Pre-Analysis Plan: Strengthening Political Accountability During Covid-19: A Field Experiment on the Effect of Digital Town Halls on the Legitimacy of Government in Freetown, Sierra Leone

Julian Michel*
Kevin Grieco*
Niccolo Meriggi†
Wilson Prichard‡§

August 20, 2021

*Ph.D. Student, UCLA
†Country Economist, IGC Sierra Leone
‡Associate Professor, University of Toronto
§This project was supported by generous funding from the International Growth Center and the International Center for Tax and Development. This study received IRB approval at UCLA (IRB20-000380) and in Sierra Leone (approved 3/25/2020; amended 5/28/2020). We thank Graeme Blair, Katherine Casey, Darin Christensen, Cesi Cruz, Adrienne LeBas, Giulia Mascagni, Oyebola Okunogbe, Dan Posner and Jon Weigel for helpful comments. We also thank our wonderful team of research assistants and enumerators. Of course, this project would not have been possible without the contributions and cooperation of the Freetown City Council.

Contents

1 Introduction

Are Digital Town Halls effective in furthering political accountability at a time in which face-to-face meetings are exceedingly risky?

The Covid-19 pandemic has proven to be a formidable challenge to democratic practices around the globe. According to one estimate, populations in 95 countries have experienced pandemic-related reductions in democratic quality in 2020 (V-Dem 2020). These erosions of democracy include restrictions on civil liberties (Hale et al. 2021), temporary suspensions of parliament (Belin and De Maio 2020), the rescheduling of elections in at least 76 countries (IDEA 2021) and executive aggrandizement by incumbents (Brown, Brechenmacher, and Carothers 2020, Mukherji 2020, Novak and Patrick 2020). While the support for democratic leaders initially tended to increase early in the pandemic due to rally around the flag effects (Giommoni and Loumeau 2020, Schraff 2020, Yam et al. 2020), later on insufficient adjustment measures (Herrera et al. 2020, Bol et al. 2021) and loss of human life (Warshaw, Vavreck, and Baxter-King 2020) eventually reduced political support for and trust in many elected officials.

Arguably, the pandemic's challenge to democratic practices is greatest in unconsolidated democracies with nascent democratic traditions and low output legitimacy (Freedom House 2020). It is there where poor governmental performance is most likely to erode systemic support for democracy. Faced with tough trade-offs between public health concerns and projections of even higher levels of absolute poverty (Mahler et al. 2021; see also Meriggi et al. 2020) – and often not being in a position to leverage substantial fiscal relief packages (but see UNODC 2020) or to credibly promise rapid vaccine access (Dahir and Mueller 2021) – leaders in developing democracies could engage citizens to legitimize costly decisions. In fact, political organizing and citizen engagement was shifted online (Bellows and Zohdy 2020, Gros and Eisen 2021). Yet, such attempts to engage citizens virtually raised questions of (a) whether such contact would be seen as shallow and less meaningful (Bellows and Zohdy 2020) and (b) how to facilitate equitable opportunities for voice where "digital divides" persist (Duarte 2021).

In this study, we provide experimental evidence on the efficacy of a low-cost and easily adoptable type of digital participatory budgeting town hall (DTH). The DTH was designed to facilitate citizen-representative interactions and horizontal (citizen-citizen) deliberation during the Covid-19 pandemic (January - March 2021). Our field experiment is situated in 30 of 48 wards of Freetown, Sierra Leone. In study wards, a random subset of property owners who were scheduled to receive a property tax notice in 2020 were invited to take part in one of 55 Digital Town Halls. These Town Halls took the form of a moderated WhatsApp chat and allowed the up to 40 invitees to interact with representatives and to deliberate with fellow property owners from their neighborhood. DTH discussions revolved around how a budget of approx. $1,500 - up to 10% of what the FCC invested per ward in 2019 on average - should be spent in their ward.

It is now well understood that trust in political representatives is crucial to facilitating compliance with pandemic-related restrictions (Weinberg 2020, Gyimah-Boadi 2021). Trust also conditions the perceived credibility of governmental messaging around the severity of the health threat and the desirability of getting vaccinated (The Economist 2020, OECD 2020). If increased citizen engagement through digital town halls were to enhance satisfaction with representatives and

political institutions, this would not only benefit managing the pandemic (UNDESA 2020), but also strengthen the social contracts that "enhance prospects for post-pandemic reconstruction" (Gyimah-Boadi 2021). Along these lines, Mbaku (2021) notes that "African Governments should invest in the necessary infrastructure to significantly improve access to these participation-enhancing technologies" (Mbaku 2021). To our knowledge, this project is the first to examine whether Digital Town Halls do indeed increase satisfaction with political representatives and democratic institutions during Covid-19. If this were the case, our DTH setup would be a desirable tool to combat pandemic-related erosions of democracy.

As a secondary research goal, we examine the "digital contact hypothesis" – the idea that online contact between citizens, and especially across identity groups, can lead to more interpersonal trust and less perceived polarization. Town Halls are a natural setting in which such interactions can take place. We thus contribute to an emerging literature on whether digital variants can have similar empathy and tolerance inducing effects (Cao and Lin 2017, White, Maunder, and Verrelli 2020).

2 Digital Town Halls: Motivation

Non-digital Town Halls have become a prominent facilitator of citizen-representative interactions since the late 1980s (Sheely 2015, p.252f.). Such deliberative settings have been shown to:

- improve development outcomes (Gonçalves 2014; but see Mansuri and Rao 2013)
- increase vote shares of participating parties (López-Moctezuma et al. 2020)
- decrease clientelism (Fujiwara and Wantchekon 2013)
- decrease occurrences of violent events (Collier and Vicente 2014)
- increase the political efficacy of participants (Boulianne 2019)
- allow citizens to become more informed (Esterling, Neblo, and Lazer 2011, Casey, Kamara, and Meriggi 2021)
- allow for updating of policy preferences (Barabas 2004, Farrar et al. 2010, Luskin et al. 2014, Sandefur et al. 2020).

Therefore, it is unsurprising that it recently has been argued that the "creation of deliberative spaces where citizens and political elites participate in meaningful conversations with real policy consequences is central to strengthen the quality of weak democracies" (López-Moctezuma et al. 2020, p.15).

Yet, few studies examine the potential of *digital* Town Halls in enhancing political accountability (for reviews of this literature, see Kies 2010 and Friess and Eilders 2015). As we argue, even if the environment were conducive to face-to-face interactions, there would be considerable relative advantages of holding digital Town Halls vis-á-vis their offline analogue.

First, participation is less costly: If access to WhatsApp already exists, participants only need to invest a modest amount of time and mobile data to enter the DTH. Whereas offline THs enable participation only in a short and fixed time period, DTHs can be accessed for weeks and whenever it is convenient for participants. This flexibility reduces the oft significant opportunity

costs of participation (Casey 2018). Intuitively, transportation costs – traditionally a barrier to participation especially in rural settings (Sexton 2017, p.35) – are not incurred. Remarkable improvements in internet activity in developing countries – 31 per cent in Sierra Leone in 2018 own a phone with internet access (Afrobarometer 2018) – have led to an explosion in social media usage (21.5 per cent in Sierra Leone report obtaining news through Facebook or Twitter at least "a few times a week" (Afrobarometer 2018)). Naturally, given our study population of property owners in the capital city, these numbers are expected to be even higher in our sample. Therefore, designing the DTH as a WhatsApp group chat confronts participants with an environment most of them are already familiar with. In our model of mediated interaction through WhatsApp, participation is less costly for political representatives too: All that is required of them is to read a summary of participant contributions and to respond in a limited number of video and voice messages. By using a freely available messenger service, organizers can save the set-up costs of in-person town halls (e.g., venue, security staff, refreshments and snacks). Consequently, by reducing participation and set-up costs, DTHs have the potential to be a particularly cost-effective platform increasing accountability.

Second, perhaps counter-intuitively, we argue that DTHs may hold more deliberative promise: In the Habermasian ideal type of deliberative democracy, participants engage in potentially endless communicative action (an exchange of reasoned arguments) as equals until the best argument prevails (Habermas 1975). In offline THs, attendants regularly find themselves unable to make their views known in front of representatives as time constraints only allow for a limited number of contributions. Statements, especially from members of marginalized groups, are often interrupted by other participants (Parthasarathy, Rao, and Palaniswamy 2019). In contrast, DTHs allow all participants to make their views known without running the risk of interference by others. Importantly, DTHs alleviate the constraint of limited attention spans on successful argumentative reasoning: While it is easy to forget what a participant argued a few minutes ago in an offline TH, participants in WhatsApp can just scroll back. Whereas immediate reactions are required offline to ensure that the conversation stays on topic, DTHs enable participants to first reflect on their statement – in theory for multiple days – before posting it. Therefore, the longer time frame in a DTH should increase the argumentative quality of contributions and facilitate perspective taking (as the need for immediate reactions in offline DTHs precludes taking the time to reflect on where someone else's argument is coming from). Finally, we can avoid face-to-face interactions which in group settings under time constraints lend themselves to emotionalized exchanges (more cues are visible – e.g., body language and facial expressions – which make it harder to focus on the merits of the argument alone).

Third, DTHs can alleviate one dimension of the well-known gap in political participation by targeting the relatively young who usually are less likely to participate in conventional forms of political engagement. However, it is to be expected that DTHs – just like their offline analogue – display additional participation biases (higher ability and willingness to participate among those able to afford internet usage, the more educated and literate, those with higher political efficacy (Boulianne 2019 on self-selection in offline TH participation; see also Neblo et al. 2010)).

Fourth, DTHs lend themselves to uncoupling horizontal (citizen-citizen) and vertical (citizen-representative) interactions. In theory, offline THs too could have separate phases for each type of interaction. In practice, however, such THs tend to be either purely horizontal (when elites

were not invited) or contain both elements without careful delineation that would allow for a study of their separate effects. It is now well understood that purely horizontal THs, in which there is no integrated mechanism to incorporate policy makers in the process, are seen as less meaningful by participants and as having less impact (Baiocchi and Ganuza 2014). Yet, incorporating elements of vertical interaction is a non-trivial task given the well-documented challenges of elite domination of the discussion (Bardhan 2002, Humphreys, Masters, and Sandbu 2005, Fearon, Humphreys, and Weinstein 2011). To enable vertical interaction without running the risk of elite domination, we opted for an indirect mode of communication: Only citizens directly communicate within DTHs, while the citizen-representative interaction is indirect. Representatives hear from their citizens through summary reports of the discussion created by the study team and respond through video messages posted in the WhatsApp group.

However, there are also potential relative disadvantages to the DTH format: The relative anonymity decreases the (reputational) cost of disruptive behavior as participants can choose how much identifying information they provide through their WhatsApp profile. Furthermore, moderating the chat is costly, constrained by the functionalities provided by WhatsApp (messages can only be deleted by who wrote them) and, if done poorly, runs the risk of altering the conversation. The absence of face-to-face interactions can lead to questioning that one is actually talking to ones' representatives and fellow community members. Fortunately, this is less of a concern here as political representatives have prominently associated themselves with the DTH intervention in public. One may argue that voice- and text-based communication is less rich when other cues cannot be observed (e.g., the eyes as an indicator of the sincerity of the speaker). The mediated interaction between participants and representatives relies on trust in the intermediary that is aggregating the information. Perhaps most crucially, while DTHs reduce participation costs for many, those lacking internet/ WhatsApp access cannot participate. Finally, the brevity of text messages may not be conducive to the articulate elaboration of arguments (Jaidka, Zhou, and Lelkes 2019). However, there are no length limitations in WhatsApp and participants have the option to record voice and video messages as well. Through our endline survey and by capturing all DTH conversations, we can measure for many of the aforementioned potential disadvantages how prevalent they were.

3 Digital Town Halls: Intervention Description

This research takes place in cooperation with the Freetown City Council (FCC) in a context of a city-wide property tax reform two of us helped lead. The reform served to broaden the tax base (less than 50% of the approximately 120,000 properties had been registered previously) and to make the tax burden more equitable (through the introduction of a more nuanced, consistent and transparent property valuation scheme). The mayor publicly announced that DTHs will be held starting in January of 2021. In her messaging, she emphasized that these DTHs are key to secure citizen participation. She stressed that she intends to institutionalize the THs and that future THs will be assigned 20% of the property tax revenue raised in a given ward (FCC 2021, p.26).

In this study, DTHs take the form of WhatsApp group chats to which up to forty owners from a given ward were invited. The overarching goal of the DTH is for the group to deliberate and

decide over how a budget of LE15 Million should be spent in their ward. The budget allocated to the TH does not come from tax revenue given (1) the severity of the budget constraint the FCC faces and (2) that an expected increase in property tax revenue - brought about by the property tax reform - will be accrued only after the DTHs have taken place. For this reason, the funds to be decided over are taken from the project's research budget, which will not be directly communicated to the DTH audience. By allowing FCC representatives to claim credit for the participatory budgeting opportunity, we ensure their buy-in.

We designed the DTHs with the goal of enabling both (direct) citizen-citizen and (indirect) citizen-representative interactions. Overall, the DTH process contains four distinct phases: horizontal deliberation, preference articulation and aggregation, vertical interaction, and decision making over services. The video contents from political representatives are shared via Qualtrics and also directly within the WhatsApp groups. DTHs are open for discussion between 7am and 10pm daily, so as to ensure that a facilitator can be present at all times. Participants are free to choose in what form they would like to participate (text/ voice/ video messages), but are asked to contribute in English.

After having verified that respondents are WhatsApp users and having obtained informed consent, participants were invited to their DTH. The DTH commenced after introductory videos by the mayor and the ward councilor were shared, in which these representatives explain the DTH process and goals. Additionally, DTH facilitators - RAs hired by the study team - introduced themselves to participants (both in the group chat and in one-to-one conversations with participants).

In the first phase of "horizontal deliberation", participants discuss which services they would like to see improved in their ward. This phase is purely horizontal because participants are told that representatives will not be involved at this stage and will not learn about what was discussed. The facilitators begin the conversation by sharing a menu of preferred services taken from a citywide survey we conducted earlier. Participants are then asked which services they would like to see added to the menu that will constitute the choice set for the eventual DTH vote. Overall, this phase serves to offer a "safe discussion space" for citizens that approximates the conditions under which deliberation is thought to work (i.e. the relative equality of citizens exchanging reasoned views on a topic of shared interest and which was framed so as to bring up sociotropic concerns ("which service would improve well-being in your ward the most?")).

The second phase – "preference articulation and aggregation" – is the first in which participant statements will be shared with political representatives. Participants are told that this will take the form of an unbiased and anonymized aggregation of their views – performed by the study team – which is presented to both the mayor and the respective ward councilor. While the discussion is still focused on preferred service delivery, it is supposed to progress from a broader consideration ("brainstorming") of multiple services in phase 1 to a more crystallized discussion of a select few items in phase 2.

In the third phase, "vertical interaction", the councilors respond in separate videos to the comments made. These response videos – one per councilor per DTH – allow the representatives to acknowledge the input received and to position themselves to the demands made. This includes highlighting their preferred services, justifications for their service preferences and explaining past

and future delivery goals. Participants are then invited to discuss the reactions received from their representatives.

The fourth phase, "decision making", consists of the final vote over how the DTH budget should be spend. This vote is cast anonymously through a Qualtrics survey. We additionally give participants the option to inform moderators of their vote in bilateral conversations. The choice set is given by a menu of services – the list provided in phase 1 plus additional items recommended in this first phase that were deemed feasible and within budget by the study team. The whole budget is dedicated to the service selected by majority rule after aggregating votes to the ward level. In case of a split vote, funds are equally divided across chosen services. The mayor announced the winning project through individualized group messages to each ward. After the announcement, we halted the WhatsApp groups after thanking participants for their contributions. We explained that chats would be used one more time in the future to announce that delivery of the chosen service has concluded. Regarding determining the site of implementation, we explained that we would choose a site in the respective ward at which delivery can be accomplished within budget (as determined by the local implementing partners we cooperated with). When there are multiple such sites, we choose the one which promised the highest utility (because it was most central, closer to higher population density areas, or because of the relative improvement towards the existing local public good in that place). Implementation was scheduled to start after the post-DTH survey (midline) which concluded at the end of March and before the service delivery survey (endline) in October 2021. What this timeline implies for the subsequent discussion is that outcome measures will be taken from the pre-service delivery midline survey.

4 Hypotheses and Outcome Families

4.1 Primary Hypotheses

In this study we test three main hypotheses. We hypothesize that being invited to participate in a DTH (treatment):

- **H1:** improves attitudes towards **political representatives and institutions**;
- **H2:** increases **political knowledge and efficacy**;
- **H3:** improves **community cohesion and interpersonal trust**.

For each hypothesis we collect a set of relevant outcomes, construct a summary index from these outcomes, and then test if the treatment (invitation to a DTH) moves the summary index in the predicted direction. We refer to the set of outcomes used to test each hypothesis as an "outcome family". We group outcomes into families to reduce the total number of hypotheses tested and therefore reduce Type I error that may arise from multiple hypothesis testing. Below, we list the set of outcomes measures that make up each outcome family. As we are relying on survey-based outcome measures, values reflect "self-identified attitudes" and not "realized behavior".

Family 1 - Attitudes Towards Political Representatives and Institutions (11 outcomes):

- Approval of the mayor (Q34)

- Approval of the ward councilor (Q33)
- Support for democracy (Q38)
- Support for direct democracy (Q39)
- Satisfaction with the political system (Q40)
- Satisfaction with FCC service delivery (Q10)
- Input opportunities the FCC provides to citizens (Q11)
- FCC responsiveness (Q12)
- FCC efficiency in resource usage (Q13)
- FCC corruption (Q14)
- FCC enforcement capacity (Q21)

Family 2 - Political Knowledge and Efficacy (7 outcomes):

Participating in town halls has frequently been linked to higher political knowledge, interest and efficacy. These are crucial indicators of the ability and willingness of citizens to hold their representatives accountable. From this perspective, DTHs not only provide a channel for vertical interaction, but also enable participants to become more effective "demand makers".

- Political efficacy (Q41)
- Interest in politics (Q7)
- Interest in city council activities (Q42)
- Political knowledge (Q32)[1]
- Attendance at political meetings (Q37)
- Attempt to contact Ward Councilor (Q30)
- Attempt to contact MP (Q31)

Family 3 - Community Cohesion and Interpersonal Trust (4 outcomes):

- Perceptions of ward cohesiveness (Q6a)
- Perceptions of interpersonal trust (Q6b)
- Ease of befriending someone in different party (Q54)
- Ease of believing political talk of someone in different party (Q54a)

4.2 Mechanisms for Outcome Family 1

There are several channels through which an invitation to the Digital Town Hall could affect a participant's attitudes towards political representatives and institutions. We specify those channels and associated outcome measures below.[2]

Mechanisms

- M1. Opportunities for voice (Q11): More input opportunities towards the FCC for citizens invited to DTHs

1. Knowledge of name of the ward councilor.

2. For now, we propose no formal test for identifying mechanisms mediating the primary effect; instead we interpret evidence that the DTH affects a mechanism outcome as suggestive evidence of mediation.

- M2. Higher level of service delivery (Q10): DTHs increase expected service delivery through associated budget. Note that services had not been delivered at the time of outcome measurement.
- M3. Better service delivery fit (Q20): DTHs as a tool to align citizen and representative preferences over services to be delivered (either bottom-up or top-down)
- M4. Higher spending transparency (Q19): Representatives clarify their priorities and what services they have delivered so far. Additional visibility of funds allocated to DTH.
- M5. Lower inefficiency (Q13): Dedicating funds to DTHs increases oversight by citizens of how these funds are used – thus inefficiency becomes more costly
- M6. Lower corruption (Q14): Dedicating funds to DTHs increases oversight by citizens of how these funds are used – thus corruption becomes more costly
- M7. Capacity signal of organizing DTHs (Q21): Increased state capacity as a precondition for the delivery of public goods

Assumptions

- Attribution (process and funds): Citizens believe that the FCC is organizing and funding the DTHs
- Promise of service implementation is credible

4.3 Secondary Outcomes: Allegiance Shifts, Emigration, Remittances

We further explore secondary hypotheses on the extent to which treatment causes allegiance shifts from informal to formal authorities, lower emigration intent, and higher investments into their community as well as lower ones into outside communities.

- HS1. Invitation to DTH makes it more likely that a participant prefers paying taxes over self-help in the community to improve local service delivery (Q46).
- HS2. Invitation to DTH makes it more likely that a participant prefers a formal authority over informal ones to settle property disputes (Q47).
- HS3. Invitation to DTH decreases intent to move to a different location (Q43).
- HS4. Invitation to DTH decreases amount of monetary remittances sent to individuals outside of Freetown in the last month (Q44).
- HS5. Invitation to DTH increases likelihood that participant contributed to local community project in the last three months (Q45).

In the Appendix we outline hypotheses for additional exploratory and descriptive analysis.

5 Study Population and Sampling

Due to our cooperation with the FCC, we can draw on administrative data on property characteristics and tax compliance for the universe of taxable properties in Freetown. These records also contain owner phone numbers, which we utilized to contact owners to learn about whether they use WhatsApp and – for owners allocated to treatment – if they would be willing to participate in the DTHs.

To be eligible to participate in the Digital Town Hall a property owner must i) own a property in one of the 30 study wards and ii) have WhatsApp on their phone. For property owners that own multiple properties, we coded them as being eligible for the DTH in the Ward that contains their highest value property (i.e, highest tax fee).[3] We used Freetown City Council (FCC) administrative records to call 15,977 property owners in our study wards. We refer to this set of property owners as the "call list". From the call list we were able to confirm 4860 property owners that had WhatsApp on one of their phones; these property owner were eligible to be selected into the Digital Town Hall intervention.

The set of 15,977 property owners on the call list is *not* a random sample of property owners from the 30 study wards. The call list was constructed in the following way. First, (most) property owners on the call list owned properties of above median value. As a response to COVID-19, the FCC intended to waive property tax for 2020 on properties of below median value. As our intervention was originally scheduled for early 2020– with compliance behavior in 2020 as the primary outcome in a companion study– it was necessary to target the DTH intervention at property owners who owned properties above the median property value. Politics related to the tax reform caused us to delay the DTH intervention until early 2021. During the calling process we unintentionally verified 450 property owners who own property below the median valued property. We included these property owners in our sample. Second, in a previous version of our research design, we planned to allocate treatment status using a two-stage randomization procedure, to mitigate and estimate geographic spillover (ex. Sinclair, McConnell, and Green 2012). Under that research design, properties were divided into geographic clusters using a grid overlay and properties within five meters of the edge of a grid cell were ineligible for the study. We constructed the call list with this research design in mind, thereby removing properties within five meters of the grid cell edge.

We were able to complete baseline surveys with 3859 of the 4860 verified property owners (79.4%). To mitigate spillover, we draw a restricted sample from this set of property owners such that each property is at least 15 meters from the closest study property. The restricted sampling leaves us with a final sample of 3619. Figure 1 in the appendix D displays the distribution of the distance from each property to the closest property in the sample.

3. This prevents the same property owner from being assigned to the DTH in multiple wards or being assigned to both treatment and control conditions. We made multiple property owners eligible for the DTH in the study wards where their highest value property was located as we reasoned that they were more likely to be resident of these properties and more likely to be involved in the administering of these properties (and therefore more likely to be directly involved in the decision to pay property tax). Note that there are only a handful of DTH participants who own multiple properties and are in the DTH of their second highest value property. In these instances, the Ward in which they have a higher value property is not a study ward.

6 Treatment Assignment

6.1 Blocking

We assign treatment status using a matched-pair design, using baseline data to match similar observations. Appendix A describes the variables for matching and how they were constructed from baseline survey data. The table below presents descriptive statistics for our blocking variables. The last column displays the number of observations that were imputed for matching. If a respondent said they "did not know" or refused to answer a question values were replaced with the unconditional mean of the variable.[4] Note that in general, the number of imputed responses is low.

	mean	std.dev	min	max	n_imp
Unconditional Tax Moral	2.23	1.55	1.00	5	25
Service Conditional Tax Moral	2.04	0.96	1.00	3	11
Percieved Prob Punish	1.94	1.11	1.00	5	52
Service Satisfaction	2.36	1.16	1.00	5	35
Opportunities for Voice	2.87	1.00	1.00	4	174
Believe Opposition Member	3.01	1.55	0.00	5	132
Mayor Approval	0.78	0.89	0.00	4	79
Councilor Approval	2.26	1.22	0.00	4	122
Gender	0.30	0.46	0.00	1	0
RDN Delivered 2019/20	0.83	0.38	0.00	1	0
FCC Responsiveness	2.82	1.19	1.00	5	199
Age	51.70	12.96	20.00	100	11
Reform Awareness / Supoort	2.38	0.67	1.00	3	19
Property Tax Fee (max)	717762.99	1036788.97	34577.18	15382140	0
Education [1-3]	1.31	0.62	0.00	2	259

Table 1: Summary Statistics of Blocking Variables

Once the blocking variables are created, we generate matched-pairs using the *blockTools* package in R. We use the Optimal Greedy ("optGreedy") matching algorithm to find best matches along mahalanobis distance. In the selection of variables to block on, our decision reflects that this design is also used for a companion paper that uses tax compliance as the main outcome variable. Thus, we not only block on variables capturing baseline orientations towards the FCC (e.g., satisfaction with the mayor/ ward councilor; perceptions of FCC responsiveness/ input opportunities/ enforcement capacity/ service deliveries), but also standard predictors of tax compliance.

We expect that certain variables are a stronger predictor of our outcomes of interest and reweight variables accordingly. We place the greatest weight on our measure of unconditional tax morale,

4. Following suggestions of: https://egap.org/resource/10-things-to-know-about-missing-data/

which asks if "*some people not paying the taxes that they owe*" is ever justified. We emphasize tax morale as it is closely linked to compliance as well as to broader trust in the state. Lower weights are placed on a set of six measures from our baseline survey: conditional tax morale (on service delivery), FCC enforcement capacity, satisfaction with FCC service provision, gender of the property owner and their awareness and support of the property tax reform. To avoid matching observations with missing values on these key variables to observations that have non-missing values close to the mean, we also place equal weight on the number of missing/imputed values for these blocking variables. The full table of blocking weights can be found in appendix E.

6.2 Treatment Assignment

In each matched pair, one unit is assigned to treatment and one to control. We implement this randomization in R using the *block_ra* function in the *randomizr* package. Table 2 below shows means and standard deviations for blocking variables across treatment and control. The last column calculates raw and standardized differences between treatment and control units for each blocking variable. Across the fifteen blocking variables, the largest (standardized) difference is .026 standard deviations for the education variable. Summary statistics are nearly identical across treatment and control groups.

	mean (T0)	mean (T1)	sd (T0)	sd (T1)	raw dif	std dif
Unconditional Moral	2.230	2.223	1.554	1.555	0.007	0.004
Conditional Morale	2.041	2.040	0.963	0.964	0.001	0.001
Likelihood Punish	1.937	1.942	1.109	1.102	-0.005	-0.004
Service Satisfaction	2.356	2.358	1.167	1.168	-0.002	-0.002
Voice Opinions	2.880	2.869	0.996	0.994	0.011	0.011
Believe political opposition	3.021	2.989	1.547	1.557	0.032	0.021
Mayor Approval	0.769	0.778	0.890	0.887	-0.009	-0.010
Councilor Approval	2.269	2.264	1.218	1.224	0.005	0.004
Gender	0.306	0.305	0.461	0.460	0.001	0.002
Received RDN 2019/2020	0.828	0.826	0.378	0.379	0.002	0.005
FCC Responsiveness	2.825	2.830	1.184	1.189	-0.005	-0.004
Age	51.654	51.878	13.001	12.866	-0.224	-0.017
Support / Awareness Reform	2.376	2.374	0.672	0.676	0.002	0.003
Property Tax Fee (highest)	721428.326	724509.263	1037836.698	1061195.430	-3080.937	-0.003
Education	1.301	1.317	0.620	0.627	-0.016	-0.026

Table 2: Randomization Balance Table. The standardized differences are calculated using the standard deviation from the control group.

7 Estimation Strategy

7.1 Summarizing our Estimation Approach

In this section we describe our approach for estimating the effects of the Digital Town Hall on our three families of survey-based outcome measures. To reduce Type I error that may arise from multiple hypothesis testing, our primary outcome in each outcome family is a summary index, comprised of the outcomes in that family. To calculate the summary index we first standardize each outcome in the family relative to the control group, then take the mean average of the standardized values.[5] Interpretation of the summary index is straightforward. A Family 1 summary index value equal to .5 means that outcomes in Family 1 are on average one half standard deviation greater than the control group means of those outcomes. We also report treatment effects and 95% confidence intervals (constructed from bootstrapped standard errors) for all individual outcome measures. We report p-values for each summary index, calculated using randomization inference under the assumption of a sharp null.

We take two approaches to constructing summary indices where values of outcomes that make up the index are missing. First, where more than 70% of outcomes that make up the index are available, we construct the summary index by dropping missing outcome values when calculating the mean. If values for less than 70% of the outcomes in the index are available, the summary index is considered missing.[6] Second, and more conservatively, if *any* outcomes that make up the outcome family are missing the summary index is considered missing. Our main results table will report results where the summary index is constructed using the first approach; results using the second approach will be reported in the appendix.[7]

Where outcome data is missing, we follow King et al. 2007 and drop both observations in the matched pair to maintain unbiased estimates (also see Fukumoto 2015).[8] Where covariate data is missing, we impute missing data using the baseline mean of that variable. For each covariate, we include a dummy variable that indicates if the covariate value is imputed.

We provide Intent-to-Treat (ITT) and Complier Average Casual Effect (CACE) estimates. We discuss our estimation of the ITT in **sub-section 2**. The nature of our intervention allows for one-sided noncompliance and indeed not all property owners who were invited to join the DTH consented to join it. Of the 1809 property owners assigned to treatment, 1626 (89.9%) consented to participate in the DTH. While ITT provide unbiased estimates of being assigned to treatment, the presence of one-sided non-compliance means that our ITT estimate will underestimate the effect of *participating* in the DTH. To get a better sense of the effect of the DTH, we also estimate the Complier Average Causal Effect, which in the context of our study is the effect of the DTH

5. Before standardizing, outcomes are re-scaled so that higher values signify movements in the theoretically predicted direction.

6. Of course, the 70% threshold is arbitrary. We will report results with different thresholds in the appendix.

7. If the sets of results differ substantively, both sets of results will be reported in the main body of the paper.

8. We provide financial incentives - packages of mobile data - for midline and endline survey takers to minimize attrition.

on property owners who consented to join it. In **sub-section 3** we discuss our estimation of the CACE, outlining the assumptions required for making unbiased estimates of this quantity.

7.2 Intent-to-Treat Effect (ITT)

We collect survey-based outcomes for all study property owners before and after the DTH intervention. We estimate the ITT using the following equation:[9]

$$Y_{ijt_2} = \beta_1 DTH_i + \sum_{j=1}^{1809} \theta_j PAIR_j + \gamma Y_{ijt_1} + \lambda \mathbf{X}_i + \epsilon_i \quad (1)$$

Where Y_{ijt_2} is the (t_2) outcome of individual i in pair j; DTH_i is an indicator variable equal to 1 if owner i is assigned to treatment and β_1 captures the average treatment effect of the Digital Town Hall; $PAIR_j$ is an indicator variable equal to 1 if owner i belongs to pair j; Y_{ijt_1} is the baseline outcome for owner i in pair j; $\mathbf{X}$ is a set of additional control variables that vary with specification (details below); ϵ_i is the error term.[10] Where the dependent variable is a summary index, we control for the corresponding *baseline* summary index.

We estimate three model specifications. First, we estimate a model with ward-level fixed effects. To get a better matching profile along baseline survey measures, we allowed pairs to match across wards. Of course, it is possible that ward-level specific effects drive key survey-based outcomes. Including ward-level fixed effects helps control for this possible source of variation. This is our preferred specification. Second, we estimate a model that controls for baseline value of *other* outcomes. For example, when estimating the effect of the DTH on a property owner's approval of the Mayor, we include as control baseline value of all other outcome measures, in all three families.[11] Third, we estimate a model that includes variables used in the above two specifications. These additional specifications will be presented in the appendix. All specifications include dummy variables that indicate if a given control variable has been imputed. Where the dependent variable is a summary index, we also include a dummy to indicate if a component of the index is missing.

7.3 Complier Average Causal Effect (CACE)

To estimate the effect of a property owner joining the town hall– rather than being assigned to treatment – we use an instrumental variable regression framework. In this set-up, joining the DTH is conceptualized as the "treatment" and our invitation to property owners to join the DTH

9. In practice, we use the *lm_robust* function in the *estimatr* package.

10. Note that the dependent variable is the midline value of a given outcome and the baseline value enters as a control. We prefer to condition on the baseline value - rather than use the change score as the dependent variable - because the randomized design limits the risk of confounding bias. See this excellent Declare Design blog post:https://declaredesign.org/blog/use-change-scores-or-control-for-pre-treatment-outcomes-depends-on-the-true-data-generating-process.html

11. Where the dependent variable is a summary index, we include the baseline values of the individual outcomes from other outcome families.

is conceptualized as the "instrument" (or encouragement). This estimator captures the local ATE among the set of people who comply with treatment, which in this case refers to property owners who are invited to join the DTH and consent to join the DTH.[12]

Assumptions This estimate is causally identified when the following assumptions hold. First, there should be no direct effect of the instrument/encouragement, which in the context of our study refers to the invitation for property owners to join the DTH. Second, there can be no indirect effect of the encouragement, which in our context would mean that being invited to the DTH affects the outcome of interest through some intermediate factor. Third, the "no defier" assumption posits that an invitation to join the DTH should not lower the probability that a property owner consent to join the DTH. This possibility is ruled out by our study design, as property owners can only join the DTH if they have been invited. Fourth, the instrument should not be correlated with potential outcomes. In our design, the instrument is randomly assigned, ruling out this possibility. Fifth, the instrument should be "relevant", in the sense that is has a substantively meaningful impact on the probability to take up treatment. This assumption is justified in our study, as the invitation to join the DTH increases treatment uptake from zero to 89.9%.

One possible threat to inference is that the encouragement itself has either a direct or indirect effect on outcomes of interest. Property owners that were assigned to receive an invitation to the DTH were contacted by our research team on behalf of the International Growth Centre (IGC). A member of the research team briefly explained the features of the DTH and asked if the participant would give their consent to join. In asking the property owner for consent, the research assistant noted that the DTH groups are *"organized by the Mayor of Freetown and your Ward Councilor"* and that property owners are *"invited to interact with your Councilor and the Mayor, to share your views on development projects in your Ward and in Freetown, an then have a direct vote on how some development funds that have been allocated to your ward will be spent"*. It is conceivable that the invitation to join the DTH has an affect on attitudes and future behavior. If this was the case, our ITT estimates would be upward biased.

7.4 Spillovers

One potential threat to inference stems from spillovers. If an individual's potential outcomes are a function of the assignment status of other units, estimates of the average treatment effect can be biased. Such violations of the Stable-Unit Treatment Value Assumption occur when individuals communicate about the treatment. Recipients of information may alter their outcomes of interest because of having talked to another study participant. In the context of our study, information that can spill over between property owners include, for instance, perceptions of political representatives and institutions.

Spillovers might be a function of either geographic or social proximity. Our experimental design includes some safeguard against geographic spillovers– we included a geographic buffer of at least 15m between treatment and control units, allowing us to exclude neighboring properties and apartments in the same building. In the appendix we lay out our strategy for detecting and

12. We estimate the CACE using the *iv_robust* function in the *estimatr* package in R

estimating both geographic and social network-based spillovers.

8 Research Ethics

Given the scale of this project, it is even more important to reflect on research ethics. We consider this research to be ethical for the following reasons. First, we obtained IRB approval both from UCLA and in Sierra Leone. Second, we followed the guidelines by the IGC on how to do field research during a pandemic. More specifically, we minimized contact wherever we could (e.g., by conducting phone surveys). When contact was necessary, we followed social distancing protocols. Our enumerators and DTH moderators were given access to facilities that enabled social distancing (and offered masks and hand sanitizers). Third, we understand that for many of our study personnel the income obtained in our project constituted their main income source at a time in which job opportunities were particularly scarce. Fourth, the study furthers the goal of improving political accountability in a setting in which in-person political gatherings were exceedingly risky. The increase in service delivery of up to ten percentage points relative to what the FCC usually delivered also has to be considered. Fifth, acknowledging the challenges of valid Covid-19 prevalence counting in low capacity contexts, it still appears that Sierra Leone was faring relatively well, also due to the country's age structure, with the U.S. deeming it to display the second-lowest level of Covid infection risk on a four point scale ("moderate level") during the intervention (CDC Travel Notice, Accessed: 03/26/2021).

Another ethical dimension considers the exclusionary target population of property owners in the upper half of the tax assessment distribution in 2020 and who were confirmed to use WhatsApp. As the FCC DTH budget will directly rely on collected property tax revenue in the future - and as we already allow representatives to claim that their are providing funds this round "in cooperation with implementing partners" - we targeted those owners who were scheduled to receive a property tax notice in 2020. Note that the underlying property tax reform shifted the bulk of the tax burden to those top tax payers. We made sure that the services to be selected from all were local public goods profiting the broader community. In fact, that mostly water-related projects were chosen should profit especially those who cannot afford private water access in their homes. Further, we note that future Town Hall rounds will be open to all citizens.

Bibliography

Afrobarometer. 2018. *Afrobarometer Data, Sierra Leone, Round 7.* Technical report.

Baiocchi, Gianpaolo, and Ernesto Ganuza. 2014. "Participatory budgeting as if emancipation mattered". *Politics & Society* 42 (1): 29–50.

Barabas, Jason. 2004. "How deliberation affects policy opinions". *American Political Science Review,* 687–701.

Bardhan, Pranab. 2002. "Decentralization of governance and development". *Journal of Economic perspectives* 16 (4): 185–205.

Belin, CÉLIA, and GD De Maio. 2020. "Democracy after coronavirus: Five challenges for the 2020s". *Foreign Policy, August,* 1–14.

Bellows, Abigail, and Nada Zohdy. 2020. *Is the Coronavirus Catayzing New Civic Collaborations for Open Government?* Volume 23. Carnegie Endowment for International Peace.

Bol, Damien, Marco Giani, André Blais, and Peter John Loewen. 2021. "The effect of COVID-19 lockdowns on political support: Some good news for democracy?" *European Journal of Political Research* 60 (2): 497–505.

Boulianne, Shelley. 2019. "Building faith in democracy: Deliberative events, political trust and efficacy". *Political Studies* 67 (1): 4–30.

Brown, Frances, Saskia Brechenmacher, and Thomas Carothers. 2020. "How Will the Coronavirus Reshape Democracy and Governance Globally". Accessed 30-July-2021, %5Curl%7Bhttps://carnegieendowment.org/2020/04/06/how-will-coronavirus-reshape-democracy-and-governance-globally-pub-81470%7D.

Cao, Bolin, and Wan-Ying Lin. 2017. "Revisiting the contact hypothesis: Effects of different modes of computer-mediated communication on intergroup relationships". *International Journal of Intercultural Relations* 58:23–30.

Casey, Katherine. 2018. "Radical decentralization: does community-driven development work?" *Annual Review of Economics* 10:139–163.

Casey, Katherine, Abou Bakarr Kamara, and Niccoló F Meriggi. 2021. "An experiment in candidate selection". *American Economic Review* 111 (5): 1575–1612.

Collier, Paul, and Pedro C Vicente. 2014. "Votes and violence: Evidence from a field experiment in Nigeria". *The economic journal* 124 (574): F327–F355.

Dahir, Abdi, and Benjamin Mueller. 2021. "Some Nations Could Wait Years for Covid Shots. That's Bad for Everyone." Accessed 30-July-2021, %5Curl%7Bhttps://www.nytimes.com/2021/03/22/world/africa/africa-vaccine-inequality-covid.html%7D.

Duarte, Christina. 2021. "Post-COVID-19: A chance to leapfrog Africa's development through digitalization". Accessed 30-July-2021, %5Curl%7Bhttps://www.un.org/africarenewal/magazine/march-2021/post-covid-19-chance-leapfrog-africas-development-through-digitalization%7D.

Esterling, Kevin M, Michael A Neblo, and David MJ Lazer. 2011. "Means, motive, and opportunity in becoming informed about politics: A deliberative field experiment with members of Congress and their constituents". *Public opinion quarterly* 75 (3): 483–503.

Farrar, Cynthia, James S Fishkin, Donald P Green, Christian List, Robert C Luskin, and Elizabeth Levy Paluck. 2010. "Disaggregating deliberation's effects: An experiment within a deliberative poll". *British journal of political science,* 333–347.

FCC. 2021. *Transform Freetown: Second Year Report.* Technical report. %5Curl%7Bhttps://fcc.gov.sl/wp-content/uploads/2021/02/Transform-Freetown-2-Year-Final-report-min.pdf%7D.

Fearon, James D, Macartan Humphreys, and Jeremy M Weinstein. 2011. "Democratic institutions and collective action capacity: Results from a field experiment in post-conflict Liberia". In *APSA 2011 Annual Meeting Paper.*

Freedom House. 2020. "Democracy under lockdown: The impact of COVID-19 on the global struggle for freedom". Accessed 30-July-2021, %5Curl%7Bhttps://freedomhouse.org/report/special-report/2020/democracy-under-lockdown%7D.

Friess, Dennis, and Christiane Eilders. 2015. "A systematic review of online deliberation research". *Policy & Internet* 7 (3): 319–339.

Fujiwara, Thomas, and Leonard Wantchekon. 2013. "Can informed public deliberation overcome clientelism? Experimental evidence from Benin". *American Economic Journal: Applied Economics* 5 (4): 241–55.

Fukumoto, Kentaro. 2015. "Missing data under the matched-pair design: a practical guide". Technical Report, Presented at the 32nd Annual Summer Meeting of Society for ...

Gonçalves, Sónia. 2014. "The effects of participatory budgeting on municipal expenditures and infant mortality in Brazil". *World Development* 53:94–110.

Gros, Maya, and Norman Eisen. 2021. "Digitizing civic spaces amid the COVID-19 pandemic and beyond". Accessed 30-July-2021, %5Curl%7Bhttps://www.brookings.edu/blog/up-front/2021/03/09/digitizing-civic-spaces-amid-the-covid-19-pandemic-and-beyond/%7D.

Gyimah-Boadi, E. 2021. "Foresight Africa Report, Brookings". Accessed 30-July-2021, %5Curl%7Bhttps://www.brookings.edu/research/foresight-africa-2021/?gclid=CjwKCAiAsOmABhAwEiwAEBR0ZiA3tdu5t3Los_5DK2BxLC_xaMwjtD1xpfDF88KA0dG6ZwF4i-IuXxoCkpYQAvD_BwE%7D.

Habermas, Jürgen. 1975. *Legitimation crisis.* Volume 519. Beacon Press.

Hale, Thomas, Noam Angrist, Rafael Goldszmidt, Beatriz Kira, Anna Petherick, Toby Phillips, Samuel Webster, Emily Cameron-Blake, Laura Hallas, Saptarshi Majumdar, et al. 2021. "A global panel database of pandemic policies (Oxford COVID-19 Government Response Tracker)". *Nature Human Behaviour* 5 (4): 529–538.

Haq, Osman, Adnan Qadir Khan, Benjamin Olken, and Mahvish Shaukat. 2020. "Rebuilding the social compact".

Humphreys, Macartan, William A Masters, and Martin E Sandbu. 2005. "The role of leaders in democratic deliberations: results from a field experiment in São Tomé and Prıncipe". *World Pol.* 58:583.

IDEA. 2021. "Global Overview Of COVID-19 Impact On Elections". Accessed 30-July-2021, %5Curl%7Bhttps://www.idea.int/news-media/multimedia-reports/global-overview-covid-19-impact-elections%7D.

Jaidka, Kokil, Alvin Zhou, and Yphtach Lelkes. 2019. "Brevity is the soul of Twitter: The constraint affordance and political discussion". *Journal of Communication* 69 (4): 345–372.

Kies, Raphaël. 2010. *Promises and Limits of Web-deliberation.* Springer.

King, Gary, Emmanuela Gakidou, Nirmala Ravishankar, Ryan T Moore, Jason Lakin, Manett Vargas, Martha Marıa Téllez-Rojo, Juan Eugenio Hernández Ávila, Mauricio Hernández Ávila, and Héctor Hernández Llamas. 2007. "A "politically robust" experimental design for public policy evaluation, with application to the Mexican universal health insurance program". *Journal of Policy Analysis and Management* 26 (3): 479–506.

López-Moctezuma, Gabriel, Leonard Wantchekon, Daniel Rubenson, Thomas Fujiwara, and Cecilia Pe Lero. 2020. "Policy Deliberation and Voter Persuasion: Experimental Evidence from an Election in the Philippines". *American Journal of Political Science.*

Luskin, Robert C, Ian O'Flynn, James S Fishkin, and David Russell. 2014. "Deliberating across deep divides". *Political Studies* 62 (1): 116–135.

Mahler, Daniel, Nishant Yonzan, Christoph Lakner, Andres Aguilar, and Haoyu Wu. 2021. "Updated estimates of the impact of COVID-19 on global poverty: Turning the corner on the pandemic in 2021?" Accessed 30-July-2021, %5Curl%7Bhttps://blogs.worldbank.org/opendata/updated-estimates-impact-covid-19-global-poverty-turning-corner-pandemic-2021%7D.

Mansuri, Ghazala, and Vijayendra Rao. 2013. "Localizing development: Does participation work?"

Mbaku, John. 2021. "Entrenching democracy in African countries: Policy imperatives for leaders in 2021". Accessed 30-July-2021, %5Curl%7Bhttps://www.brookings.edu/blog/africa-in-focus/2021/03/18/entrenching-democracy-in-african-countries-policy-imperatives-for-leaders-in-2021/%7D.

Meriggi, N, M Humphreys, AB Kamara, M Krupoff, M Levine, H Mcleod, AM Mobarak, W Prichard, A Shridhar, P van der Windt, et al. 2020. "Tracking the economic consequences and responses to COVID-19 in Sierra Leone". Accessed 30-July-2021, *International Growth Centre,* %5Curl%7Bwww.%20theigc.%20org/wp-content/uploads/2020/05/Meriggi-et-al-Data-Brief-2020-1.%20pdf%7D.

Miguel, Edward, and Michael Kremer. 2004. "Worms: identifying impacts on education and health in the presence of treatment externalities". *Econometrica* 72 (1): 159–217.

Mukherji, Rahul. 2020. "Covid vs. democracy: India's illiberal remedy". *Journal of Democracy* 31 (4): 91–105.

Neblo, Michael A, Kevin M Esterling, Ryan P Kennedy, David MJ Lazer, and Anand E Sokhey. 2010. "Who wants to deliberate—and why?" *American Political Science Review,* 566–583.

Novak, Benjamin, and Kingsley Patrick. 2020. "Hungary's leader grabbed powers to fight the virus. Some fear other motives". *New York Times, April* 5.

OECD. 2020. "Enhancing public trust in COVID-19 vaccination: The role of governments". Accessed 30-July-2021, %5Curl%7Bhttps://www.oecd.org/coronavirus/policy-responses/enhancing-public-trust-in-covid-19-vaccination-the-role-of-governments-eae0ec5a/%7D.

Parthasarathy, Ramya, Vijayendra Rao, and Nethra Palaniswamy. 2019. "Deliberative democracy in an unequal world: A text-as-data study of South India's village assemblies". *American Political Science Review* 113 (3): 623–640.

Rossiter, Erin. 2020. "Measuring Agenda Setting in Interactive Political Communications".

Sandefur, Justin, Nancy Birdsall, James Fishkin, and Mujobu Moyo. 2020. "Deliberative Democracy and the Resource Curse: A Nationwide Experiment in Tanzania".

Schraff, Dominik. 2020. "Political trust during the Covid-19 pandemic: Rally around the flag or lockdown effects?" *European journal of political research.*

Sexton, Renard. 2017. *The Unintended Effects of Bottom-Up Accountability: Evidence from a Field Experiment in Peru.* Technical report. Working Paper.

Sheely, Ryan. 2015. "Mobilization, participatory planning institutions, and elite capture: Evidence from a field experiment in rural Kenya". *World Development* 67:251–266.

Sinclair, Betsy, Margaret McConnell, and Donald P Green. 2012. "Detecting spillover effects: Design and analysis of multilevel experiments". *American Journal of Political Science* 56 (4): 1055–1069.

The Economist. 2020. "The Politics of Pandemics". Accessed 30-July-2021, %5Curl%7Bhttps://www.economist.com/leaders/2020/03/12/the-politics-of-pandemics%7D.

UNDESA. 2020. "UN/DESA Policy Brief 61: COVID-19: Embracing digital government during the pandemic and beyond". Accessed 30-July-2021, %5Curl%7Bhttps://www.un.org/development/desa/dpad/publication/un-desa-policy-brief-61-covid-19-embracing-digital-government-during-the-pandemic-and-beyond/%7D.

UNODC. 2020. "Covid-19 Emergency Support Packages in West and Central Africa". Accessed 30-July-2021, %5Curl%7Bhttps://www.unodc.org/unodc/en/corruption/covid-19-emergency-support-packages-in-west-and-central-africa.html%7D.

V-Dem. 2020. "Pandemic Backsliding: Democracy Nine Months into the Covid-19 Pandemic". Accessed 30-July-2021, *V-Dem Policy Brief Series*, %5Curl%7Bhttps://www.v-dem.net/media/filer_public/13/1a/131a6ef5-4602-4746-a907-8f549a5518b2/v-dem_policybrief-26_201214_v31.pdf%7D.

Warshaw, Christopher, Lynn Vavreck, and Ryan Baxter-King. 2020. "Fatalities from COVID-19 are reducing Americans' support for Republicans at every level of federal office". *Science advances* 6 (44): eabd8564.

Weinberg, James. 2020. "Can Political Trust Help to Explain Elite Policy Support and Public Behaviour in Times of Crisis? Evidence from the United Kingdom at the Height of the 2020 Coronavirus Pandemic". *Political Studies,* Online First.

White, Fiona A, Rachel Maunder, and Stefano Verrelli. 2020. "Text-based E-contact: Harnessing cooperative Internet interactions to bridge the social and psychological divide". *European Review of Social Psychology* 31 (1): 76–119.

Yam, Kai Chi, Joshua Conrad Jackson, Christopher M Barnes, Jenson Lau, Xin Qin, and Hin Yeung Lee. 2020. "The rise of COVID-19 cases is associated with support for world leaders". *Proceedings of the National Academy of Sciences* 117 (41): 25429–25433.

Appendices

A Blocking Variable Definitions

Appendix: Description / Construction of Blocking Variables

Variable	Survey Question / Variable Creation	Response Categories
Unconditional tax Morale	Please tell me for the following statement whether you think it can always be justified, never be justified, or something in between: *some people not paying the taxes that they owe.*	1 Never justified 2. Not really justified 3. Neither justified or unjustified 4. Somewhat justified 5. Always justified -888. Refuse to answer -999. Don't Know
Conditional Tax Moral	Tell me if you agree, disagree or neither agree nor disagree: *Taxpayers could refuse to pay taxes if they are not receiving public services of adequate quality*	1. Agree 2. Neither agree nor disagree 3. Disagree -888. Refuse to answer -999. Don't Know
Perceived Likelihood punishment	Imagine a situation where someone did not pay their taxes and the FCC found out. How likely do you think it is that this person will face legal consequences such as having to pay late fines or having their property seized?	1. Very Likely 2. Somewhat Likely 3. In the middle 4. Somewhat Unlikely 5. Very Unlikely -888. Refuse to answer -999. Don't Know
FCC Service Satisfaction	The Freetown City Council (FCC) is supposed to develop the city and provide the people of Freetown with services to benefit everyone. Some people say they are doing a good job and they are satisfied. Other people say they are not doing a good job and they are dissatisfied. Still other people are in the middle. How satisfied are you with the Freetown City Council?	1. Completely satisfied 2. Somewhat satisfied 3. In the middle 4. Somewhat dissatisfied 5. Completely dissatisfied -888. Refuse to answer

		-999. Don't Know
Gender	Enumerator Codes as Male or Female	
Received RDN 2020 or 2019	Coded as "1" if they received an RDN in 2019 or 2020. RDN delivery for 2020 is taken from administrative records. RDN from 2019 is taken from baseline survey: *Did you receive a property Rate Demand Notice (RDN) for the tax year 2019?* (Note: respondents who said they "don't know" if they received an RDN in 2019 are coded as having not received it	
Number of Primary Variables Imputed	How many of the responses to the primary variables were missing and needed to be imputed. "Primary Variables" are: i) unconditional tax moral, ii) conditional tax Moral, iii) Likelihood punishment, iv) FCC Service satisfaction	
Support / Awareness for Reform	This variable uses responses to two survey questions: **A. Reform Awareness:** In the previous 12 months, have you heard or read any information about the new systems of property tax that the Freetown City Council is introducing? **B. Reform Support** [asked conditional if response to "A" is 1 or 2] You said you heard about the new property tax system. Some people support this reform, while others oppose it. What is your position? **Coding Logic** We want to block on the respondent's support for the reform. However, we don't have a measure the respondent's support when they told us they are not aware of reform. We interpret this lack of awareness as not have a strong position on the reform: that is, we code them as neither supporting nor opposing the reform. We create an ordinal variable that has 3 levels. - 1) respondent knows about the refom AND strongly/somewhat oppose it; - 2) respondent doesn't know about the reform OR respondent knows about the reform AND neither supports it nor opposes it; - 3) people who know about the reform AND support it. **Coding Note 1**: 11 respondents answered either "don't know" or "refused to answer" the reform awareness question.	**A. Reform Awareness** 2. Quite a lot 1. A little bit 0. No -888. Refuse to answer -999. Don't Know **B. Reform Support** 5. Strongly support the reform 4. Somewhat support the reform 3. Neither support nor oppose the reform 2. Somewhat oppose the reform 1. Strongly oppose the reform -888. Refuse to answer -999. Don't Know

	Coding Note 2: 19 respondents answered either "don't know" or "refused to answer" the reform support question (having said they are aware of the reform). Both scenarios are replaced with the unconditional mean of above coded variable	
Voice Opportunities	The Freetown City Council is supposed to represent the citizens of Freetown. Some people say that there are opportunities for citizens like you to voice your opinion about City Council business. Other people say that there are no opportunities to voice your opinion on City Council business. Please tell me if you think there are:	1. Many opportunities 2. Some opportunities 3. Few opportunities 4. No opportunities at all -888. Refuse to answer -999. Don't Know
Believe Opposition	Again, please think about people who support a different political party than you. When you talk about government business (politics) with these people, do you find it easy or hard to believe the things that they say?	1. Very Easy 2. Somewhat Easy 3. Somewhere in the middle 4. Somewhat hard 5. Very hard 0. I do not support a political party -888. Refuse to answer -999. Don't Know
Mayor Approval Rating	Do you approve or disapprove of the way your mayor has performed on the job over the past twelve months?	0. Strongly Approve 1. Approve 2. Neither approve nor disapprove 3. Disapprove 4. Strongly disapprove

		-888. Refuse to answer -999. Don't Know
Councilor Approval Rating	Do you approve or disapprove of the way your ward councillor has performed on the job over the past twelve months?	0. Strongly Approve 1. Approve 2. Neither approve nor disapprove 3. Disapprove 4. Strongly disapprove -888. Refuse to answer -999. Don't Know
FCC Responsiveness	Some people say that the Freetown City Council is "responsive" to their needs. By "responsive" I mean that the Freetown City Council takes action to address things that people want. Other people say that the Freetown City Council is not responsive and does not address the things that they need. Please tell me if you think the Freetown City Council is:	1. Completely Responsive 2. Somewhat Responsive 3. In the middle 4. Somewhat Unresponsive 5. Completely Unresponsive -888. Refuse to answer -999. Don't Know
Age	**Note:** Not every respondent knows their age. We attempted to age through a three-step process. First, we ask: *How old are you?* If the respondent knows, this is their final age. If they don't know we ask: *Do you know what year you were born?* If the respondent does not know the enumerator is asked to estimate their age.	
Tax Fee for highest value property	From administrative records	
Education	What is the highest level of schooling that you have completed?	0. Never attended school

	Coding: We code respondents into three categories. 1. No School 2. Any schooling less than "higher education" 3. Higher Education: University, Polytechnic School, Teachers college **Coding Note:** 250 Respondents listed either “other”, “refused”, or “don’t know”. These respondents were given a value equal to the mean of the above coded variable.	1. Koranic or other non-formal schooling 2. Primary school 3. Junior Secondary School 4. Vocational Training 5. Senior Secondary School 6. University Degree 7. Polytechnic School 8. Teacher College -555. Other (specify) -888. Refuse to answer -999. Don’t Know

B Exploratory Analysis

- E1. Invitation to DTH increases approval of the mayor if service selected in DTH was preferred by participant in baseline.
- E2. Invitation to DTH increases approval of the ward councilor if service selected in DTH was preferred by participant in baseline.
- E3. Invitation to DTH increases perception of FCC institutional quality if service selected in DTH was preferred by participant in baseline.
- E4. Invitation to DTH increases approval of the national government. (Misattribution)
- E5. For a given DTH, participants develop more similar preferences regarding service delivery than those not invited from that ward.
- E6. For a given DTH, participants converge more around the service preferred in baseline (among all treated owners in that ward) than those not invited from that ward.
- E7. Invitation to DTH increases perceptions of Ward cohesiveness the more homogeneous the vote over service decisions was.
- E8. Invitation to DTH increases interpersonal trust the more homogeneous the vote over service decisions was.

C Descriptive Hypotheses

Descriptive Analysis 1: Who Participates Actively?

We will also explore the following descriptive relationships. Needless to say, as these are descriptive features of the data we intend to explore, we are not conducting hypotheses tests (for which we would need to penalize given their amount).

In line with the research on the participation gap in participatory settings, we expect the following individual characteristics to predict how frequently – as measured by the overall number of contributions – a participant posts:

D1a. Invitation to DTH leads to more active participation in DTHs among males.

D1b. Invitation to DTH leads to more active participation in DTHs the higher the level of educational attainment.

D1c. Invitation to DTH leads to more active participation the higher the level of income.

D1d. Invitation to DTH leads to more active participation the higher the tribal homogeneity in the DTH.

D1e. Invitation to DTH leads to more active participation among those with higher levels of political interest.

D1f. Invitation to DTH leads to more active participation among those who received an RDN in 2020.

D1g. Invitation to DTH leads to more active participation among those who perceive the new property tax system to be unfair.

D1h. Invitation to DTH leads to more active participation among those who are copartisans of the mayor.

Descriptive Analysis 2: Who Sets the Agenda? Who Influences Eventual Choices Over Services?

Conceptually, agenda setting in a deliberative context occurs when a participant introduces a topic – e.g., a preferred service – which is then being referenced or replied to by other participants. The opposite is given when a participant does not pick up the topic from the previous comment. In terms of measurement, we can utilize topic models to examine whether topics change across a temporally ordered sequence of posts (e.g., as in Rossiter 2020). Regarding influence over eventual service choices, we are interested in who initiates the conversation about a service that participants develop a preference for between baseline and midline.

D2a. Participants who are male are better able to shape the discussion.

D2b. Participants who are male are better able to influence service choice.

D2c. Participants with higher levels of educational attainment are better able to shape the discussion.

D2d. Participants with higher levels of educational attainment are better able to influence service choice.

D2e. Participants with higher levels of income are better able to shape the discussion.

D2f. Participants with higher levels of income are better able to influence service choice.

D2g. Participants with higher levels of political interest are better able to shape the discussion.

D2h. Participants with higher levels of political interest are better able to influence service choice.

D2i. Participants who are copartisans of the mayor are better able to shape the discussion.

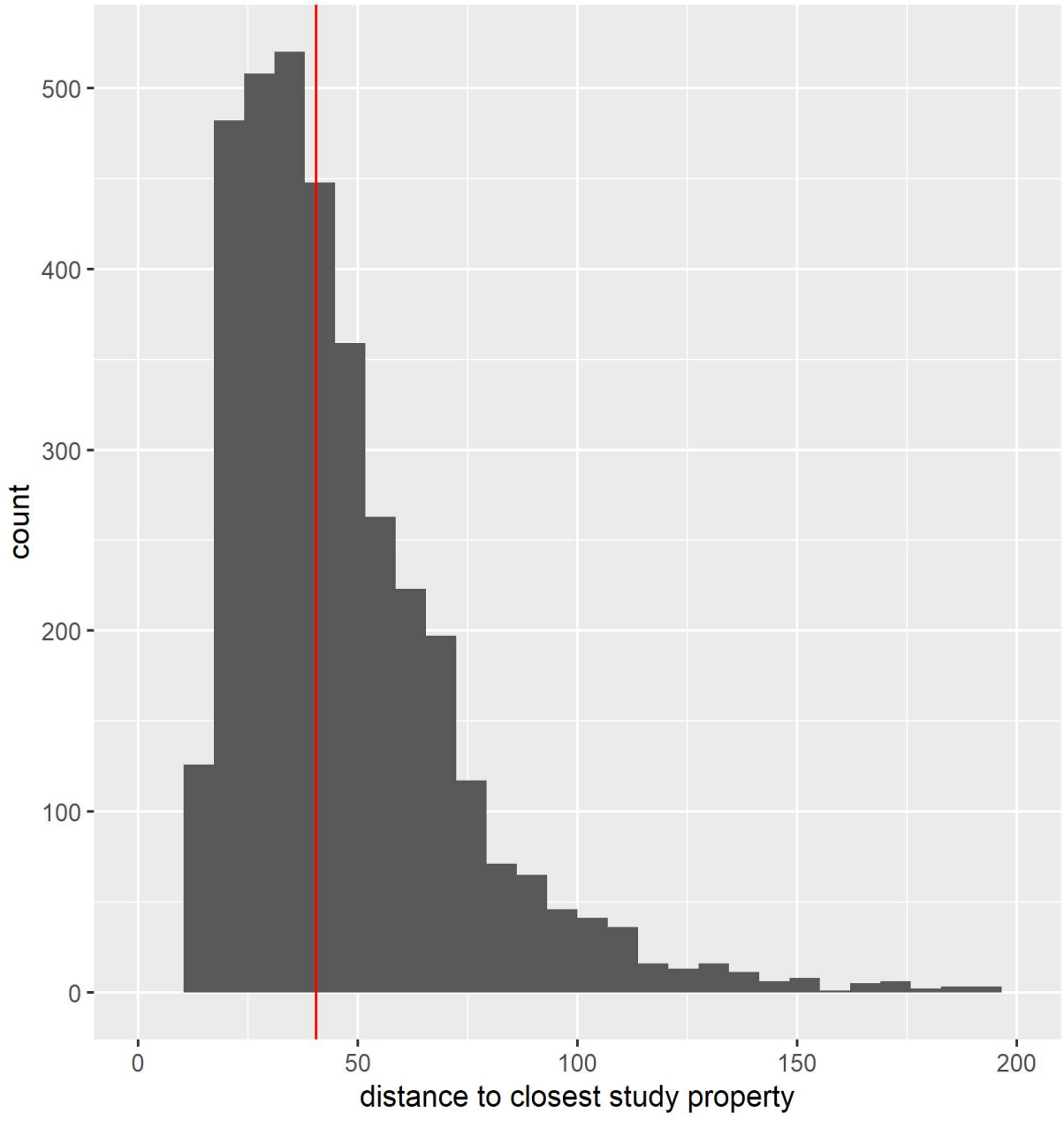
D2j. Participants who are copartisans of the mayor are better able to influence service choice.

D2k. Participants with higher tax burdens relative to their income are better able to shape the discussion.

D2l. Participants with higher tax burdens relative to their income are better able to influence service choice.

D Restricted Sampling Histogram

Figure 1: Histogram of minimum distance between study properties



E Blocking Weights

Variable Name	Weights
Unconditional Moral	1.1
Conditional Morale	1
Likelihood Punish	1
Service Satisfaction	1
Support / Awareness Reform	1
Gender	1
Number Primary Vars Imputed	1
Received RDN 2019/2020	.9
Mayor Approval	.1
Councilor Approval	.1
Voice Opinions	.1
FCC Responsiveness	.1
Believe political opposition	.1
Property Tax Fee (highest)	.09
Education	.09
Age	.09

Table 3: Covariate Matching Weights Table

F Detecting and Estimating Spillovers

As a first step we will examine whether general awareness of the tax reform – and the DTHs surrounding it – are widely known among the population. The mayor has made the property tax reform a key campaign promise in her 2018 election bid, conceptualized it as one of the five pillars of her signature "Transform Freetown" agenda, and has repeatedly talked about both the tax reform and the DTHs on the city council website (FCC Website), in newspapers (e.g., The Sierra Leone Telegraph), radio and television (e.g., Al Jazeera English). When the mayor was selected as one of Time's 100 Next Leaders, the property tax reform was given as one example of her bold and progressive leadership (Times 2021 Next 100 Leaders). In short, if we can show through our surveys that existence of the DTHs is widely known - or alternatively, widely unknown - in both the control and treatment groups, differences in outcomes would not reflect differential knowledge about the DTH's existence.

F.1 Geographic Spillover

Fortunately, we have a design-based way to identify those spillovers that occur due to geographic proximity between units. Following Miguel and Kremer 2004, we can define a radius Z around the property of every single property that ended up in the control condition. While the amount of eligible neighboring properties this control unit has is endogenous to, for instance, population density in that area, the share of existing eligible units that ended up in treatment is random. To estimate geographic spillover effects, we estimate outcomes in control units as a function of being "close" to a treated property, using the following regression equation:

$$Y_i = \alpha + \beta_1 SPILL_{geo_i} + \epsilon_i \tag{2}$$

Where Y_i is the outcome indicator of control property owner i; $SPILL_{geo}$ is a dummy variable equal to 1 if there is at least 1 treated study property "close" to control property i; β_1 captures the effect on the outcome of being close to a property where the owner is in a Digital Town Hall; ϵ_i is the error term. Note that in this set-up the intercept term α captures the (weighted) average outcome of control properties that are not "close" to study properties in the treatment condition.

Clearly, estimating the above equation requires that we define the distance Z at which a non-study property is "close" to a study property. As our goal is to estimate treatment spillovers to neighboring properties we want to select as small a distance as practical to estimate the spillover. This involves a bias-variance trade off– increasing the distance at which we define properties as "close" increases the number of properties used to estimate the parameter of interest and lowers variance in our estimate; but doing so also downward biases our estimate, including properties further away where spillover is likely to be less intense. Absent a theoretical or methodological superior value for Z, we use 50m, 100m, 150m, 200m and 250m, also to examine whether spillover decrease as distance increases.

As the concentration of properties varies across the city, the probability of being assigned to "spillover treatment" (in the above equation, the probability that $SPILL_{geoi}$ is equal to one) varies across properties. To account for this, we weight observations by the inverse probability of

being assigned their spillover treatment condition, calculated by re-simulating treatment assignment of study properties 1,000 times[13]. Note that this implies that control properties outside of the distance Z to any study property are weighted zero – ie, not used to calculate spillover effects.

If we find that there is a spillover effect (ie. $\beta_1 > 0$), we will expand the above model to account for the number of treated properties that are "close" to non-study properties.

Specifically, we estimate spillover effects with the following regression equation:

$$Y_i = \alpha + \beta_1 SPILL_{geo_i} + \beta_2 SPILLCOUNT_i + \epsilon_i \tag{3}$$

This specification adds the term $SPILLCOUNT_i$, which is the number of treated properties close to non-study property i; β_2 is the effect for each additional study property, beyond the first, within **Z** distance of property i. This allows us to estimate if the magnitude of the spillover effect is conditioned by the number of treated properties close to non-study property i.

We include the Rcode for the estimation and visualization in appendix 4. Note that this is still lacking the inverse probability weighting, which will be added later.

At a theoretical level, the direction of the bias introduced by social spillovers is ambiguous: Those uninvited may display disappointment effects that would upward bias our estimate. For instance, individuals may lament that they were not selected to participate. Disappointment can arise also from observing that a service was selected that was not one's own priority. Yet, from our perspective, the more severe disappointment inducing spillovers are likely to emerge outside of our sampling frame, thus cannot influence survey-based outcomes: non-property owners, property owners in the lower half of the property tax assessment or property owners in the upper half of the assessment without access to WhatsApp – all of which were ineligible for receiving an invitation.

In terms of spillovers within our DTH study population, we believe that positive updating that downward biases our estimates is most likely. First, even uninvited property owners should appreciate that political representatives are making costly investments into soliciting citizen input in challenging times. Second, precisely because of the exclusionary target population, property owners should value that only they are receiving such additional input opportunities irrespective of individual input opportunities. Third, the menu of services to be chosen from in the DTHs were exclusively local public goods that profit the broader community. Therefore, even uninvited citizens should update positively after receiving more services. Fourth, one may argue that receiving services while not bearing the cost of participation actually is the ideal outcome for citizens (ex. Haq et al. 2020). In short, even uninvited property owners obtaining more information about the DTH intervention through contact with a participant are expected to update positively vis-à-vis their political representatives. If this is correct, our estimates would be made more conservative. To collect additional evidence on spillover direction, we embed an item in our midline survey that asks treated individuals about reactions of those with whom they

13. We refrain from conducting more iterations due to the computational intensity of our restricted sampling procedure

discussed the DTHs.

F.2 Estimating Social Spillovers

But what about those spillovers that do not occur due to geographic proximity? As our intervention is relying on WhatsApp, we may believe that information was shared through such messenger services along non-geographic network lines. We utilize survey data to get at these spillovers.

To provide descriptive evidence on spillover potential and occurrence, we focus first on survey items asked towards treated individuals' spillover potential (frequency of WhatsApp usage; number of WhatsApp contacts; number of WhatsApp contacts with contact in the last month). We also directly ask them how many non-household members and non-DTH participants in Freetown they talked about the DTH with. These items are likely to overestimate the potential for and occurence of spillovers, as treated individuals may follow social desirability concerns by exaggerating communications and networks.

The bulk of our spillover-related items is targeted at participants in the control condition. These are being asked whether they are aware of the DTH – with a follow-up item on what exactly they know about the topic (open-entry) and how they learned about it. We then ask for their immediate reaction when they first heard of the topic to get at the direction of bias spillovers would introduce. Further, we implement a name generator in which we ask participants to name up to five individuals they know who participated in the DTH intervention (only asked if they indicated that they know a participant). When cross-referenced with our administrative data on property owner names, we can examine whether the individuals named were indeed among the treated. As with treatment individuals, we again ask about potential for spillover reception (frequency of WhatsApp usage, number of WhatsApp contacts, number of WhatsApp contacts with contact in last month).

In terms of estimation, we cannot rely on design-based inference as we lack an exogenous measure of network size (e.g., the number of contacts of owner i that were eligible for receiving treatment). To complicate things further, our survey measures of WhatsApp network size are measured post-treatment. Therefore, estimating the compliance outcome of control unit i as a function of network size indicators and a dummy of whether a treatment individual was correctly named rests on the assumption that treatment status did not affect network size. As above with the geographic spillover estimation, we note that we are less likely to detect spillovers because the following estimation is slightly underpowered as only the aprox. 1800 control status owners are being included.

$$Y_i = \alpha + \beta_1 SPILL_{social\,i} + \beta_2 FrequencyUsage_i + \beta_3 NetworkSize_i + \beta_4 FrequencyContact_i + \epsilon_i \tag{4}$$

Where Y_i is the outcome indicator of property owner i in the control condition; $SPILL_{social}$ is a dummy variable equal to 1 if at least 1 treated study property owner was correctly identified; β_1 captures the effect on tax compliance behavior of correctly identifying a DTH participant; ϵ_i is the error term. $FrequencyUsage$ is an ordinal variable on how often a participant has used

WhatsApp over the last seven days. $NetworkSize$ is the total number of self-identified contacts a participant has in WhatsApp. $FrequencyCon-tact$ is the total number of contacts a participant has in WhatsApp that the participant had contact with over the last month.