrated in South America finding impacts on household investment, education and labour supply (Field 2007, Galiani & Schargrodsky 2010).

[2] Formalization requires surveying and town planning to meet the standards of formal law. There are scale economies to surveying, and so governments and development agencies alike make efforts to coordinate land demarcation (surveying) en masse.

the poor, to identify individuals with high returns to loans, and to report corruption (Olken 2009, Niehaus et al. 2013, Basurto et al. 2018). Agents may have different preferences from the social planner and strategically give misleading information. In a closely related paper to ours, Rigol et al. (2020) test whether cash incentives can encourage entrepreneurs to report which of their peers have the highest marginal returns to a loan. Our paper is, to the best of our knowledge, the first to study whether agents can be used to extract information on willingness-to-pay.

There is also a long literature on eliciting willingness-to-pay for non-market based goods. In a related paper, Ali et al. (2016) estimate the demand for title deeds in a neighbourhood of Dar es Salaam using a take-it-or-leave-it randomisation of title fees. Their method estimates mean compliance conditional on fee size, and so cannot be used to determine individual willingness-to-pay. In another related paper, (Berry et al. 2020) elicit the willingness-to-pay for water filters using the Becker-deGroot-Marschak (BDM) method. This method does allow the researcher to estimate individual willingness-to-pay, however the policy maker cannot use it to set fees in practice.[3] Our paper provides a method (by eliciting third party information) that both identifies individual willingness-to-pay, and can be practically implemented.

In another related study, Balan et al. (2020) show that tax collection by local elites can raise more revenue than collection by state agents. Their evidence suggests that the primary mechanism trough which this works is informational advantages of chiefs that enabled them to better target tax visits based on households underlying payment propensities. They test this with a treatment arm where state collectors meet with local chiefs and indicate, address by address, ability and willingness-to-pay. Our paper sheds light on this particular mechanism by directly measuring the ability of local leaders to predict willingness-to-pay, and by studying the conditions under which this information can be accurately extracted.

Our paper makes three contributions. First we challenge the view that the low uptake of title deeds is due to plot owners not recognising, or not needing, the benefits from tenure formalisation Briggs (2011). We provide evidence of significant demand for title deeds, albeit at lower prices than the government is currently charging. We estimate the demand for property titles using the Becker-deGroot-Marschak (BDM) method which incentivises respondents to truthfully reveal their willingness-to-pay.[4] Roughly 40% of plot owners in our study are willing to pay fees equal to the monthly income of a typical household. This is much higher demand than is found in previous work in Dar es Salaam (Ali et al. 2016). Yet, demand remains lower than current fees. We suggest that the government could set lower

[3]The BDM cannot be used in practice by the policy maker because it relies on the credible incentive that the customer will be able to buy the good at a random price.

[4]The BDM method was originally developed by Becker et al. (1964) and is still used at the frontier of applied work (Berry et al. 2020).

prices so as to raise the uptake of titles.

Our second contribution is to show that local leaders have accurate information about both the aggregate demand curve in their neighbourhoods, as well as, the ability to distinguish variation in willingness-to-pay across owners in their neighbourhood. This is true even when conditioning on the fee size, or property value. Therefore, the local knowledge of community leaders can be used to set prices of land titles so as to raise uptake and collect sufficient revenue. This would help to make formalisation inclusive for the urban poor and financially viable for the government.

Our third contribution, is to show that, when predicting willingness-to-pay, leaders are influenced by an environment where their predictions are used to allocate subsidies, but also that almost all of these distortions can be mitigated with a simple cash prize for ex-post accuracy. Notably, we find that leaders only distort their average response; we find no evidence that this environment affects leader predictions when it comes to discrimination across different plot owners in their neighbourhood.

Finally, forty-two of our respondents were selected, at random, to undertake in-depth interviews digging into the determinants of their willingness-to-pay, including the expected benefits and costs of tenure formalisation, alongside other factors. Results from this qualitative work are discussed in a companion paper (Manara & Regan 2020).

The paper is outlined as follows. The experimental setting and design are described in section 2 which covers the study context and data collection methods. The data is described in section 3 including a description of the demand elicited by BDM. Results in section 4 show leaders' ability to predict demand on the aggregate and for price discrimination. In section 5 we conclude.

2 Context and Setting

2.1 Conceptual motivation for extracting willingness-to-pay

In this paper we propose that, by collaborating with leaders who have local knowledge, the central government can more effectively target fees to both neighbourhoods and individual plots and owners. In doing so, this price discrimination could raise uptake while still meeting the fee requirements to cover cost. By price discriminating, the government can cross-subsidize and thereby raise the revenue required to make a titling program cost effective. The potential gains are twofold. First, conditional on the project being complete, price discrimination can be used to recover the Harberger triangle deadweight loss. In a simple example this would mean waiving fees for particular individuals who are identified as having

a low ability and willingness-to-pay. The second set of potential gains can be much larger. In a context where projects are only built if the expected revenue is above the fixed cost, then price discrimination can make the entire project viable which can lead to significant gains (Kremer & Snyder 2018). This reasoning is similar in spirit to Romer (1994) who shows the potential for large gains from trade when 'new' goods are introduced in the market by raising enough revenue to cover a fixed cost of entry.

An alternative response is simply for the government to cover these project costs and give away the titles for free. There are two reasons why this may not be possible. First, is that the government may not be able to secure the necessary funds to do so, or the efficiency of raising public funds may be so low as to make it unviable. This may be especially true if channels of raising revenue are limited or wasteful as is the case in many developing countries (Pomeranz & Vila-Belda 2019). Secondly, a growing body of research underscores that building capacity for revenue collection is important for state development (Besley & Persson 2014). From this perspective, governments should not universally subsidise formalisation, but rather encourage those with higher private benefits to make more of a contribution to the public fund. Finally, while it might seem radical to advocate that the government price discriminates when allocating property titles, it is important to observe that the current fee structure already employs a price discrimination strategy. Invoice fees are calculated based on location, land use, and individual plot size. Further, in the private market for survey services, a basic version of leader-elicited price discrimination is already employed. The largest surveying and planning company in Tanzania, offers a 'free lunch' to individual plot owners that can not afford to pay the survey fees. To do this, they hold discussions with local leaders who help them identify the plot owners with the lowest willingness-to-pay. As long as these individuals do not own plots above 800m^2, they are offered the service for free.[5]

2.2 Experimental Setting

Our study was conducted in Dar es Salaam where the Tanzanian Ministry of Lands, Housing and Human Settlements Development (MLHHSD) designed and implemented a pilot project to formalise land. Here uptake has been less than 13% after the first two years. Since the government has fronted the fixed cost of surveying and planning they have lessened coordination issues, and now plot owners can simply pay their invoice to complete the process of acquiring a title.

The title that we study is a legal document of ownership, Certificate of Right of Occupancy (CRO), that is supplied by the MLHHSD and provides the highest protection by law in the

[5]From author's discussions.

country. A CRO formally recognizes a 66 year lease of a plot of land from the government. Legally a CRO provides private benefits in three ways; protection from government-led expropriation, use as collateral with mainstream banks, and legal transferability of land.[6]

A plot of land must be surveyed and approved by the municipal town planning office to be eligible for a CRO. There are scale economies to surveying; the survey of a standalone plot may cost around 6 million TSh while the average cost drops to 17% of this when 10 plots are surveyed at once, 5.8% for 100 plots, and for large scale projects with more than 1,000 plots the average cost is about 0.2 million TSh.[7] For this reason the MLHHSD has run a pilot program in the ward of Kimara, Dar es Salaam, surveying plots at scale. The costs of this program include survey and administrative fees.[8] Facing these fees, demand for CROs has been low. This motivates concerns over the effectiveness of the government's pricing strategy for raising revenues and supplying affordable CROs.

We conduct a survey and experimental sessions with 90 local leaders from fifteen neighbourhoods where surveying was complete and invoices issued to plot owners.[9] The neighbourhoods were all located in Kilungule A and B, two Mtaas [10]in Ubungo Municipality of Dar es Salaam. For simplicity we refer to our study area as Kilungule and it is shown in Figure 3. In the following weeks we conducted information sessions with plot owners. Finally, we surveyed 146 owners and offered them a discounted invoice through the BDM method. These owners had yet to pay their invoice by the start of the intervention (April 2019); over three years since the formalization project commencement. The full time line of the study is depicted in Figure 1.

[6]More specifically, owners of a CRO who are expropriated by the government are entitled to higher compensation, and since surveying is a pre-requisite, documentation of exact plot boundaries mitigates potential conflict with neighbours (Wolff et al. 2018). While ownership of a plot without CRO can be enough for access to small loans, these typically have a maximum ceiling of 20 million TSh, when the informal sale agreement is used as collateral. Instead, there is no ceiling for loans pledged against CRO: in this case, the loan amount is only limited by the collateral value and the bank's single borrower limit. (Manara & Pani 2020). For land sales the CRO provides the buyer a guarantee of the seller's rightful ownership. While land is often sold informally these types of sales are susceptible to scamming with land being sold to multiple people. Wolff et al. (2018) describe a case in Kigamboni, Dar es Salaam, where a single plot was sold to over 30 individuals.

[7]From author's discussions with two of Tanzania's leading survey companies.

[8]Figure 2 shows an example of an invoice from the Kimara program with charges that include costs for surveying, administrative costs and also land value capture 'Premium' and 'Revolving Fund'. The latter is a mark-up used to subsidise future surveying projects. Some fees are fixed (Application, CRO, and Deed Plan), while all others vary with plot size and land value.

[9]The specific title of these leaders is 'mjumbe', or 'wajumbe' (plural), and while they represent a political party they are unofficial and unpaid positions and so bear a quasi-formal status (Manara 2020). The neighbourhoods, or 'shinas', typically contain 250 plots, and there are roughly six wajumbe per shina. In our study area both the ruling CCM party and the opposition Chadema party were represented by wajumbe and, in each neighbourhood, a given party will have one mjumbe and a collection of assistant wajumbe.

[10]Mtaa is the smaller administrative unit and the lower level local government in Tanzania. Typically referred as *street or neighbourhood.*

2.3 Data Collection

2.3.1 Sample Selection

We collected CRO invoice records of all 1,482 invoiced plots in our study area and matched 1,401 of these to geo-located plot boundaries. Of these, only 13% had purchased their title deed, even though 28% had been invoiced over two years earlier, and only 3% had been invoiced within the last six months. From this population we randomly sampled fifteen invoiced plots from each neighbourhood in our study area, for a total of 225 plots. We stratified our sampling so that low, medium, and high value plots were represented in each neighbourhood. We then conducted a rapid survey of the selected plot owners in order to gather their contact information, occupancy (i.e. owner or tenant), and their social connection to each leader (i.e. whether they knew or ever interacted with their leaders).

Following the invoice collection, we conducted a census of the 96 leaders in our study area which allowed us to match them to neighbourhoods, classify their party affiliation (CCM or Chadema) and hierarchical position (main leader or leader assistant), and geo-locate their residence. From this population we randomly assigned leaders to one of three treatment groups. We stratified the randomisation based on political affiliation and physical and social proximity to sampled invoiced plots.

All randomisation was done mechanically during a series of public meetings where the process could be observed. Despite the potential for mechanical error, this was an important procedure to garner trust with the community. It also provided a practical experience with randomisation so that those who also participated in the BDM at the end of the study were already familiar with the lottery process.

2.3.2 Owner Information Sessions

We invited all 225 sampled plot owners to attend an information session to introduce them to our project, two to three weeks before their actual research session. The focus of the information session was on familiarising the respondents with the BDM procedure. They were told that, during the research session, they would be asked "What is the maximum price that you would and could pay in the next 10 days for your invoice towards your title deed?". We then explained the concept of willingness-to-pay both in theory and with examples. They were told that on research day they would have an opportunity to commit to pay their invoice if it was offered at a price they could afford, and so it was important that they thought carefully over the following weeks about their willingness-to-pay for the title deed. We then explained the specifics of the BDM method and that their best strategy was to determine for themselves their true willingness-to-pay and then reveal exactly that

price to the surveyor. We used theory and examples to show why this was the best strategy for them. We finished the session by practising with volunteers for either a soda or an aerial photo of their plot. Throughout the session we asked for feedback from respondents until it was clear they understood.

Owners were given at least two weeks between the information session and the price elicitation session. During this period they were encouraged to consult others (family, joint plot owners, friends, etc.) on their willingness-to-pay and plan out a strategy for gathering the funds they may need if they won a discount. This time was also used to sort out individual issues with each invoice. Some of these issues were simple for us and the Ubungo Municipal Office to accommodate, such as the misspelling of names, partial payments already made, and the addition of spouses to invoices. On few exceptional circumstances, we allowed 'decision makers' to participate on behalf of the true owner on the invoice.[11] For other issues we had to drop invoices from our sample. This was the case where, by the time of starting the study, invoices had already been fully paid or the plots sold (19 cases), where at least one owner had deceased (4 cases), when the owner lived out of country and could not be reached (13 cases) or had conflicts (5 cases) over the rightful ownership. After discarding these issues there were 184 remaining invoiced plots.

2.3.3 Owner Survey and Price Elicitation

We invited 184 eligible plot owners to participate in a survey and price elicitation lottery, and 146 of these attended. We also invited a leader to each session in order to establish trust with the respondents. The survey collected information on demographics, a CRO knowledge test, sentiments towards tenure security, and perceived costs and benefits of a CRO. Following the survey each respondent participated in the BDM price elicitation. This began with a practice round where the respondents were randomly assigned the opportunity to purchase either a soda or an aerial photo of their plot (see Figure 4 for an example) through the BDM mechanism. Following the practice, they were offered the opportunity to acquire the title deed for their plot at a discounted invoice price, again through the BDM mechanism. If the respondent won the discount, they were scheduled to make their payment within ten days.[12]

[11] This was done in two exceptional cases, one where the plot owner had been living in Canada for over thirty years and his brother was the de-facto owner of the plot, and a second where the plot owner was disabled and her son took on responsibility for the plot. In both cases the decision maker was responsible for paying the invoice, and in neither case did we change the name of the plot owner on the invoice.

[12] Because the title deed cost was high for many households we did not ask for immediate payment. First, asking respondents to bring the full amount of cash necessary to cover their bid value would be a significant wasted effort in the case that they did not win. The second reason was to allow enough time to gather funds from family, friends, or micro-lending groups. In fact, 15% of respondents admitted asking the financial support of family and friends to make higher bids (Manara & Regan 2020).

The BDM procedure that we implement closely follows that of Berry et al. (2020) with slight adjustments to our context. Respondents stated their willingnes-to-pay (bid) and participated in a lottery extracting a new invoice price (draw). According to standard BDM procedure, if the draw was lower or equal to their bid, they would be offered the title deed at the new discounted price; if the draw was higher, they would not be offered a new price. Each BDM session began with a description of the procedure followed by a practice for either a soda or an aerial photo of their plot before proceeding with their invoice. Scripts can be found in Appendix B. Practice rounds enabled respondents to understand that their bid should represent the maximum price they could and would like to pay; their bid could not be changed after the lottery; and, upon winning, they must make the according payment within ten days. Once the bid for the invoice was finalized, a price was drawn which determined whether the respondent would pay for the invoice at the drawn price.[13]

There were 39 respondents who drew prices lower than their bid and so won a discounted invoice value. For each, we confirmed that they could pay and that they had a plan to collect the necessary funds, and had them sign off on their bid value and draw outcome. All participants received a 10,000TSh cash allowance for their participation, and winners were required to use this as a down-payment in order to discourage overstating their willingness-to-pay. Still, five (12.8 percent) of the winners did not complete the purchase.[14]

2.3.4 Leader Survey and Experiment

We conducted surveys with the leaders one month in advance of the first plot owner price elicitation session. All 96 leaders in our study area were invited to participate and 90 (93.8 percent) attended and completed the survey. The questionnaire consisted of demographics, a CRO knowledge test, social network, and predictions of plot owner characteristics. The network and prediction questions all related to the owners of the 15 selected plots in each leader's respective neighbourhood. For reference the leaders were given both official names and nicknames of each owner as well as a photo of the particular plot that was selected.

The survey concluded with price elicitation tasks. Leaders were asked to rank each of the 15 plot owners in their neighbourhood in terms of their willingness-to-pay for the title deed.

[13]Practically, the respondents drew 1 of 75 plastic balls from an opaque jug. Each ball corresponded to a price between 0 and their full invoice value which was recorded on a reference sheet. The exact distribution depended on the size of their plot (thus, indirectly, the invoice value). In order to maintain goodwill the distribution of prices was shown upon request just before the price was drawn and none of the respondents asked to change their bid after seeing the distribution. A full description of the distributions can be found in Appendix C.

[14]Three of these cited unforeseen health issues with a family member that became a priority for the funds that were allocated to the title deed. One was unable to borrow the money that she had expected to. The last one went away on business and was unwilling to arrange a representative to make her payment.

After ranking, leaders had also to predict, for each plot owner, their exact willingness-to-pay. Each leader conducted the task under their randomly assigned treatment. The exact scripts used can be found in Appendix A.

Leaders assigned to the *control* group were told that the research was conducted for academic purposes only. They were encouraged to be as truthful and accurate as possible to enable high quality research. Finally, they were ensured that their answers would not be used to change any procedure over the course of the study.

Leaders in the *stakes* group were informed that their responses to the price elicitation tasks would be used to change procedures in the remaining study; particularly, to help decide which plot owners would have higher chances to win high discounts through the lottery. If leaders suggested a plot owner had a low willingness-to-pay, we would adjust the distribution of discounts available in the lottery to this plot owner so as to make it more likely that they win a high discount.[15]

Finally, leaders in the *incentives* group received the same instructions as the stakes group, but they had the opportunity to earn cash for their accuracy. We adopted an ex-post payment rule that would be implementable in a policy setting.[16] Leaders were given simple payment examples to work through. Each leader was reminded that being as truthful and accurate as possible was the best way to earn the cash. At the end, the leader with the most points was paid 30,000TSh and the four runner-ups were paid 20,000TSh each.

3 Data and Sample Descriptives

3.1 Summary Statistics and Balance

In Table 1 we present mean characteristics for the whole sample of both the plot owners (column 1) and leaders (column 2). Plot owners tend to be younger, have higher household monthly incomes, and score worse on a short quiz about CROs, but are less educated than leaders. While the majority of owners are male there is a significant share of female ownership (48% of plots have sole ownership, and 60% of these are owned by men). This is in line with previous findings that the cultural environment in Dar es Salaam is not particularly hostile

[15]We adjusted the distribution of available discounts based on an average of leader predictions for the same plot owner, therefore mitigating concerns over the ethical aspects of this treatment.

[16]Before the price elicitation tasks, leaders were explained that, at the end of the study, we would pick one price level and observe which plot owners stated willingness-to-pay above that price. For each plot owner with stated willingness-to-pay above the threshold price, leaders would get a number of points corresponding to the assigned ranking position of that plot owner. This is implementable in a real world setting, since the policy maker will oberve which of the plot owners do in fact uptake titles. If titles were purchased by owners for whom the leader ranked high, then the leader was accurate.

to co-titling or female ownership (Ali et al. 2016). Leaders are also slightly more likely to be men, but 40% of them are women. Considering potential heirs, 92% of plots are owned by individuals with at least one child.

The average CRO invoice value is 527,000 TSh per month, or roughly two and a half times the median monthly income in our sample. Most plots are occupied by their owners, still 28% are owned by absentee landlords. A full 86% of plots were acquired by purchase, as opposed to inheritance or squatting, though only 24% of all plots have a certificate of sale (*hati ya mauzo* or *sale agreement*). Exactly half of the plots are owned by individuals with at least one other plot in Tanzania.

Leaders themselves tend to own their homes; 94% own the plot they live on while the remainder all live on a plot owned by a member of their household. Leaders typically have a long history of residence in Kilungule; while only 7% have settled in the past six years, a full 38% have been living there for over 19 years. Out of the fifteen owners sampled for each neighbourhood, leaders know on average 12 of these, though only 4.3 have ever come to the leader for official assistance. Leaders have few social connections among the plot owners in the study ; on average 0.22 owners are family, 1.4 are friends, 1.8 meet together regularly for religious purposes, and 1.3 are considered highly esteemed by the community.

Also presented in Table 1 are differences in leaders' characteristics between *stakes* and *control* groups (column 4) and differences between *incentives* and *control* groups (column 5). There are only a few marginally significant differences, though standard errors are large. The *stakes* group has fewer women and more leaders with household income below 100,000TSh compared to the *control* group. The *incentives* group has more leaders with their home plot surveyed than the *control* group.

3.2 Demand for CROs

Figure 5 describes the demand for CROs elicited through the BDM. For the BDM demand curve we show, for each price, the share of plot owners whose bid was greater than or equal to that price. This is done by running successive logit regressions at each price point and correcting for heteroskedasticity in the calculation of the confidence intervals.

While the full sample of plot owners were not willing to purchase a title deed at their invoiced price there is still a significant amount of demand for CROs. Over 40 percent of plot owners would be willing to pay 200,000 TSh which is more than the monthly household income of half of our respondents. However, demand is still much below invoice fees that are currently being charged. The median invoice in our sample is 500,000 TSh, at such a price less than 10 percent of plot owners would be willing to pay. Even if all plots were charged

170,000 TSh, the minimum invoice value observed in our sample, roughly 50 percent of plot owners would not purchase a title deed.

In Figure 5b we compare the elasticity of demand calculated from smoothed version of the demand curve above. There is a wide range (200-600,000 TSh) where demand is relatively elastic, beyond which we have trouble estimating due to the sparsity of observations in the tail of the distribution.

3.3 Leader Predictions and Placebos

Because we are interested in knowing whether leader's have accurate knowledge of the willingness-to-pay for CROs in their neighbourhoods, we first check if they have knowledge on a related set of plot characteristics. In Table 2 we run regressions based on the model:

$$y_{ij} = \beta \hat{y}_{ij} + x_j' \gamma + \epsilon_{ij} \tag{1}$$

where y_{ij} is a characteristic of plot i related to leader j, $\hat{y}_{ij}$ is leader j's prediction of plot i's characteristic and x_j is a vector of leader controls for randomization strata, neighbourhood, and surveyor id.

Panel A shows that leaders predictions of plot and plot owner characteristics are positively associated with their true characteristics. In column 1 leaders are able to distinguish between owners with higher or lower income. Our estimate for income rank are very similar as those found by Rigol et al. (2020) for Indian entrepreneurs' predictions of their peer's income rank. In column 2 we show leader's predictions of CRO invoice value rank are positively associated with the true CRO invoice value rank of plots in our sample, and for column 3 this is also true across the full sample of plots.[17] Therefore column 3 signals that our plot owner survey sample is not selected towards plots that are easier to predict. In columns 4 and 5 we can see that leaders also have some ability to predict whether plot owners have paid their property tax or if they have a certificate of sale.

Panel B does placebo tests by comparing the relationship of leader predictions and actual characteristics across treatment groups. It is a placebo because all of these predictions were given by leaders before they were assigned their treatment. Although there are no significant differential coefficients of either the stakes or the incentives treatments, the stakes group does have a slightly higher differential between predicted and observed for each characteristic.

[17]The full sample of plots includes those plot owners that were not part of our plot owner survey.

4 Results

4.1 Leader Predictions of Aggregate Willingness-to-Pay

Figure 6 compares demand for CROs elicited through the BDM mechanism with that elicited through local leaders. For the BDM demand curve we show, for each price, the share of plot owners whose bid was above that price. We follow a similar procedure for the leader predicted demand curve, but use the leader prediction of the plot owner's willingness-to-pay instead of the owner's bid. Since there are multiple leaders for any given owner, and so multiple predictions of their willingness-to-pay, we cluster standard errors at the plot owner level. The same 146 plots are used to construct both the BDM and leader predicted demand curves.

In Figure 6a, we only use leaders under the *control* group and compare the demand curve based on their responses with the BDM results. Whether demand is elicited from the BDM mechanism or predicted by leaders, the curves are strikingly similar. At least on an aggregate level, leaders seem to have knowledge of the distribution of willingness-to-pay in their neighbourhoods.

When leaders are told that their responses will be used to determine the likelihood that a plot owner receives a discount (*stakes*) they distort their responses. Figure 6b uses only leaders under the *stakes* treatment and compares the demand curve based on their responses with that based on the BDM. For most prices where demand is positive there is a large gap between the demand curve elicited from this group of leaders compared to the BDM. This suggests that, despite their predictive ability, eliciting aggregate demand from leaders may be difficult in a setting where their responses are used to price CROs in the community.

Offering a monetary incentive to leaders for their predictive accuracy (*incentives*) can mitigate the distortions created in the *stakes* environment. Figure 6c uses only leaders under the *incentives* treatment and compares the demand curve based on their responses with that based on the BDM. Whether demand is elicited from the BDM mechanism or predicted by leaders with incentives, the curves are statistically indistinguishable. This is not only due to wide confidence intervals. The largest gap between the point estimates of leader and BDM elicited demand curves is a 0.08 point difference, and for most prices the gap is less than a 0.03 point difference. The cash incentive has shrunk the gap that occurs when leaders are told that their responses will used to determine discounts.

4.2 Leader's ability to distinguish willingness-to-pay across owners

While leaders may be able to predict the aggregate distribution of demand fairly well, it remains to be seen if they can also distinguish between individuals with high and low willingness-to-pay. In this section we describe the ability of leaders to distinguish individuals with high and low willingness-to-pay by running regressions based on the model:

$$w_{ij} = \beta \hat{w}_{ij} + x_j' \gamma + \epsilon_{ij} \tag{2}$$

where w_{ij} is willingness-to-pay of plot i related to leader j, $\hat{w}_{ij}$ is leader j's prediction of plot i's willingness-to-pay and x_j is a vector of leader controls for randomization strata, neighbourhood, and surveyor id.

In Table 3 Panel A we show the coefficient on leader's predictions of different measures of owner's willingness-to-pay is always positively associated with the true measure of owners willingness to pay. Column 1 considers the within neighbourhood rank; an individual predicted to be one position higher in the ranking is on average 0.2 positions higher in the rank of plot owners' bids. Column 2 uses the actual level of willingness-to-pay; an individual predicted to bid 10,000TSh above another will on average bid 1,000TSh more. Column 3 takes the log of willingness-to-pay; a one percent increase in predicted willingess-to-pay translates to a 0.33 percent increase in actual willingness-to-pay on average. Column 4 takes the percentile rank of all owners in the sample (rather than within neighbourhood). Here moving from an individual at the median to one at the 60th percentile of predictions results in a 2.3 percentile increase in the true willingness-to-pay on average. Finally, columns 5 and 6 use the probability of being the top or bottom rank in the neighbourhood; an individual is 15 percentage points more likely to be the highest willingness-to-pay in the neighbourhood if predicted to be so, and 24 percentage points more likely to be the lowest willingness-to-pay if predicted so. On this last point it is of interest to note that one of the largest land surveying companies in Tanzania runs a 'free lunch' program, consulting local leaders before charging fees to determine plot owners in the neighbourhood who are in need of a discount. In one of their larger projects, they surveyed over 5,000 plots and used leader information to waive fees for about 2% of the plot owners.

Leaders may have knowledge of individual willingness-to-pay, and yet, they may distort their responses if it can help certain plot owners win or if they are paid incentives for accuracy. In Panel B we analyse the impact of the *stakes* and *incentives* environments. To do so we

adjust model 2 to account for the differential coefficient for leaders in different environments:

$$w_{ij} = \beta \hat{w}_{ij} + \beta^S \hat{w}_{ij} 1(j \in stakes) + \beta^I \hat{w}_{ij} 1(j \in incentives) + \alpha_S + \alpha_I + x_j' \gamma + \epsilon_{ij} \quad (3)$$

where $1(j \in stakes)$ is an indicator if leader j was assigned to the stakes environment, $1(j \in incentives)$ is an indicator if leader j was assigned to the incentives environment, and α_S and α_I are dummies for each treatment group. Returning to Table 3 Panel B, none of the differential coefficients of either environment is significantly different from zero at the five percent level. Therefore we find no evidence that the stakes or incentives environments create distortions in the predictions.

4.3 Property Characteristics to distinguish willingness-to-pay across owners

The government currently charges for CROs with a formula based on ward level land values, plot area and land use. In this section we examine the ability of this formula to target high and low willingness-to-pay individuals. In addition, we create a measure of property values based on photos of the plot, and local knowledge of the area.[18] We consider this measure of property value as another potential indicator to price discriminate on. Below we show how variation in property and invoice value relate to willingness-to-pay of plot owners.

In Table 4 we run regressions of the general form:

$$w_{ij} = \alpha z_{ij} + \beta \hat{w}_{ij} + x_j' \gamma + \epsilon_{ij} \quad (4)$$

where z_{ij} is either invoiced fee or property valuation of plot i related to leader j. When willingness-to-pay is transformed, we also transform the observable characteristic accordingly, e.g. in Panel A column 1 where the outcome is the rank of willingness-to-pay, we use the rank of invoice value as the explanatory variable.

In panel A we use invoice value unconditional of the leaders prediction of willingness-to-pay. Across columns 1-5 invoice values are positively associated with individual willingness-to-pay. Column 6 shows that the bottom rank willingness-to-pay is particularly difficult to predict with the invoice value. Otherwise the invoice value correlates strongly with willingness-to-pay, with coefficients that are typically closer to 1 than the leader predictions in Table 3 Panel A. Finally we note that, while variation in invoice value closely follows that of willingness-to-

[18] This follows the procedure that is used for property valuation by local governments and the Ministry of Lands. The valuations are based on the subjective determination of three students from Ardhi University, a local university which specialises in surveying, planning, and valuation.

pay, the average invoice value is more than 2.7 times that of the average willingness-to-pay (Table 1 Column 1).

In Panel B we include the leader's prediction in addition to the invoice value. In columns 1-4 we show that, conditional on the invoice value, the leaders are still able to explain variation in the willingness-to-pay. This suggests that invoice formula and leader predictions could be applied complementary to one another. Finally, conditional on invoice value, leaders are not able to capture any variation when it comes to the the top rank of willingness-to-pay. Instead, when considering the bottom rank, leaders are effective while the invoice value is not.

Moving to Panel C we use property valuation unconditional of the leaders prediction of willingness-to-pay. In columns 1-4 the property valuation is positively associated with willingness-to-pay and the correlations are of similar magnitude than the leader predictions in Table 3 Panel A. However, in columns 5 and 6 the subjective valuation of the property has no ability to predict the top or bottom ranked willingness-to-pay. In Panel D columns 1-4 we show that subjective property value and leader prediction are both able to describe variation in willingness-to-pay conditional on one another. In columns 5 and 6 only the leader prediction is able to describe the variation in the top and bottom rank willingness-to-pay.

4.4 Can willingness-to-pay cover project costs

In this section we do back-of-the-envelope calculations to determine whether the willingness-to-pay is high enough to cover the cost of the project. Currently, 13% of invoices have been paid and their average fee was 616,000TSh. Therefore, the government raised about 80,000TSh on average. We sampled plots from the remainder of invoices, and here the average willingness-to-pay was 194,000TSh. Taking this figure as representative for the entire 87% of unpaid invoices, the maximum revenue that could be extracted from the remainder, averaged across the entire sample, is 0.87*194,000=168,780TSh. Together the average potential revenue is about 249,000TSh.[19] Considering that the average cost of surveying a plot is about 200,000TSh for large projects (quote from two private survey companies), and comparing this to the average willingness-to-pay, we realize that the costs of the project are covered and there is an average gain of 50,000TSh per plot. That means that the gains outweigh the costs, even only counting the perceived private gains to the title document. Furthermore, in a separate study we document that plot owners already perceive large benefits to the surveying and allocation of beacons regardless of the acquisition of the title

[19]Note that this is a conservative estimate since the willingness-to-pay of the 13% of property owners who hae aready paid, must have had a willingness-to-pay above their invoiced fee. Here we assume that their willingness-to-pay was equal to the fee.

document (Manara & Regan 2020). Thus the overall private gains are larger than those captured by the willingness-to-pay for the title alone. In addition, there are likely further gains to surveying and titling that are not internalised by the current plot owners, which will manifest in the long-run (Michaels et al. 2020). Together this suggests that the gains to formalisation can far outweigh the costs of surveying and planning.

5 Conclusion

Despite there being low uptake of property titles in much of urban Africa, we find that demand for property titles, as elicited by the BDM method, is substantial for a community in Dar es Salaam, Tanzania, where the uptake of land titles is currently low. We find that local leaders are able to predict this demand ex-ante, both on the aggregate and at the individual level. Under an environment where the responses of leaders are used to allocate subsidies, their predictions deteriorate. However, an incentive scheme of cash prizes can mitigate this.

African governments adopt land tenure reforms to contrast the socio-economic issues connected with unplanned and rapid urbanisation, essentially pushing for a transition from informal land tenure systems to more formalised ones. Our evidence suggests leveraging on the local knowledge of key actors in the left behind informal system as a means to make formalisation projects more affordable and inclusive.

References

Ali, D., Collin, M., Deninger, K., Dercon, S., Sandefur, J. & Zeitlin, A. (2016), 'Small price incentives increase womens access to land titles in Tanzania', *Journal of Development Economics* **123**, 107–122.

Balan, P., Bergeron, A., Tourek, G. & Weigel, J. (2020), Local Elites as State Capacity: How City Chiefs use Local Information to Increase Tax Compliance in the D.R. Congo. CEPR Discussion Paper DP15138.

Basurto, P., Dupas, P. & Robinson, J. (2018), Decentralization and efficiency of subsidy targeting: Evidence from cheifs in rural Malawi. Working paper.

Becker, G., DeGroot, M. & Marschak, J. (1964), 'Measuring Utility by a Single-Response Sequential Method', *Business Science* **9**(3), 226–234.

Berry, J., Fischer, G. & Guiteras, R. (2020), 'Eliciting and Utilizing Willingness-to-Pay: Evidence from Field Trials in Northern Ghana', *Journal of Political Economy* **128**(4), 1436–1473.

Besley, T. (1995), 'Property Rights and Investment Incentives: Theory and Evidence from Ghana', *Journal of Political Economy* **103**(5), 903–937.

Besley, T. & Ghatak, M. (2010), Property rights and economic development, *in* D. Rodrik & M. Rosenzweig, eds, 'Handbook of Development Economics', Vol. 5, Elsevier, chapter 68, pp. 4525–4595.

Besley, T. & Persson, T. (2014), 'Why Do Developing Countries Tax So Little?', *Journal of Economic Perspectives* **28**(4), 99–120.

Bezu, S. & Holden, S. (2014), 'Demand for second-stage land certification in Ethiopia: Evidence from household panel data', *Land Use Policy* **41**, 193205.

Briggs, J. (2011), 'The Land Formalisation Process and the Peri-Urban Zone of Dar es Salaam, Tanzania', *Planning Theory and Practice* **12**, 115–153.

Collier, Glaeser, Venables, Blake & Manwaring (2017), Secure, legally enforceable and marketable land rights for urban development. Working paper.

Field, E. (2007), 'Entitled to Work: Urban Property Rights and Labor Supply in Peru', *The Quarterly Journal of Economics* **122**(4), 15611602.

Galiani, S. & Schargrodsky, E. (2010), 'Property rights for the poor: Effects of land titling', *Journal of Public Economics* **94**, 700–729.

Goldstein, M. & Udry, C. (2008), 'The Profits of Power: Land Rights and Agricultural Investment in Ghana', *Journal of Political Economy* **116**, 981–1022.

Henderson, J. V., Regan, T. & Venables, A. (2020), 'Building the City: From Slums to a Modern Metropolis', *Review of Economic Studies* . forthcoming.

Henn, S. (2020), Complements or substitutes? how institutional arrangements bind chiefs and the state in africa. Working paper.

Kremer, M. & Snyder, C. (2018), Worst-case bounds on r&d and pricing distortions: Theory with an application assuming consumer values follow the world income distribution. Working paper.

Lall, S., Henderson, J. V. & Venables, A. (2017), Africas cities: Opening doors to the world, Technical report, Washington, D.c. https://openknowledge.worldbank.org/handle/10986/25896.

Manara, M. (2020), Formal, informal, and legitimate. Implementing land institutions in Dar es Salaam. working paper.

Manara, M. & Pani, E. (2020), Complementarities in the co-evolution of property and credit institutions: how financial actors manage risk in the nascent credit market of Dar es Salaam. working paper.

Manara, M. & Regan, T. (2020), Determinants of demand for title deeds in urban Tanzania. working paper.

Michaels, G., Nigmatulina, D., Rauch, F., Regan, T., Baruah, N. & Dahlstrand-Rudin, A. (2020), Planning ahead for better neighbourhoods: Long run evidence from Tanzania. working paper.

Michalopoulos, S. & Papaioannou, E. (2013), 'Pre-colonial ethnic institutions and contemporary African development', *Econometrica* **81**(1), 113152.

Moses, M. & Chiwambo, D. (2018), 'Assessing land titles application and uptake in regularised informal settlements in Tanzania', *International Journal of Urban Sustainable Development* **10**(3), 279–291.

Niehaus, P., Atanassova, A., Bertrand, M. & Mullainathan, S. (2013), 'Targeting with Agents', *American Economic Journal: Economic Policy* **5**(1), 206–238.

Olken, B. (2009), 'Corruption perceptions vs. corruption reality', *Journal of Public Economics* **93**, 950–964.

Omar, H. (2017), 'Regularization Of Informal Settlements Should It Be A Demand Driven Or Supply Driven: The Case Of Kimara Ward In Ubungo Municipality, Tanzania', *Researchjournali's Journal of Geography* **4**(7).

Pomeranz, D. & Vila-Belda, J. (2019), 'Taking State-Capacity Research to the Field: Insights from Collaborations with Tax Authorities', *Annual Review of Economics* **11**, 755–781.

Rigol, N., Hussam, R. & Roth, B. (2020), Targeting high ability entrepreneurs using community information: Mechanism design in the field. HBS Working Paper 20-082.

Romer, P. (1994), 'New goods, old theory, and the welfare costs of trade restrictions ', *Journal of Development Economics* **43**, 5–38.

Sheuya, S. & Burra, M. (2016), 'Tenure Security, Land Titles and Access to Formal Finance in Upgraded Informal Settlements: The Case of Dar es Salaam, Tanzania', *Current Urban Studies* **4**, 440–460.

UN Habitat (2016), Slum almanac 2015/2016: Tracking improvement in the lives of slum dwellers, Technical report, Nairobi, Kenya. http://unhabitat.org/slum-almanac-2015-2016/.

Wolff, S., Kuch, A. & Chipman, J. (2018), Urban land governance in dar es salaam: Actors, processes and ownership documentation. IGC working paper C-40412-TZA-1.

6 Tables

Table 1: Owner and Leader Summary and Balance

Plots		Leaders			
	(1)		(2)	(3)	(4)
	Mean		Mean	Diff Stakes-Contr	Diff Incent-Contr
Sole ownership	0.48				
	(0.033)				
Sole ownership and female	0.17	Female	0.40	-0.24*	-0.15
	(0.025)		(0.052)	(0.124)	(0.130)
Under 40 years old	0.14	Under 40 years old	0.07	0.06	0.04
	(0.023)		(0.026)	(0.064)	(0.058)
Over 60 years old	0.14	Over 60 years old	0.33	0.09	0.11
	(0.023)		(0.050)	(0.120)	(0.123)
Educ. primary or less	0.31	Educ. primary or less	0.57	0.05	0.05
	(0.031)		(0.053)	(0.129)	(0.131)
Educ. above secondary	0.53	Educ. above secondary	0.12	-0.07	-0.06
	(0.033)		(0.035)	(0.087)	(0.090)
Monthly income < 100,000TSh	0.21	Monthly income < 100,000TSh	0.19	0.25*	0.00
	(0.027)		(0.041)	(0.104)	(0.080)
Monthly income > 300,000TSh	0.57	Monthly income > 300,000TSh	0.42	-0.08	0.05
	(0.033)		(0.052)	(0.127)	(0.132)
Avg. CRO quiz score	4.9	Avg. CRO quiz score	7.4	0.15	0.08
	(0.115)		(0.124)	(0.309)	(0.318)
No children	0.05	Opposition party	0.14	0.03	0.00
	(0.014)		(0.037)	(0.092)	(0.091)
Over 4 children	0.56	Assistant leader	0.39	-0.05	0.01
	(0.033)		(0.052)	(0.126)	(0.130)
Absentee Owner	0.54	Owns their home plot	0.94	0.00	0.03
	(0.033)		(0.024)	(0.064)	(0.058)
Acquired in last 6 years	0.07	Settled in last 6 years	0.07	-0.03	0.04
	(0.017)		(0.026)	(0.056)	(0.074)
Acquired over 19 years	0.22	Settled over 19 years	0.38	-0.01	-0.06
	(0.028)		(0.051)	(0.127)	(0.128)
Acquired by purchase	0.56	Home plot surveyed	0.91	0.07	0.17*
	(0.033)		(0.030)	(0.087)	(0.070)
Has sale certificate	0.16	Count of 15 owners known at all	12	0.54	1.1
	(0.024)		(0.321)	(0.807)	(0.773)
Owns another plot	0.32	Count of 15 owners use services at all	4.3	1.7	0.33
	(0.031)		(0.465)	(1.19)	(1.01)
Owns another surveyed plot	0.16	Count of 15 owners family members	0.22	0.09	-0.03
	(0.024)		(0.052)	(0.130)	(0.114)
Owns another titled plot	0.06	Count of 15 owners close friends	1.4	-0.41	-0.08
	(0.016)		(0.142)	(0.358)	(0.363)
Avg. invoice value (1000TSh)	527	Count of 15 owners religious affiliation	1.8	-0.48	0.07
	(18.0)		(0.267)	(0.646)	(0.757)
Avg. plot area (sqm)	473	Count of 15 owners highly esteemed	1.3	0.02	0.08
	(33.4)		(0.124)	(0.297)	(0.330)
Avg. BDM bid (1000TSh)	194				
	(14.6)				
N	225		90		

*$p \leq 0.10$ for difference=0 t-test
Standard errors in parentheses

Table 2: Leader Predictions and Placebos

	(1) Income Rank	(2) Invoice Rank	(3) Invoice Rank Full	(4) Property Tax Paid	(5) Certificate of Sale
Panel A: Predictions					
Leader Prediction	0.20***	0.30***	0.34***	0.07**	0.09*
	(0.020)	(0.035)	(0.029)	(0.029)	(0.045)
N	871	871	1349	871	871
R^2	0.25	0.13	0.11	0.14	0.18
Panel B: Placebos					
Leader Prediction	0.19***	0.28***	0.32***	0.02	0.09*
	(0.035)	(0.058)	(0.046)	(0.050)	(0.047)
Stakes × Leader Prediction	0.05	0.06	0.08	0.06	0.03
	(0.048)	(0.086)	(0.068)	(0.065)	(0.057)
Incentives × Leader Prediction	-0.03	0.01	-0.02	0.09	-0.04
	(0.046)	(0.077)	(0.071)	(0.072)	(0.042)
N	871	871	1349	871	871
R^2	0.25	0.13	0.11	0.14	0.18

$^{*}p \leq 0.1, ^{**}p \leq 0.05, ^{***}p \leq 0.01$

Notes: Robust standard errors clustered at leader level in parentheses. Each observation is a leader-plot owner pair. Column 1 the dependent variable is the within neighbourhood rank of plot owner's income. The dependent variable in columns 2 and 3 is the within neighbourhood rank of invoice value. Column 2 restricts the sample to respondent owners, while column 3 includes all invoices. Column 4 the dependent variable is an indicator if the plot owner paid property tax in 2018. Column 5 the dependent variable is an indicator if the plot owner has a certificate of sale. The regressor is always the leader's prediction of the dependent variable. Fixed effects for leader strata, neighbourhood, and surveyor are included in all models.

Table 3: Leader's ability to distinguish variation in willingness-to-pay

	(1) WTP Rank	(2) WTP	(3) ln(WTP+1)	(4) WTP Percentile	(5) Top Rank	(6) Bottom Rank
Panel A: Predictions						
Leader Prediction	0.20***	0.10***	0.33***	0.23***	0.15***	0.24***
	(0.024)	(0.029)	(0.048)	(0.037)	(0.052)	(0.055)
N	871	871	871	871	871	871
R^2	0.19	0.09	0.10	0.09	0.03	0.12
Panel B: Distortions from real stakes						
Leader Prediction	0.175***	0.105	0.253***	0.159**	0.124	0.249***
	(0.041)	(0.081)	(0.095)	(0.069)	(0.085)	(0.093)
Leader Prediction	0.049	0.011	0.208	0.150*	0.043	-0.120
× Stakes	(0.058)	(0.091)	(0.133)	(0.089)	(0.125)	(0.130)
Leader Prediction	0.030	-0.025	0.089	0.098	0.019	0.103
× Incentives	(0.055)	(0.088)	(0.112)	(0.085)	(0.125)	(0.135)
N	871	871	871	871	871	871
R^2	0.19	0.09	0.10	0.10	0.03	0.12

$^{*}p \leq 0.1, ^{**}p \leq 0.05, ^{***}p \leq 0.01$

Notes: Robust standard errors clustered at leader level in parentheses. Each observation is a leader-plot owner pair. Column 1 the dependent variable is the within neighbourhood rank of plot owner's BDM bid. The dependent variable in column 2 is the value of the plot owner's BDM bid in Tanzanian shillings, and column 3 is the log value. Column 4 is the percentile rank across the entire distribution, rather than neighbourhood only. Column 5 the dependent variable is an indicator if the BDM bid is the highest in the neighbourhood, and column 6 indicates if the bid was the lowest in the neighbourhood. The regressor is always the leader's prediction of the dependent variable. Fixed effects for leader strata, neighbourhood, and surveyor are included in all models.

Table 4: Using Observable Characteristics to distinguish variation in willingness-to-pay

	(1) WTP Rank	(2) WTP	(3) ln(WTP+1)	(4) WTP Percentile	(5) Top Rank	(6) Bottom Rank
Panel A: Invoice Formula						
Invoice	0.26***	0.49***	1.33***	0.43***	0.44***	0.04
	(0.017)	(0.053)	(0.088)	(0.031)	(0.059)	(0.051)
N	871	871	871	871	871	871
R^2	0.25	0.37	0.15	0.20	0.19	0.09
Panel B: Invoice Formula and Leader Prediction						
Invoice	0.228***	0.480***	1.247***	0.409***	0.431***	0.026
	(0.021)	(0.052)	(0.092)	(0.032)	(0.060)	(0.052)
Leader Prediction	0.151***	0.053***	0.253***	0.179***	0.062	0.239***
	(0.023)	(0.015)	(0.043)	(0.035)	(0.044)	(0.055)
N	871	871	871	871	871	871
R^2	0.30	0.37	0.16	0.22	0.20	0.12
Panel C: Valuation						
Property Value	0.12***	0.20***	0.27***	0.22***	0.02	0.03
(1,000TSh)	(0.007)	(0.072)	(0.061)	(0.022)	(0.047)	(0.066)
N	870	871	871	871	871	871
R^2	0.15	0.07	0.09	0.09	0.01	0.08
Panel D: Valuation and Leader Prediction						
Property Value	0.075***	0.171**	0.229***	0.195***	-0.015	-0.011
(1,000TSh)	(0.012)	(0.073)	(0.059)	(0.023)	(0.054)	(0.064)
Leader Prediction	0.170***	0.092***	0.301***	0.202***	0.147***	0.242***
	(0.029)	(0.029)	(0.046)	(0.038)	(0.054)	(0.056)
N	870	871	871	871	871	871
R^2	0.21	0.09	0.11	0.12	0.03	0.12

$^{*}p \leq 0.1, ^{**}p \leq 0.05, ^{***}p \leq 0.01$

Notes: Robust standard errors clustered at leader level in parentheses. Each observation is a leader-plot owner pair. Column 1 the dependent variable is the within neighbourhood rank of plot owner's BDM bid. The dependent variable in column 2 is the value of the plot owner's BDM bid in Tanzanian shillings, and column 3 is the log value. Column 4 is the percentile rank across the entire distribution, rather than neighbourhood only. Column 5 the dependent variable is an indicator if the BDM bid is the highest in the neighbourhood, and column 6 indicates if the bid was the lowest in the neighbourhood. The regressor in Panels A and C are the invoice and property valuation equivalents of the dependent variable, respectively. While the regressor in Panels B and D are the leader's prediction of the dependent variable as well as the invoice and property valuation equivalents of the dependent variable, respectively. Fixed effects for leader strata, neighbourhood, and surveyor are included in all models.

7 Figures

Figure 1: Project Timeline

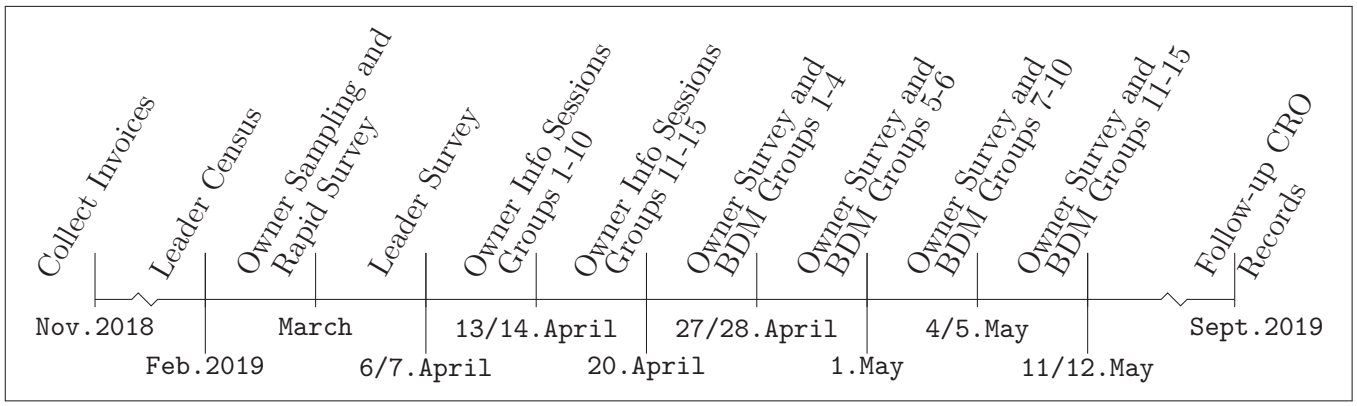


Figure 2: Example of an Invoice for a CRO

UBUNGO MUNICIPAL COUNCIL

Invoice

Date: 07-Nov-2018

Invoice No: 1368046

TO: [redacted]

P.O Box [redacted]

DAR ES SALAAM

LOT ID: [redacted], LOT NUMBER: [redacted], AREA: 484 SQM

BLOCK: 4 KILUNGULE B KIMARA IN UBUNGO, DAR ES SALAAM

Description	Amount	Amount Due
Application Fee	20,000.00	20,000.00
Land rent From 1st April, 2018 to 30th June, 2018	3,630.00	3,630.00
Registration Fee	2,904.00	2,904.00
Certificate of Occupancy Fee	50,000.00	50,000.00
Deed Plan Fee	20,000.00	20,000.00
Survey Fee	16,940.00	16,940.00
Stamp Duty	816.00	816.00
Premium	181,500.00	181,500.00
Revolving Fund	120,000.00	120,000.00
TOTAL	**415,790.00**	**415,790.00**

Please pay in A/C Name: Katibu Mkuu Ardhi, A/C NO: 20101000025, Bank: NMB

OPERATIONAL COST	**140,000.00**	**140,000.00**

Please pay in A/C Name: Ubungo Municipal Council, A/C NO: 0150235213100, Bank: CRDB

Figure 3: Location of Study Area in Dar es Salaam

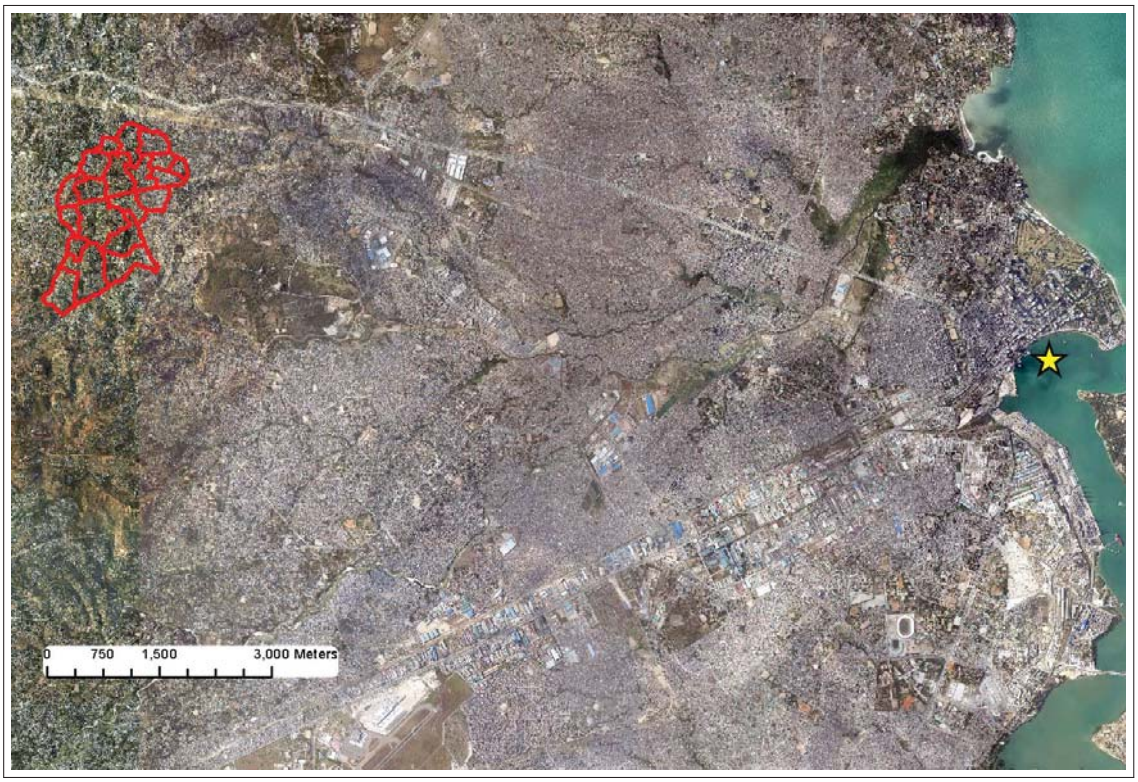


Figure 4: Example of a Plot Photo

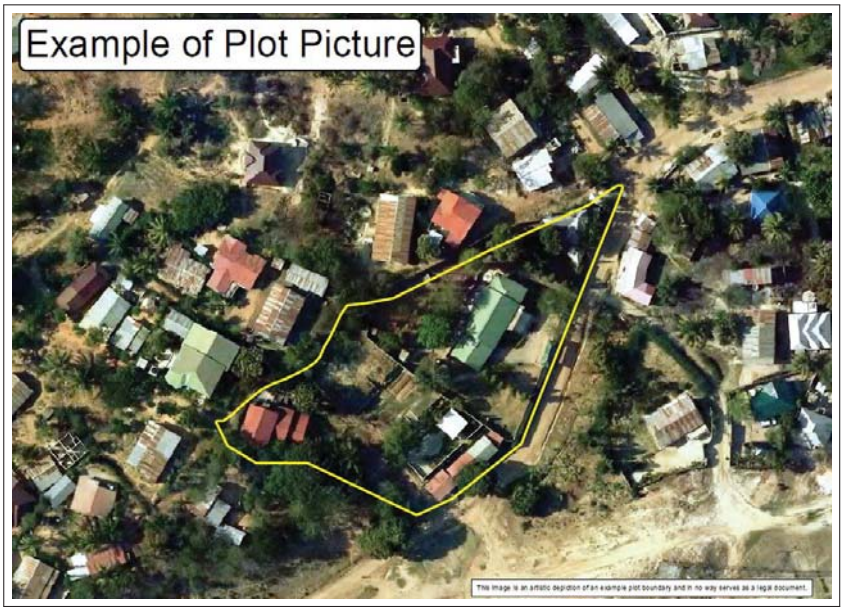
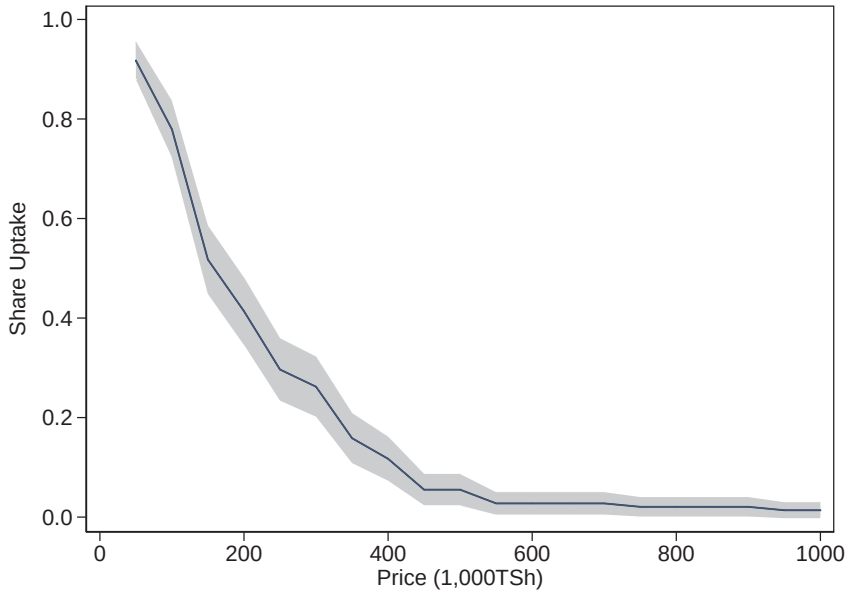
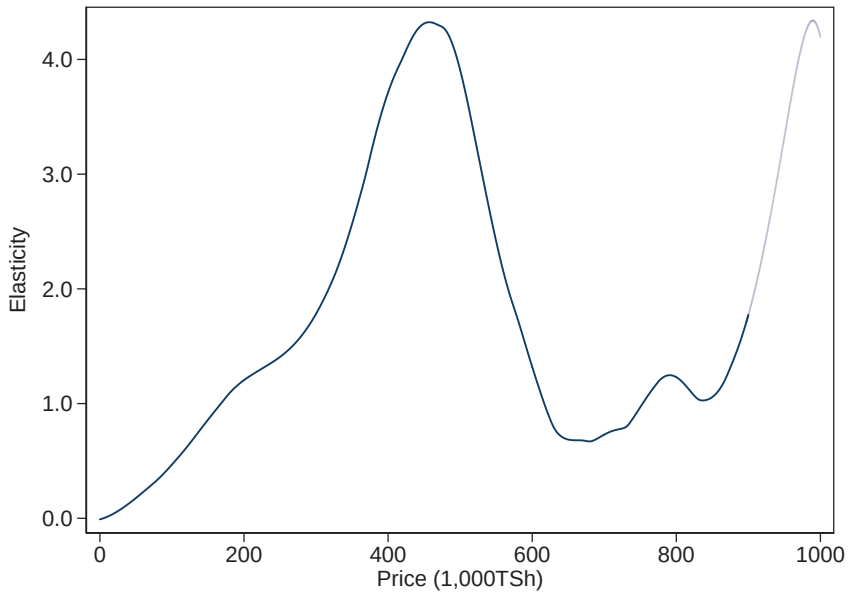


Figure 5: BDM Elicited CRO Demand and Elasticity

(a) Demand Curve



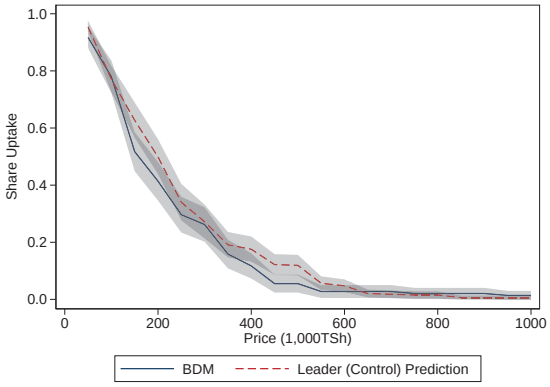
(b) Price Elasticity of Demand



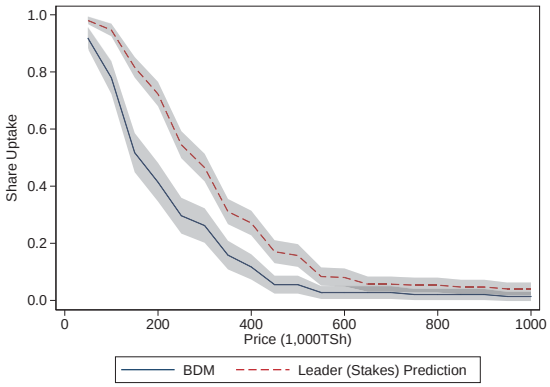
Notes: Figure 5a plots the BDM demand curve with 90% confidence bands. The demand curves indicate the share of respondents with a BDM bid greater than or equal to the indicated price. Confidence intervals are calculated using logit regressions (at prices TSh 50,000; 100,000; . . . ; 1,000,000) clustering standard errors at the plot level. The sample is 146 plots. Figure 5b shows demand elasticities using BDM predicted demand. The BDM elasticity is calculated by a local polynomial regression where, first demand is interpolated using a local polynomial regression with an Epanechnikov kernel, then the point elasticity is calculated and smoothed using a local polynomial regression. In Figure 5b to highlight the sparsity of data in the right tail of our data we lower the transparency over the range of the three largest observations used in the elasticity calculation.

Figure 6: Leader Elicited CRO Demand

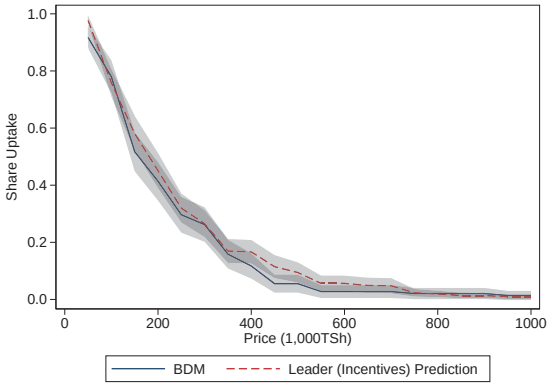
(a) Control Group Leader Elicitation



(b) Stakes Group Leader Elicitation



(c) Incentives Group Leader Elicitation



Notes: Figure 6 plots the BDM and Leader Predicted demand curves, with 90% confidence bands. The demand curves indicate the share of respondents with a BDM bid, or leader predicted WTP, greater than or equal to the indicated price. Confidence intervals are calculated using logit regressions (at prices TSh 50,000; 100,000; . . . ; 1,000,000) clustering standard errors at the plot level. The same sample of 146 plots are used for both, and predictions are frequency weighted by the number of leaders making predictions on that plot (i.e. each plot is equally weighted when calculating each leader predicted demand curve). Sub-figure 6a uses only leaders from the control group and compares the demand curve from their predictions with that of the BDM. Sub-figures 6b and 6c use leaders from the stakes and incentives groups respectively.

Appendices

A Leader Experimental Scripts (English)

Section 5: Experiment

Task 1

For this task, you are asked to think about all plot owners of Kilungule A and B and the maximum price that they would pay for a title deed in the next couple of months. For instance, I would not buy a soda if the shop keeper charged 10,000. If the price was lowered to 1,000 or 800 I still would not buy, but if the shop keeper lowered the price further to 500 I would buy the soda. So the maximum price that I would pay for a soda is 500.

39.1 Out of 100, how many plot owners of Kilungule A and B would take up the title deed in the next couple of months if the price was zero, that is, if the Government was giving it for free?		
Input a number X from 0 to 100		
39.2 So, does it mean that (100 – X) plot owners would NOT take even if the Government was giving it for free?	YES	NO

Note: Proceed only if the respondent responds YES to 39.2. Otherwise call Assistance.

40.1 Out of 100, how many plot owners of Kilungule A and B would pay for the title deed in the next couple of months if their invoice price was:		
		Input a number X from 0 to 100
40.1	100,000	
40.2	200,000	
40.3	300,000	
40.4	400,000	
40.5	500,000	
40.6	600,000	
40.7	700,000	
40.8	800,000	
40.9	900,000	
40.10	1 mio	
40.11	1 mio & 100,000	
40.12	1 mio & 200,000	
40.13	1 mio & 300,000	
40.14	1 mio & 400,000	
40.15	1 mio & 500,000	
40.16	1 mio & 600,000	
40.17	1 mio & 700,000	
40.18	1 mio & 800,000	
40.19	1 mio & 900,000	
40.20	2 mio	
40.21	2 mio & 100,000	
40.22	2 mio & 200,000	
40.23	2 mio & 300,000	
40.24	2 mio & 400,000	
40.25	2 mio & 500,000	
40.26	2 mio & 600,000	
40.27	2 mio & 700,000	
40.28	2 mio & 800,000	
40.29	2 mio & 900,000	
40.30	3 mio	

Notes: Normally, as the price increases, the number of people who would purchase at that price decreases or stays the same. So the ODK will NOT let you proceed if the number X inserted for a response (e.g. 41.20) is bigger than the previous response (e.g. 41.19). If your respondent consistently gives higher numbers for
increasing prices, call Assistance.

!!! Stop the question when the respondent gives response: 0 "zero" !!!
!!! The ODK will allow you to go above 3 mio, if necessary !!!

Task 2

For this task, you are asked to think about the selected plot owners from your shina and the **maximum price** that each plot owner would pay for a title deed in the next couple of months.

41.1 Please rank the selected plot owners from your shina from the highest to the lowest willingness to pay. At the top place, rank the plot owner who would pay the highest price. At the bottom place, rank the plot owner who would pay the lowest price.

41.2 Please, indicate the maximum price that each plot owner would pay for a title deed in the next couple of months.

	41.1 Plot ID	**41.2 Max price that plot owner would pay for a title deed in the next couple of months**
HIGHEST PRICE		
SECOND PLACE		
THIRD PLACE		
FOURTH PLACE		
FIFTH PLACE		
SIXTH PLACE		
SEVENTH PLACE		
EIGHTH PLACE		
NINTH PLACE		
TENTH PLACE		
ELEVENTH PLACE		
TWELFTH PLACE		
THIRTEENTH PLACE		
FOURTEENTH PLACE		
LOWEST PRICE		

Note: You can write any number in intervals of 50,000 OR **'zero'** for plot owners who would only take up if the title deed was for free OR **'less than 0'** for plot owners who would NOT take up even if it was for free.
!!! Respondents can indicate the same maximum price for two or more plot owners !!!

INTRUCTIONS

SCRIPT 1: Control Group

Congratulations, you made it to the final section of the questionnaire! Now we are going to assign you two final tasks. As before, your responses will be used for research purposes only.

With this research, we want to understand how much leaders know about the plot owners of Kilungule A and B, especially those living in their shinas, and how accurate is their knowledge. We encourage you to be as truthful and accurate as possible. In this way, you will allow us to produce high quality research and you will demonstrate your knowledge as a leader!

Your answers will NOT be used to change anything we do in the course of the study.

SCRIPT 2: Treatment 1

Congratulations, you made it to the final section of the questionnaire! Now we are going to assign you two final tasks. Differently from previous questions, your responses to this section will NOT be used for research purposes only. Before presenting each task, we will explain very clearly how we will use your responses. Please listen carefully and do not hesitate to ask any questions.

Before Task 1

As you know, all plot owners participating in the research will have the chance to win a discount on the price of the title deed through a lottery process. Our objective is to get as many plot owners titled as possible within our budget.

With Task 1, we ask to leaders on **the capacity of plot owners of Kilungule A and B to pay for a title deed**. This information will allow us to decide how much discount we should make available through the lottery.

So, do you understand that with your responses to Task 1 you can influence the discounts that plot owners can get? For example, if we find out from you and other leaders that the capacity to pay is very low we will make more discount available to be won through the lottery.

Proceed with task 1

Before Task 2

As you know, all plot owners participating in the research will have the chance to win a discount on the price of the title deed through a lottery process. Our objective is to get as many plot owners titled as possible within our budget.

With Task 2, we ask to leaders what **is the capacity of each of the selected plot owners from their shina to pay for a title deed**. We will take this information into account when deciding to whom we should make available higher discounts through the lottery.

So, do you understand that with your responses to Task 2 you can influence the discounts that plot owners in your shina can get? For example, if leaders of a shina suggest that a plot owner has a very low capacity to pay we will make more likely that this plot owner wins a higher discount through the lottery.

Proceed with task 2

SCRIPT 3: Treatment 2

Note that you will earn points for performing well on the two tasks. At the end of the study, we will reward the 5 leaders with the best scores with some monetary prizes: 30,000 to the 1st place, 20,000 to each of the next four! So, this is your opportunity to show your knowledge and win a prize!

Incentive for Task 1

As part of the research, we will interview plot owners on their capacity to pay for the title deed. At the end of the study, we will pick one price level and count the number of plot owners of Kilungule A and B who would pay at least that price.

Task 1 allows us to measure how good you are at predicting that number. You will earn points depending on the correctness of your responses to Task 1. Be as truthful and accurate as you can if you want to win the prize!

For simplicity, I am going to explain the rule that we will use to assign points through an example.

- Suppose that I ask you: *how many letters come before C in the alphabet?*
- The correct response is obviously: *2, that is, letters A and B.*
- You will earn:
    - 2 points for responding 2 (correct response)
    - 1 point for responding 1 or 3 (wrong response)
    - 0 points for responding 0 or 4 (wrong response)

This simple example shows that the more accurate responses will earn more points.

Incentive for Task 2

As part of the research, we will interview plot owners on their capacity to pay for the title deed. At the end of the study, we will pick one price level and observe which plot owners from your shina would pay at least that price.

Task 2 allows us to verify if those who have higher capacity to pay are the same that you rank higher in Task 2. Ranking at the highest places those plot owners that have the highest capacity to pay will earn you points! Be as truthful and accurate as you can if you want to win the prize!

For simplicity, I am going to explain the rule that we will use to assign points through an example.

- Suppose that I ask you to *rank four letters of the alphabet from the first to the fourth.*
- There are several possible rankings of which only one is correct.

Option 1: CORRECT		Option 2: NOT CORRECT	
1	A	1	D
2	B	2	B
3	C	3	C
4	D	4	A

- To allocate points, we will pick one letter, say for example B.
- We will cross out letter B and all letters coming before B, as in the table below.

Option 1: CORRECT		Option 2: NOT CORRECT	
~~1~~	~~A~~	1	D
~~2~~	~~B~~	~~2~~	~~B~~
3	C	3	C
4	D	~~4~~	~~A~~

- We will then sum up the remaining numbers.

Option 1: CORRECT	Option 2: NOT CORRECT
3+4=7	1+3=4
TOT 7	**TOT 4**

- As you can see, respondents who give the correct ranking (Option 1) will score 7 points, while respondents who give an incorrect ranking (for example, Option 2) will score 4 points only.

This simple example shows that the more accurate rankings will earn more points.

B BDM Scripts (English)

Section 2: BDM

BDM Instructions **SHEET 1**

Read exactly from the script, do not say anything that is not in the script.

READ:

- We would like to share the cost of your invoice, but the price that you will pay is not yet fixed. It will be determined by chance in a lottery that we will play at the end of this survey.
- You will not have to spend any more towards the invoice than you really want to.
- You may even be able to buy it for less.
- If you do not want to pay anything, state this, and you will not have to.

Here is how the Lottery works:

- I will ask you to tell me the maximum price that you would and could pay in the next 10 days towards the invoice for your title deed. Let us call this your ***bid***.
- If you state your bid at 'zero' it means that you are not willing to pay anything. By placing a bid larger than 'zero', you declare yourself willing and able to pay that amount in the next 10 days.
- Therefore, you **must** state a bid that you are ABLE to pay in the next 10 days.
- We will write your bid down on a piece of paper and return to the lottery after finishing the survey.
- At the Lottery table there is a cup with many different balls with different numbers on them. They represent discounted prices for your invoice.
- After the survey, we will sit at the Lottery table and pick a ball from the cup.
  If the number you pick (your **draw**) corresponds to a price that is greater than your bid, then you will not be offered any discount. You will receive your allowance straight away.
- If the number you pick (your ***draw***) corresponds to a price that is less than or equal to your bid:
  - You will pay that price for your invoice in the next 10 days.
  - You will not receive your allowance until that payment has been made.
- If you win a discount and you fail to pay within the 10 days, as agreed, you will
  - loose the discount
  - loose the allowance
- In any case, if you wish, you will be able to pay for your invoice at the original price at any time.

Final notes:

- You can withdraw yourself from the study at any time with no consequences for yourself.
- You will only have one chance to play the lottery for your invoice.
- You cannot change your bid once the lottery has occurred.

Answer any questions respondent has.

To read ONLY upon request:

What happens if you win a discount at the Lottery:

- You will have 7 days to collect the money. From day 8 to 10 you will go to Ubungo Municipality with the researchers.
- You will pay the discounted price that was drawn at the Lottery. The discount will be paid, at the same time, from the research budget.
- Thus, your invoice will be paid fully and you will receive a receipt of the full payment.

The receipt and the title deed will display only the name(s) of the plot owners. Thus, your title deed will be as valid as if it was purchased outside of the research project.

2.1 Which item has the respondent been assigned to practice on?	Soda	Picture of Plot

BDM Practice **SHEET 2** (plot picture)

REMEMBER: Get respondent to state HIGHEST price they are WILLING AND ABLE to pay right now

Let us practice the lottery together. We will play the same lottery, but this time instead of playing for your invoice we will play for a satellite picture of your plot.

1) What is the maximum price that you would and could pay for this picture? We will call that amount your "bid".

[Respondent states a price X]

2) Now, we proceed with the lottery.
   a. If we draw a number that is equal to **X** or less than **X**, you will buy the picture at the discounted price drawn.
   b. If we draw a number greater than **X**, you will not be offered any discount.
   c. You cannot change your stated maximum price after the lottery has occurred.
   d. Do you understand?

3) Please, tell me –if we extract **[X + 100 TSh]** now through the lottery, what happens?

Correct Response: they are not offered any discount and can NOT buy the picture.

If respondent does not give the correct answer, explain the rules again and then ask question again -> go back to 2).

4) And if we extract **[X - 100 TSh]** now through the lottery, what happens?

Correct Response: they will purchase the picture at [X - 100 TSh].

If respondent does not give the correct answer (both that they will purchase and at the correct price), explain the rules again and then ask question again -> go back to 2).

5) If we draw **[X + 100 TSh**], will you regret NOT being offered that discounted price?
   a. If YES -> proceed to 6.
   b. If NO -> skip to 7.
6) If yes, do you want to change your bid to **[X + 100 TSh**]?
   a. If YES -> Ok, your new bid is **[X + 100 TSh**].
   -> Go back to 2) with [X + 100 TSh] as new bid.
   b. If NO -> proceed to 7.
7) So, is **X** truly the most you would want to pay?
   a. If YES -> proceed to 8.
   b. If NO -> go back to 1.
8) If you draw **X**, you must be able to pay **X** right now. Are you able to pay **X** right now?
   a. If YES -> proceed to 9.
   b. If NO -> What is the maximum price that you would and are ABLE to pay now?
   -> Go back to 1.

9) Could you please show to me the amount you have stated you are willing to pay?

a. **If YES -> proceed to 10.**
b. **If NO -> Go back to 8.**

Wait for respondent to show that she has enough funds for Final Bid.
Record respondents Final Bid (Section 2 question 2.2.1)

2.2.1 Record Respondent's Final Bid **[X]**	TSh

10) Now you will draw a price from the cup. If you draw **X** or less, you will buy the picture at the price you draw. If you draw more than **X**, you will not be able to buy the picture. Are you ready to pick a ball?

Mix balls in cup, hold cup above eye level of respondent and have her pick a ball without looking

11) Now you can draw a ball from the cup.

Let respondent draw ball. Together, look at the ball and read the price picked. [Drawn price is Y]
Record Drawn Price (Section 2 question 2.2.2)
Record if Drawn price is lower/equal to or higher than Final Bid (Section 2 question 2.2.3)

2.2.2 What price did you draw? **[Y]**	TSh
2.2.3 Was the price drawn Higher or lower/equal to the bid?	Higher
	Lower or Equal

12) Let us look at the ball together
    a. **[If Y <= X]:** The price is **Y** which is [less than/equal to] the amount you said you would and are able to pay for this picture. You can now buy the picture at this price.

    -> Exchange payment for picture.

    b. **[If Y > X]:** The price is **Y** which is greater than the amount you said you would be willing to spend for this picture. You can NOT purchase the picture.

13) Do you have any questions about the game?

Address any questions or concerns respondent has. Make sure she understands rules of game.

BDM **SHEET 3** (Invoice for Title Deed)

REMEMBER: Get respondent to state HIGHEST price they are WILLING AND ABLE to pay within 10 days.

READ:

- Now you will play to pay for your Invoice
- Your invoice value is **[state value minus deductions from questionnaire]**, you will not be offered a price above this value or below zero.
- Recall the informational meeting held by us in the last weeks
- Have you thought about how much you would and could to pay for your invoice?
- Will you have the funds available within no more than 10 days?

Let's begin:

1) What is the maximum price that you would and could pay for your invoice? We will call that amount your "bid".

[Respondent states a price X]

2) After finishing the questionnaire, we will proceed with the lottery.
    - If we draw a number that is equal to **X** or less than **X**, you will pay for your invoice at the discounted price drawn.
    - If we draw a number greater than **X**, you will not be offered any discount.
    - You cannot change your stated maximum price after the lottery has occurred.
    - Do you understand?

3) Please, tell me –if we extract **[X + 5,000 TSh]** through the lottery, what will happen?

Correct Response: they will not be offered any discount to their invoice.

If respondent does not give the correct answer, explain the rules again and then ask question again -> go back to 2).

4) And if we will extract **[X - 5,000 TSh]** now through the lottery, what will happen?

Correct Response: they will pay for the invoice at [X - 5,000 TSh] in the next 10 days.

If respondent does not give the correct answer (both that they will purchase and at the correct price), explain the rules again and then ask question again -> go back to 2).

5) If we draw **[X + 5,000 TSh]**, will you regret NOT being offered that discounted price?
    - **If YES -> proceed to 6.**
    - **If NO -> skip to 7.**
6) If yes, do you want to change your bid to **[X + 5,000 TSh]**?
    - **If YES ->** Ok, your new bid is **[X + 5,000 TSh]**.
      -> Go back to 2) with [X + 5,000 TSh] as new bid.
    - **If NO -> proceed to 7.**
7) So, is **X** truly the most you would want to pay?
    - **If YES -> proceed to 8.**
    - **If NO -> go back to 1.**

8) If you draw **X**, you must be able to pay **X** within 10 days. Are you able to pay **X** within 10 days?
   - **If YES -> proceed to 10.**
   - **If NO ->** What is the maximum price that you would and are ABLE to pay within 10 days from now?
     -> Go back to 1.

9) Do you confirm that you have a plan to collect the money in 7 days in order to make the payment within 10 days?
   - **If YES -> proceed to 10.**
   - **If NO -> Go back to 8.**

10) If the lottery draws a price **X** or below **X** we will keep your allowance on hold until your payment has been made at Ubungo Municipality. Do you accept to have your allowance on hold if you win?
   - **If YES ->** OK, this is your final bid. We are now going to write it down and seal the envelope.
   - **If NO ->** start again from 1)

Record respondents Final Bid (Section 2 question 2.3)

2.3 Record Respondent's Final Bid **[WTP_0]**	TSh

11) You're bid is now sealed and cannot be changed. We will proceed with the lottery after finishing the remainder of the questionnaire.

Surveyor, write [WTP_0] in the envelope, make the respondent sign and seal the envelope

Surveyor, do you confirm that the envelope has been sealed and the plot owner is aware he cannot change his response in section 2?	YES	NO

C BDM Distributions

Discounts for a plot below or equal to 200 square metres

The integers below ranging from 1-75 represent the lottery balls.

Each ball a corresponding percentage below it.

The percentage represents the discouted price as a percentage of the full invoice value (e.g. 0% means a price of 0 TSh, 50% is a price of half the total invoice cost, 75% is three quarters the full invoice price, etc.).

1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
0%	0%	0%	1%	1%	2%	2%	3%	3%	4%	5%	6%	6%	7%	8%
16	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
9%	10%	11%	12%	13%	14%	15%	16%	17%	18%	19%	21%	22%	23%	24%
31	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**
26%	27%	28%	30%	31%	32%	34%	35%	37%	38%	39%	41%	43%	44%	46%
46	**47**	**48**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
47%	49%	50%	52%	54%	55%	57%	59%	60%	62%	64%	66%	67%	69%	71%
61	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**	**73**	**74**	**75**
73%	75%	77%	78%	80%	82%	84%	86%	88%	90%	92%	94%	96%	98%	100%

Discounts for a plot above 200 and below or equal to 300 square metres

The integers below ranging from 1-75 represent the lottery balls.

Each ball a corresponding percentage below it.

The percentage represents the discouted price as a percentage of the full invoice value (e.g. 0% means a price of 0 TSh, 50% is a price of half the total invoice cost, 75% is three quarters the full invoice price, etc.).

1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
0%	1%	2%	3%	4%	5%	6%	7%	8%	10%	11%	12%	13%	15%	16%
16	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
17%	18%	20%	21%	22%	23%	25%	26%	27%	29%	30%	31%	33%	34%	35%
31	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**
37%	38%	39%	41%	42%	44%	45%	46%	48%	49%	51%	52%	53%	55%	56%
46	**47**	**48**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
58%	59%	60%	62%	63%	65%	66%	68%	69%	70%	72%	73%	75%	76%	78%
61	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**	**73**	**74**	**75**
79%	81%	82%	84%	85%	87%	88%	90%	91%	93%	94%	96%	97%	99%	100%

Discounts for a plot above 300 and below or equal to 400 square metres

The integers below ranging from 1-75 represent the lottery balls.

Each ball a corresponding percentage below it.

The percentage represents the discouted price as a percentage of the full invoice value (e.g. 0% means a price of 0 TSh, 50% is a price of half the total invoice cost, 75% is three quarters the full invoice price, etc.).

1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
0%	5%	7%	10%	12%	14%	16%	18%	20%	22%	24%	25%	27%	29%	30%
16	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
32%	33%	35%	36%	38%	39%	40%	42%	43%	44%	46%	47%	48%	50%	51%
31	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**
52%	53%	55%	56%	57%	58%	60%	61%	62%	63%	64%	65%	67%	68%	69%
46	**47**	**48**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
70%	71%	72%	73%	74%	75%	76%	78%	79%	80%	81%	82%	83%	84%	85%
61	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**	**73**	**74**	**75**
86%	87%	88%	89%	90%	91%	92%	93%	94%	95%	96%	97%	98%	99%	100%

Discounts for a plot above 400 and below or equal to 500 square metres

The integers below ranging from 1-75 represent the lottery balls.

Each ball a corresponding percentage below it.

The percentage represents the discouted price as a percentage of the full invoice value (e.g. 0% means a price of 0 TSh, 50% is a price of half the total invoice cost, 75% is three quarters the full invoice price, etc.).

1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
0%	6%	9%	12%	14%	16%	19%	21%	23%	24%	26%	28%	30%	31%	33%
16	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
34%	36%	37%	39%	40%	42%	43%	44%	46%	47%	48%	50%	51%	52%	53%
31	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**
55%	56%	57%	58%	59%	61%	62%	63%	64%	65%	66%	67%	68%	70%	71%
46	**47**	**48**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
72%	73%	74%	75%	76%	77%	78%	79%	80%	81%	82%	83%	84%	85%	86%
61	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**	**73**	**74**	**75**
87%	88%	89%	90%	91%	92%	93%	94%	94%	95%	96%	97%	98%	99%	100%

Discounts for a plot above 500 and below or equal to 700 square metres

The integers below ranging from 1-75 represent the lottery balls.

Each ball a corresponding percentage below it.

The percentage represents the discouted price as a percentage of the full invoice value (e.g. 0% means a price of 0 TSh, 50% is a price of half the total invoice cost, 75% is three quarters the full invoice price, etc.).

1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
0%	9%	13%	16%	19%	22%	24%	26%	28%	30%	32%	34%	35%	37%	39%
16	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
40%	42%	43%	45%	46%	47%	49%	50%	51%	53%	54%	55%	56%	57%	59%
31	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**
60%	61%	62%	63%	64%	65%	66%	67%	68%	69%	70%	71%	72%	73%	74%
46	**47**	**48**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
75%	76%	77%	78%	79%	80%	81%	82%	83%	84%	84%	85%	86%	87%	88%
61	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**	**73**	**74**	**75**
89%	90%	90%	91%	92%	93%	94%	94%	95%	96%	97%	98%	98%	99%	100%

Discounts for a plot above 700 and below or equal to 1000 square metres

The integers below ranging from 1-75 represent the lottery balls.

Each ball a corresponding percentage below it.

The percentage represents the discouted price as a percentage of the full invoice value (e.g. 0% means a price of 0 TSh, 50% is a price of half the total invoice cost, 75% is three quarters the full invoice price, etc.).

1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
0%	16%	22%	26%	29%	32%	35%	37%	39%	41%	43%	45%	47%	48%	50%
16	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
51%	53%	54%	55%	56%	58%	59%	60%	61%	62%	63%	64%	65%	66%	67%
31	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**
68%	69%	70%	71%	72%	73%	74%	75%	76%	76%	77%	78%	79%	80%	80%
46	**47**	**48**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
81%	82%	83%	83%	84%	85%	86%	86%	87%	88%	88%	89%	90%	90%	91%
61	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**	**73**	**74**	**75**
92%	92%	93%	93%	94%	95%	95%	96%	97%	97%	98%	98%	99%	99%	100%

Discounts for a plot above 1000 and below or equal to 2000 square metres

The integers below ranging from 1-75 represent the lottery balls.

Each ball a corresponding percentage below it.

The percentage represents the discouted price as a percentage of the full invoice value (e.g. 0% means a price of 0 TSh, 50% is a price of half the total invoice cost, 75% is three quarters the full invoice price, etc.).

1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
0%	29%	35%	39%	43%	46%	48%	50%	52%	54%	56%	58%	59%	60%	62%
16	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
63%	64%	65%	66%	67%	68%	69%	70%	71%	72%	73%	74%	75%	75%	76%
31	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**
77%	78%	78%	79%	80%	80%	81%	82%	82%	83%	84%	84%	85%	85%	86%
46	**47**	**48**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
87%	87%	88%	88%	89%	89%	90%	90%	91%	91%	92%	92%	93%	93%	94%
61	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**	**73**	**74**	**75**
94%	95%	95%	95%	96%	96%	97%	97%	98%	98%	98%	99%	99%	100%	100%

Discounts for a plot above 2000 square metres

The integers below ranging from 1-75 represent the lottery balls.

Each ball a corresponding percentage below it.

The percentage represents the discouted price as a percentage of the full invoice value (e.g. 0% means a price of 0 TSh, 50% is a price of half the total invoice cost, 75% is three quarters the full invoice price, etc.).

1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
0%	55%	60%	64%	66%	69%	70%	72%	73%	74%	76%	77%	78%	78%	79%
16	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
80%	81%	81%	82%	83%	83%	84%	84%	85%	85%	86%	86%	87%	87%	88%
31	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**
88%	89%	89%	89%	90%	90%	90%	91%	91%	91%	92%	92%	92%	93%	93%
46	**47**	**48**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
93%	94%	94%	94%	94%	95%	95%	95%	95%	96%	96%	96%	96%	97%	97%
61	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**	**73**	**74**	**75**
97%	97%	98%	98%	98%	98%	98%	99%	99%	99%	99%	99%	100%	100%	100%