INFORMATION FRICTIONS IN GOVERNMENT-FIRM RELATIONSHIPS: TENDER RATING, WILLINGNESS-TO-PAY, AND INFORMATION SOURCES

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1. Introduction

In this project, which takes place in Uganda, we aim to study the determinants of participation in public procurement, with a special focus on the role of corruption and related perceptions of public entities. For this purpose, we partner with the Public Procurement and Disposal of Assets Authority (PPDA), the main anti-corruption and public procurement regulatory body in Uganda.

Our goal is to shed light on the following questions:

(1) Do firms' perceptions of public entities matter for firms' decisions to participate in procurement?

(2) What other characteristics of public procurement tenders do firms find more or less attractive?
(3) Are firms interested in acquiring information on public bodies' performance and corruption levels?

(4) Does providing firms with information about public entities affect their participation in procurement?

We plan to answer these questions with a field experiment involving approximately 600 firms interested in doing business with the government.

Specifically:

(1) We measure firms' perceptions of public bodies, and compare them to newly collected information on public bodies' conduct from procurement audits conducted by the Ugandan government.

(2) We experimentally elicit firms' willingness to conduct business with specific public bodies, and investigate how this varies depending on a firm's perceptions of the public body.

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(3) We elicit firms' willingness to pay for access to two sets of information: (a) the results of procurement audits conducted by PPDA, and (b) summary statistics on firms' perceptions of public entities, measured with a large-scale survey of Ugandan firms conducted in 2020.

(4) We provide access to the two sets of information described in (3) to a random subset of firms, and analyze how this affects firms' participation in public procurement.

2. Sample selection

We collect survey data on a sample of 600 firms that have previous experience conducting business with the government. For this purpose, we conducted a mobilization survey in December of 2020 with a double objective: First, to recruit firms that are suitable for our experiment, and second, to collect two key pieces of information needed to prepare the experimental survey: 1) A list of procurement and disposal entities (PDEs) that are known to the respondent, and 2) the sector in which the firm operates.

This mobilization survey targeted firms that belong to two different lists of companies: 1) firms registered in PPDA's Registry of Providers (ROP) and 2) firms that were pre-qualified with at least one public entity as of the fiscal year 2018-2019. A further constraint is that firms should not be part of our existing RCT (i.e., a related project that has been on the field over the past two years).

Because the survey includes several questions where the firm is asked to provide their perception of different public entities, our sample selection has prioritized firms with previous experience in public procurement. Therefore, the eligibility criteria was to only include firms that:

(1) Had made at least one bid in the last 12 months

(2) Agreed to disclose the name of at least one PDE known to them

(3) Report having access to an e-mail address at least twice per week.

3. Experimental Survey

The baseline survey contains 5 main sections:

(1) Business details

(2) Audits, public procurement and information

(3) Perception of public entities

(4) Tender rating

(5) Willingness to pay for information regarding public entities

3.1. **Business details.** We collect basic information about the respondent and the firm. In particular we collect the following information:

(1) Age of the firm (in years)

(2) Number of permanent employees, currently

(3) Number of temporary employees, currently

(4) Number of invitations received from public entities to present a bid in the last 12 months

(5) Number of bids made in the last 12 months

(6) Number of bids won in the last 12 months (out of the bids made)

(7) Share of revenues accounted for by public procurement contracts in the last 12 months

(8) Number of active contracts in the last 12 months

3.2. **Perception of public entities.** In this section, we elicit firms' perceptions about a maximum of 5 PDEs, randomly selected from the list of PDEs known to the firm.

First, we characterize the relationship with each PDE by asking the following three questions:

(1) Have you **ever submitted a bid** for a procurement contract carried out by this public entity?

(2) Have you ever **won a procurement contract** carried out by this public entity?

(3) Do you personally know **any public official** who works in this public entity?

Then, we elicit the firm's perception about each PDE asking about different aspects of the procurement process, in a way that makes them directly comparable to objective administrative data on public bodies' performance (i.e. PPDA's audits), so we can investigate whether there exists misalignment them. In particular, we ask the following questions:

(1) At the start of a fiscal year, public entities publish their procurement plan, where they estimate the time they will spend in the procurement process for each contract (that is, the process of publishing the contract, evaluating the bids and selecting a provider).

In a typical year, what do you think is the percentage of contracts where **this procurement process is carried out on time**, according to the plan?

(2) Think about all the procurement contracts planned by a public entity in a typical year. What do you think is the percentage of these contracts that are **completed in time**,

according to the initial plan?

(3) Think about the contracts that a public entity signs in a typical year. What do you think is the percentage of contracts in which **providers are paid in time, as established in the contract?**

(4) In a typical year, what do you think is the percentage of contracts in which **the public entity explained to each bidder the reasons for not being selected?**

(5) In a typical year, what do you think is the percentage of contracts that are **won by providers that have a personal connection with public officials?**

(6) In a typical year, what do you think is the percentage of contracts in which **the winning firm had to give a gift, a counterfavour or some extra money to public officials?**

(7) On a scale from 0 to 100, how much do you think each of these public entities **comply with the rules and regulations** that should be followed by law when engaging in public procurement? (where 0 means "they do not comply with any rule" and 100 means "they comply with all the rules and regulations".

(8) When a public entity needs to procure a good or service it will invite providers to present their bid. If they are following an open bidding method, they will publish a tender notice in newspapers and websites inviting all firms to present their bids. On the other hand, if they are not following an open bidding method, they will only invite specific providers to present their bids.

The entity will receive a certain number of bids for the contract, one from each bidder who is interested in providing the good or service.

In a typical year, what do you think is the percentage of contracts **that receive more than two (2) bids?** That is, the percentage of contracts that receive bids from more than two (2) providers.

3.3. **Tender ratings.** In this section, we ask firms to grade specific profiles of potential government tenders, following an experimental design similar to the one used by Kessler, Low and Sullivan (2019). The key ingredient of this experimental method is that all tenders are hypothetical, but they are created by randomly drawing the relevant characteristics of interest from the true distribution of tenders in Uganda. The profiles are generated by randomly matching different characteristics using multiple template styles and subject to restrictions to make them realistic. Our team of research assistants manually checks everything for accuracy as well.

Crucially for our purpose, we provide incentives to respond truthfully by enrolling the respondents in a newsletter service where we provide them with timely information about procurement opportunities that match their interests twice a week. To identify the best tenders for them, they are told that we will use their responses to the tender rating exercise. The details of this setting are introduced to respondents with an animated video.

Each respondent is asked to rate a total of 10 tenders, with the following composition: 6 from the PDEs they evaluated in the previous section, 2 from PDEs not known to them selected at random, and 2 from non-government entities that engage in open procurement processes (large private firms, NGOs etc.). Importantly, the tenders are displayed to the respondent in a random order, to avoid any bias towards entities appearing at the end, and which may be caused by respondent's fatigue.

One common concern in such an experimental design is how to pass the "qualify/disqualify test," that is, the quick decision made by the respondent on whether the item to be rated is worth considering. In this setting, firms will only be interested in tenders that are aligned with their business activity, which depends on the subject of procurement displayed in the tender (e.g., a construction firm will not be interested in tenders with subjects in the sector printing supplies). Therefore, if they were asked to evaluate a tender in with a subject that is not aligned with their business, their rating would be close to zero, regardless of the PDE that has published the tender, or any other characteristics of the contract.

Our implementation of the qualify/disqualify test is as follows: First, we collected information about the sector(s) in which the firm operates during the mobilization survey, and produced customized hypothetical tenders for each firm, drawing random subjects that belonged to these sectors. Before each of the tenders is displayed, we ask the respondent if they are interested in the subject of the tender that they are about to see:

- If the respondent answers positively, the tablet shows the hypothetical tender and prompts the respondent to provide their rating. In particular, we ask the respondent to grade the tender using the following two questions about the tender:

  (1) If you see this tender notice from this entity, how interested would you be in bidding for this contract?

    - **1 − 2: Little interest.** The subject is interesting, but there are many characteristics of this tender that do not make it a great match for me.

    - **3 − 4: Some interest.** The subject is interesting and there are some characteristics I like. I might inspect the bidding documents.

    - **5 − 6: High interest.** The subject is interesting, and the tender has both some characteristics I like and some that I like less. I would certainly inspect the bidding documents to find out more.

    - **7 − 8: Very high interest.** This tender has many characteristics that make it a very good match for me. I would at least buy the bidding documents for this tender.

    - **9 − 10: Perfect match.** This tender has all the characteristics I am looking for, and I would certainly plan on bidding for such a tender!

(2) Assume that you have submitted a bid for this contract. How likely do you think it is that you win?

- If the answer is negative, the tablet does not display the tender, and moves on to ask whether the subject of the next tender is interesting.

This procedure is designed to mimic the process of a firm that scans a newspaper or a website in search of new opportunities: Normally, a person would first reads the subject, and if this it potentially interesting, then they proceed to read the rest of the information to make a final decision.

Since tenders that are not displayed are not rated, the tender rating exercise finishes when the respondent has replied positively to 10 subjects.

3.4. **Willingness-to-pay.** In this section, we estimate the degree to which firms value having access to information on public entities' performance and compliance with regulations. Specifically, we elicit firms' willingness to pay (WTP) for accessing two different pieces of information: 1) the summarized results of the procurement audits conducted by PPDA in the last 5 fiscal years, and 2) information on other firms' perception of public entities, obtained through a survey of 2,000 government providers in Uganda.

This information is presented in the form of well-organized reports, containing easy to consult tables which summarize the scores obtained by public entities across various performance and compliance dimensions. In the case of the audits, our report is significantly easier to read than the long unstructured reports typically compiled by the auditors. While it is possible for a firm to ask other firms their opinion about a certain public entity, the report increases the set of information available to a large set of firms, rather than the limited network of an individual firm.

We estimate the firm's willingness to pay (WTP) for these two pieces of information using a variant of the Becker-DeGroot-Marschak (BDM) mechanism (Becker et al., 1964). In this setting, the individual is asked to state their bid for an item. Then, a random price is drawn and compared to the bid made by the respondent. If the bid is higher or equal than the random price, she receives the item and pays the random price. If the bid is lower, she cannot purchase the item. Importantly, the respondent only has one chance to place their bid, and is fully informed about this mechanism at the start of this section of the experiment, including a practice round[1].

We use the BDM mechanism for several reasons. First, because it is *incentive compatible*: Since the bid stated by the respondent does not affect the price they pay for the item, the optimal strategy is to bid the maximum they are willing to pay for the item. Second, unlike take-it-or-leave-it (TIOLI) offers, which only yield a range, BDM provides an exact measure of WTP.

In addition to the above component, we incorporate into the WTP experiment an information experiment. In particular, we are interested in understanding whether providing information

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[1] In our experiment, and to ensure that the revelation of the price for one of the items is not affecting their stated bid for the other, we ask the respondent to state their bid for each of the reports before revealing the two random prices.

on public bodies' audits performance, and on other firms' perceptions of public bodies, affect firms' future decisions regarding public procurement.

To test this hypothesis, we provide information on audit results and on other firms' perceptions to all firms who win the bid (i.e. their WTP is equal or higher than the randomly drawn price), but we use the variation in reception time as a treatment. Varying reception time is possible since firms are told that the reports are prepared specifically for each firm, therefore taking some additional time after the baseline survey is conducted. After stratifying on location and sector, we split the sample into three treatment groups, each representing one third of the sample:[2]

(1) Control (C): They receive both reports after the endline data is collected.

(2) Treatment 1 (T1): They receive the reports on firm perceptions immediately, but the reports on audits after the endline data is collected.

(3) Treatment 2 (T2): They receive the reports on firm perceptions after the endline data is collected, but the reports on audits immediately.

We then compare, over the course of the following year, how firms' public procurement decisions differ between the various treatment arms and the control group.

3.4.1. *Imperfect compliance.* The combination of the BDM mechanism with the information experiment entails that not all firms in the treated groups are necessarily treated (i.e. a firm in T1 or T2 will not receive the report if they lose their bid). To maximize the share of respondents in the treatment group that are in fact treated while maintaining incentive compatibility in the BDM elicitation procedure, we draw the price from a distribution with high mass at zero, which means that most firms will be receiving the report[3]. Firms who do not win the report are dropped from the analysis of the information treatment.

4. Analysis of Tender Ratings

We estimate specifications such as the following:

$$V_{ijp} \quad = \quad 'X_{jp}\beta +' E_{jp} + \epsilon_{ij}$$

where V_{ijp} is our outcome variable of interest of firm j for tender i, published by public entity p. $'X_{jp}$ is a vector of variables capturing the perception that firm j has expressed about PDE p along various dimensions, $'E_{jp}$ is a vector of variables referring to the previous experience of firm j with PDE p, and ϵ_{ij} is the error term.

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[2]We define four strata based on two dummy variables: 1) firm located in Kampala, and 2) firm belonging to the sector of "Building and construction."

[3]Normal distribution with mean of 1,000 UGX (0.27 USD), and standard deviation of 300 UGX. The characteristics of the distribution are not communicated to the respondent at any point.

We estimate this specification through OLS (and Ordered Probit for robustness). We also include PDE fixed effects in some specifications.[4]

4.1. **Outcome variables.** We capture two outcomes variables, as described in section 3.3, both measures on a scale from 1 to 10:

(1) Interest in the tender.

(2) Likelihood to win the bid (conditional on having submitted a bid).

Our main outcome variable is the *interest in the tender*.

4.2. **List of the 8 variables in $'X_{jp}$, and the 3 variables in $'E_{jp}$ for baseline regressions:**

(1) **TimelyProcurement:** Share of contracts procured on time (compared to procurement plan).

(2) **TimelyCompletion:** Share of completed on time (compared to procurement plan).

(3) **TimelyPayment:** Share of providers paid on time (according to contract).

(4) **Feedback:** Share of contracts in which the PDE provides feedback to unsuccesful bidders (i.e. explained the reasons for not being selected).

(5) **Connection:** Share of contracts awarded to firms with a personal connection with public officials at the PDE.

(6) **Corruption:** Share of contracts in which the winning firm had to provide a gift, a counterfavour or some extra money to public officials.

(7) **Compliance:** On a scale of 0 to 100, how much does the PDE comply with rules and regulations.

(8) **Competition:** Share of contracts published that received more than two bids.

(1) **PreviousBid:** Firm has submitted a bid with the PDE in the past

(2) **PreviousWon:** Firm has won a contract with the PDE in the past

(3) **KnowOfficial:** Firm knows a public official at the PDE

We will also run specifications where the full set of characteristics of the tender is included, as well as specifications where we control for additional firm characteristics we collected.

We also plan to estimate whether all perceptions matter jointly as determinants of interest.

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[4]A constraint of our analysis is our inability to control for firm fixed effects, due to the fact that we are able to only show up to 10 tenders to each firm (due to time and attention constraints).

4.3. **Main regressors of interest.** The main regressor of interest is **Corruption**, which we expect to negatively affect interest in the tender. We also expect firms to prefer PDEs for which tenders are more competitive (**Competition**), as it's a signal of lower corruption levels (on the other hand, we could also expect a negative effect on Competition if firms prefer to do business with entities that receive less participation). Additionally, we expect **KnowOfficial** to matter if firms want to do business with PDEs they have connections with (we could expect the opposite if firms do not need our service for PDEs for which they already have a connection).[5]

Other important variables of interest are the funding source of the contract (as firms tend to be more negative towards contracts fully handled by the Ugandan government, relative to those overseen by international organizations, for example) and whether the contract is given by an international or local non-public entity. Additionally, we think firms might value positively the fact that the PDE provides timely payments and that it provides feedback to all bidders.

5. ANALYSIS OF WILLINGNESS-TO-PAY

As described in section 3.4, we estimate the firm's WTP for two pieces of information.

We plan to investigate how the WTP distribution differs depending on the two pieces of information provided. We are also interested in how WTP depends on baseline characteristics of the firm, in order to shed light on which types of firms are more interested in acquiring information about public entities: we are particularly interested in the degree of the firm's previous involvement in procurement, and in firm size.

Finally, after the WTP elicitation, we ask the respondents what drove their decision, in order to investigate the reasons behind a respondent's interest (or lack of interest) in a specific piece of information.

6. ANALYSIS OF INFORMATION TREATMENT

To evaluate the effect of the information treatment we define the following specification:

$$O_{j,t=2} \quad = \quad \beta_1 FirmPerceptionInfo_j + \beta_2 AuditInfo_j +' \Delta F_j \gamma + \epsilon_{jm}$$

where $O_{j,t=2}$ is the outcome variable for firm j at $t = 2$ (endline), $FirmPerceptionInfo_j$ is a dummy indicating if firm j received the report about other firm's perceptions, $AuditInfo_j$ is a dummy indicating if firm j received the report about the audits conducted by PPDA, and $'F_j$ is a vector of baseline firm characteristics for firm j (using also strata fixed effects). We also plan to combine both treatments into a unique treatment indicator variable.

We measure outcome variables primarily using a phone follow-up, taking place approximately four months after the baseline survey.

6.1. **Outcome variables.**
(1) Public procurement activity of the firm since the last interview:

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[5]We also plan to interact several variables, such as *Corruption* and *KnowOfficial* (or **PreviousWon**), since these effects should be attenuated if the firm has a personal connection in the PDE or has already won a contract with the PDE.

(a) Number of total bids made, since the baseline survey (to test whether the information increased the firm's willingness to participate in procurement)

(b) Bidding for contracts from PDEs that are higher in the rankings of the report received by the firm.

(2) Updated perceptions about the public entities they had evaluated in the baseline survey. Depending on our ability to collect reliable data on the phone, we might just collect summarized information about whether they changed perceptions about PDEs since we last talked to them.

We also plan to measure a firm's interest in continuing to receive updated reports such as the one they received, measuring a firm's willingness to signup (for a cost) for receiving an updated version of the report in the future. Depending on the availability of the data, we are also pursuing the possibility of measuring clicks and use of our email newsletters, which would allow us to measure interest in specific tenders without relying on the endline survey.

APPENDIX

6.1.1. *Full list of tender characteristics.* The distribution of these characteristics follows the real distribution that our team has obtained through the collection of tenders published in newspapers and websites, except for some variables, whose distribution is defined by the research team, given the difficulty in capturing this information from real tenders.

(1) Tender attributes

   (a) **International:** Dummy equal to 1 if the procurement method is "Open International Bidding". Presence in the tender is defined by the distribution found in real tenders.

   (b) **SourceUganda:** Dummy equal to 1 if the source of funding is the government of Uganda, and zero if the source is an international donor. Present in all tenders.

   (c) **InvitationInspection:** Dummy equal to 1 if the tender explicitly invites bidders to inspect the bidding documents, and zero if the tender only indicates the bidding documents have been issued. Presence in the tender is defined by a distribution set by the research team.

   (d) **BidDocumentPrice:** Price to be paid for bidding documents, which contain detailed information about the contract and how to prepare the bid. Purchasing them is a pre-requisite for bidding, which is why this price is sometimes referred as a "non-refundable fee". Presence in the tender is defined by the distribution found in real tenders.

   (e) **BidSecurityAmount:** A bid security is a monetary guarantee that the bidder will sign the contract if they are selected at the price stated in their bid. Typically, firms obtain this guarantee from a bank, in exchange for a percentage of the value of the security. Therefore, higher values imply higher risks and costs for bidders. Presence in the tender is defined by the distribution found in real tenders.

   (f) **BidDeadlineDate:** Distance (in days) to the deadline for submitting bids. Present in all tenders.

   (g) **PrebidMeetingDate:** Distance (in days) to the presentation organized by the PDE to explain the details of the contract to potential bidders. Presence in the tender is defined by the distribution found in real tenders.

   (h) **BEBNoticeDate:** Distance (in days) to the display of best evaluated bidder (BEB) notice, which is the official communication declaring what is the winning firm for the contract. The notice may also include the reasons why unsuccesful bidders were not selected. Presence in the tender is defined by the distribution found in real tenders.

   (i) **ContractSigningDate:** Distance (in days) to the scheduled date for the winning firm to sign the contract. Presence in the tender is defined by the distribution

found in real tenders.

(j) **PaymentSchedule:** Dummy indicating the presence of a comment reassuring providers that they receive their payment immediately after the delivery of the goods or services procured. Presence in the tender is defined by a distribution set by the research team.

(k) **Feedback:** Dummy indicating the presence of a comment at the end of the tender, reassuring providers that they will explain to unsuccesful bidders the reason for not being selected. Presence in the tender is defined by a distribution set by the research team.

(2) Information present in tender

(a) **ProcurementMethodPresent:** Dummy equal to 1 if the tender indicates if the procurement is domestic or international ("Open domestic bidding" or "Open international bidding") and zero if the method is not explicit ("Open bidding"). Defined by the distribution found in real tenders.

(b) **PrebidMeetingPresent:** Dummy equal to 1 if pre-bid meeting is scheduled for this tender. Defined by the distribution found in real tenders.

(c) **BidDocumentPricePresent:** Dummy equal to 1 if the bid document price appears in the tender. Defined by the distribution found in real tenders.

(d) **BidSecurityAmountPresent:** Dummy equal to 1 if the bid security amount appears in the tender. Defined by the distribution found in real tenders.

(e) **OtherDatesPresent:** Dummy equal to 1 if the post-deadline dates are present in the tender (i.e. "Display of the best evaluated bidder (BEB) notice" and "Contract signing date"). Defined by the distribution found in real tenders.