"I wld like u WMP to extend electricity 2 our village"

On Information Technology and Interest Articulation[*]

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Abstract

How does access to information communication technology (ICT) affect who gets heard and what gets communicated to politicians? On one hand ICT can lower communication costs for poorer constituents; on the other, technological channels may be used disproportionately more by the already well connected. To assess the flattening effects of ICTs we presented a representative sample of constituents in Uganda with an opportunity to send a text-message to their representatives at one of three randomly assigned prices. Critically, and contrary to concerns that technological innovations benefit the privileged, we find evidence that ICT can lead to significant flattening: a greater share of marginalized populations use this channel compared to existing political communication channels. Price plays a more complex role. Subsidizing the full cost of messaging increases uptake by over 40%. Surprisingly however, subsidy-induced increases in uptake do not yield further flattening since free channels are not used at higher rates by more marginalized constituents.

Introduction

The quality of democratic institutions as a tool of political representation depends on interest articulation: the opportunity and willingness of voters to communicate their needs and preferences to their representatives in government. What politicians think, how they vote, and what they prioritize depends in part on what they hear from constituents. But in many low-income countries, voters often have limited channels of communication with their representatives. Communication is often unidirectional and clustered around election periods. Moreover, there can be inequality in who can access politicians: men are often more likely to have access than women, wealthier constituents are more likely to have access than poor constituents and so on.

We examine how the availability and cost of a new system of communication with politicians—one which is based on innovations in Information Communication Technologies (ICTs)—affects *who* gets to be heard and *what* gets communicated. Generally assessing the effects of technological innovations on political communication is rendered difficult because the existence and costs of new ICT platforms are likely to be correlated with features of a political system that may independently determine political participation. Though past research has demonstrated a positive correlation between an individual's access to ICTs and levels of political engagement (Boulianne, 2009), the causal arrow has been left undetermined. To overcome these identification problems we implement an experiment in two senses.

First we introduce a novel ICT system based on short message services (SMS) that provides an avenue for voters to communicate directly with their elected representatives. Second, to assess how the representativeness of interest articulation depends on the cost of communication, we experimentally vary the price for using the ICT system. The experiment is implemented with voters in all parliamentary constituencies in Uganda, making this, to our knowledge, one of the first nation wide experiments on the role of information technology on political communication. Moreover, in structure, the experiment mimics actual innovations introduced by the Parliament of Uganda (the uSpeak system) and, more recently, by the Parliament of Botswana (Botswana Speaks), which enhances the validity

of our analysis.[1]

Our findings support the widely held view that populations often classified as politically marginalized, such as poor and women, are less likely to use existing forms of political engagement and have more limited access to their political representatives. Encouragingly, our results also suggest that opening a new ICT channel has a potential of flattening political access, with marginalized populations relatively more likely to take advantage of a low-cost, impersonal, alternative technology to contact representatives. We do not however find evidence that the priority issues for ICT users are closer to those of the general population than are those of groups exhibiting high levels of political engagement via traditional communication channels.

Turning to the effect of price on uptake, we find that prices matter, even when the differences in the cost of political communication are quite small. Providing a subsidy increases uptake considerably, though in our data this effect depends on *full* subsidization (i.e., offering access to the system for free) and not on partial subsidization. Strikingly however—and contrary to our prior expectation—we do not find that applying a subsidy to communication has a significantly stronger effect on uptake by more marginalized citizens. In other words, making access to the technology free does increase engagement by marginalized groups, but it does not increase the *relative* uptake of these constituents. One explanation for this is that marginalized populations enjoy fewer alternative channels of access and are therefore less price-sensitive than populations that can substitute between new and traditional forms of political access.

We also examine a set of simple strategic hypotheses that draws on ways that citizens might condition their behavior on the likely behavior of politicians or of other citizens. We find that these strategic considerations provide little purchase in assessing patterns of communication. In particular, voter engagement is not related in expected ways to likely correlates of politician responsiveness nor are the types of communications sent related to the volume of messaging in ways suggested by simple strategic logics.

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[1]The uSpeak system is the subject of a separate study by the authors. Following the experiment we report here, we have partnered with the National Democratic Institute and the Ugandan Parliament to assess the effects of the Parliamentary Call System (PCS), which allows constituents in randomly selected constituencies to send messages to their MP via SMS or a voice call to a call center.

Overall our results suggest modest but encouraging effects of ICTs on broadening political access. Concerns that setting up new ICT channels privilege the already privileged are not borne out. Marginalized populations use ICTs at higher rates than less marginalized populations even when they have to pay to do so. New technologies expand political access in particular to poorer populations, to more remote populations, and to women. Flattening of interest articulation, however, is more a function of technology availability than of cost. Nonetheless cost is not inconsequential: although full price messaging increases the relative share of marginalized populations among ICT users, this benefit is achieved at the cost of reducing overall uptake.

The hypotheses, measurement of key variables, and estimation strategies of this paper were all developed after data was collected but prior to any analysis, and were made publicly available in the form of a pre-analysis plan. We provide a description of consistency with, and deviations from, the pre-analysis plan in the Online Appendix. Moreover, data and replication files were made available to referees with first submission of this article. As such this paper joins calls made by Lupia and Elman (2014) and Miguel et al. (2014), and others, to increase transparency of data analysis as a means to increase the reliability of published results in the social sciences.

In the next section we situate our study within the broader literature on ICT and politics and consider arguments drawn from decision and strategic theory regarding how technologies and the costs of political access are likely to affect who gets to communicate and what gets communicated to politicians.

ICT and Political Communication

In recent years there has been a growing interest in the effects of information technology on political outcomes as these tools become increasingly prevalent across the developed and developing world. Generally, past work has focused on the political effects of exposure to ICTs, usually operationalized as Internet usage, or the availability of technological innovations that allow citizens to communicate among themselves, such as SMS (Pierskalla and Hollenback, 2013), Facebook, and Twitter (Aday et al., 2012). One set of studies focuses

on the implications of exposure to mass media, another focuses on the political effect of peer-to-peer communication platforms.

Studies that examine the relationship between usage of ICT and political activism generally find that ICT is positively related to traditional forms of political participation at the individual level. This correlation has been recently confirmed using meta-analysis of 38 such studies (Boulianne, 2009). Though informative, a challenge for many of these studies has been the risk of bias due to reverse causality (politically active citizens likely are more disposed to consume ICT) and spurious correlation (e.g., the existence of an omitted factor causing some citizens to be more active both online and politically).[2]

At the national level, usage of ICTs has been associated with countries' levels of democracy (Shirazi, Ngwenyama and Morawczynski, 2010) with a suggestion that ICT can strengthen democratic processes by facilitating group interaction, information dissemination, and debate (Oates, 2003). Here too, the availability and exposure to ICT is plausibly correlated with features of a political system that may independently determine countries' level of democracy. Indeed, as one author notes, in this area "it is particularly challenging to disentangle political, social and technology factors" (Diamond, 2010).

A more nascent literature focuses on the relationship between peer-to-peer ICTs and collective action. On one hand, peer-to-peer ICTs have been associated with lowering levels of corruption in Namibia (Bailard, 2009), increased voter turnout in Spain (Suárez, 2006), and supporting the organization of protests in Tunisia (Breuer, Landmann and Farquhar, 2012). These studies all point to politically relevant features of peer-to-peer technological innovations; they provide access to information, lower transaction costs, and a tool for coordination. On the other hand, several recent studies question the causal interpretation ascribed to such technological innovations. For example, Aday et al. (2012) find no evidence that social media played a significant role in collective action during the Arab spring. Similarly Miard (2009) finds that mobile penetration has no significant effect on anti-government demonstrations, using a large-n research design. These findings corroborate the arguments put forwards by Shirky (2011), cautioning against a tendency

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[2]Note also that the positive relationship between Internet usage and political activism is rather sensitive to substantial year-by-year variation and to the choice of participation proxy (Bimber and Copeland, 2013).

among academics and policy makers to uncritically adopt 'technological optimism.'[3]

We depart from these studies in two ways. First, while past studies focus on uncovering a positive relationship between ICT and political activism, this study focuses instead on how ICTs are used to articulate interests that may substitute or supplement traditional forms of political communication. Second, many past studies focus on *public* ICT platforms in which citizens are on the receiving side of communication. By contrast, we study the implications of a *private* ICT system linking citizens to politicians, in which citizens are the senders and initiators of political content provided privately to politicians. As such, citizens usage of the private ICT system to articulate interests is the political action of interest.

We also situate our study within the literature on political accountability. Though democratic forms of governance are now common in many low-income countries, the quality of elected governments, as measured by corruption levels and quality of public services, remains low. One leading explanation—together with the dominance of clientelism and the weakness of electoral institutions (Wantchekon, 2003)—is the effect of information deficits. Whereas studies of the determinants of political accountability overwhelmingly focus on the lack of information in the hands of citizens (Pande, 2011), a motivation for this study is the idea that a lack of information in the hands of politicians may be just as important.

With limited information on the preferences of citizens, politicians have little ability to serve as representatives, and parties have fewer incentives to differentiate themselves based on policy-positions (Bleck and van de Walle, 2012). Moreover, politicians may have little incentive to act in a representative manner when they know that their constituents know that they have such poor information (Ashworth, 2012). Instead, politicians who are unable to assess public opinion may be more likely to respond to the demands of powerful interest groups (Bartels, 2008) or serve as rubber-stamps for the executive branch. This logic provides one explanation for why African parliaments are generally considered weak vis-à-vis the executive (Barkan et al., 2010). These possibly adverse effects of limited

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[3]See also Pierskalla and Hollenback (2013) that demonstrate the 'dark-side' of technological innovations, pointing to a positive relationship between the spread of mobile technology and political violence.

information in the hands of politicians also provide a basis for our prior that citizens would take advantage of new channels of political communication to articulate their needs, preferences and priorities.

Finally our analysis speaks to an older but still important literature on political power and decision-making. In a well known exchange Bachrach and Baratz (1962) responded to the work of Dahl (1958) and others, by arguing that political power operates, at least in part, through what issues are placed on the political agenda; not simply through the exclusion of issues by elites, but through the non-initiation of demands by interested parties because they anticipate "that they would provoke strenuous opposition and perhaps sanctions." In a subsequent response Lukes (1974) highlighted the possibility that power can operate through the ways that subjects conceptualize their interests. Power may be most effective when the weak and marginalized are unaware of their conflicts of interest with the strong. Under this reading, an operation of the third face of power could result in weak interest articulation because of a lack of awareness of those interests.[4] For later developments in this discussion see Digeser (1992). In our study we assess responses to an *invitation* to articulate interests. Since the availability of the ICT platform was made independent from citizens' social position, our experiment provides leverage for distinguishing between these accounts, a point we return to in the conclusion.

Technology Induced Flattening

Our survey data establishes that in Uganda, as in rich industrialized countries, there is inequality in who voices their interests. Particularly there is variation in *access*—the extent to which channels exist to communicate with politicians if need or want arise and in *engagement*—the extent to which individuals use existing paths to participate in political processes. In Uganda as elsewhere, there exist large and significant differences between the poor and non-poor, and male and female citizens with respect to both political access and political engagement. These measures of access and engagement also correlate with each other, suggesting that communication depends not just on the desire to communicate but also on the opportunity. In this context, we seek to assess how technologies for political

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[4]Alternatively, it could result in participation that articulates the interests of others.

communication might alter preexisting patterns of interest articulation. Specifically we are interested in whether the introduction of a private ICT platform flattens political access or exacerbates existing inequalities.

On one hand, there is a concern that the groups that have the weakest access to political processes are also the least likely to access and use ICTs. According to some, "ICT has the power to create new inequities, as well as exacerbate existing ones" (Thompson, 2008, 822). And existing evidence suggests, as expected, that marginalized populations have weaker access to ICTs. For example, Hafkin and Huyer (2007) find that women in low-income countries are significantly less likely than men to use ICTs. Such a gender divide, applies to both access and to the frequency of usage (Park, 2009).

On the other hand, usage of technology does not necessarily follow access in a deterministic way. In fact there are reasons to assume that marginalized groups would adopt a bottom-up ICT system to communicate with elected politicians, at higher rates compared to non-marginalized groups. In many low-income countries existing channels of communication with representatives are highly personal, and thus commonly require traveling to meet one's representative or his/her staff in person. Thus existing channels of political interest articulation likely entail significant investments in time and money. For this reason, women who are less likely to travel outside their village for both cultural and cost reasons, may value the ability to contact representatives through mobile technologies, which eliminate the need to travel.[5] In addition, marginalized populations, such as poor constituents, may even find the impersonal aspect of ICT system rather appealing.[6]

This discussion suggests that there is a need to critically assess the case for "technological optimism" in the area of politics and governance.[7] We seek to assess whether ICT

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[5] Many Ugandan MPs, for example, have an office in their constituency, in which they (or their assistants) meet with constituents in person. In addition, most rallies and consultation meetings with MPs take place at the sub-county or parish level, rather than at one's village. However, due to poor roads and dearth of personal and public transit options, transportation costs in Sub-Saharan Africa are notoriously high. Local and regional transportation costs for the typical African country are thought to be at least twice those of the typical Asian country (Kessides, 2005).

[6] In most African countries, SIM cards can be purchased without providing any identification information. SMS communication is, thus, anonymous unless the sender decides to proactively signal his/her identity.

[7] Belief in the positive effects that ICTs may have on the nature of political representation contributes to the launch of several new initiatives. In Africa alone innovations include the Africa Technology and Transparency Initiative and the African Electronic Governance for Research Initiative. Whether such ICT initiatives can genuinely alter representative-constituent relation is still an open question.

innovations increase or decrease interest articulation of marginal populations by focusing first on a core hypothesis regarding the representativeness of user *demographics*.

$H_{1.1}$ **ICT Availability Induced Flattening 1:** The share of ICT users from marginalized groups is greater than it is for traditional channels of political communication.

If all citizens had similar preferences then the identity of those constituents articulating interests to politicians might be less inconsequential. However, there are good reasons to believe that policy preferences are also a function of class (Meltzer and Richard, 1981) and gender (Chattopadhyay and Duflo, 2004). If this is the case, then the identity of those using the new ICT platform might also affect what types of preferences get to be voiced. This motivates our second question: Does the introduction of a new ICT system result in more representative articulation of constituency needs and preferences?

$H_{1.2}$ **ICT Availability Induced Flattening 2:** The priority issues for ICT users are closer to those of the general population than are those of groups exhibiting high levels of political engagement via traditional communication channels.

Note that our hypothesis focuses on the representativeness, in terms of their preferences, of those engaging in political communication, rather than on the representativeness of interests articulated.

Price Induced Flattening

All political communication is costly. This cost can have significant implications for the *level* of communication, for *who* communicates, and for *what* gets communicated. Ultimately the price of political communication can determine which constituents and what views get better represented. Decision theoretic considerations suggest that political access satisfies the law of demand (we consider strategic logics below). We state this expectation as our next hypothesis:

H_2 **Demand:** Less expensive communication results in greater levels of communication.

Beyond its affect on the quantity of communication, price is likely to affect *whose* voice gets to be heard. Specifically, marginalized populations may be more reluctant to raise their voice when the cost of political communication is high. Data gathered by the National Democratic Institute (NDI) suggests that such patterns are likely to hold in Uganda. In 2010, NDI conducted a small pilot study in Uganda to examine the willingness of survey respondents to send a text-message to their members of parliament (MPs) as a function of *hypothetical* prices. NDI found that poorer constituents reported greater sensitivity to the price of political communication (See online appendix, Sec. 2.1).

Although the patterns NDI reports suggest that higher prices likely generate relatively more messaging of wealthier constituents, it is an open question whether actual behavior is consistent with the sort of hypothetical behavior claimed by citizens.[8] Access to alternative channels of communication plays a similar, though perhaps more counterintuitive, role to wealth. More advantaged individuals may be *more* sensitive to prices if they enjoy the option to substitute to more traditional channels of political communication. We assess these questions in terms of heterogeneous demand effects:

$H_{3.1}$ **Price Induced Flattening 1:** The subsidy effect (difference in uptake between higher and lower prices) will be stronger for (a) poorer constituents and (b) constituents with alternative channels of access to politicians.

Though price variation has been examined in the context of consumer goods and health products, to our knowledge, this is the first study to experimentally vary the cost of contacting one's representative in parliament. If price variation affects the type of people sending messages, then different price schemes can affect the representativeness of the ICT platform. This will be the case, for example, if people who cannot afford to pay a full price have different needs and priorities than those who can afford to make use of the system even in the absence of a subsidy. In the end, the relative benefits of various levels of subsidization depend on both the elasticity of demand with respect to price and the variation in political preferences as a function of income. To the extent that the representativeness of the ICT

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[8]More broadly, more works is needed on comparing hypothetical and actual behavior, especially since a growing number of studies use survey experiments that do not require subjects to take real actions (Barbas and Jerit, 2010).

platform may, in turn, alter the behavior of political actors, understanding the effects of cost is of theoretical and policy relevance.

$H_{3.2}$ **Price Induced Flattening 2:** Lower prices result in a greater representation of marginalized populations among message senders.

Strategic Logics

The analysis so far is based on a conceptualization of voters as facing a simple decision theoretic problem, to engage or not. But the decision to engage in politics is plausibly a strategic decision and the value of participation may depend on expectations of the actions of other voters and of politicians. Treating the participation problem as a collective action problem suggests two possible patterns.[9]

First, strategic considerations can provide a rationale for why subsidization may *reduce* political participation. This might arise, for example, if the messages for public goods act as strategic substitutes. We describe this logic more formally in the online appendix (Section 2.2). If this strategic consideration dominates then we should witness the opposite effect to that stated in Hypothesis H_2.

Strategic considerations also have implications for the *content* of communication (conditional on who communicates). Under one logic, for example, citizens may be relatively more likely to send messages with public goods content (rather than with demands for private goods) when prices are low. The core insight is that when there is no cost, one can expect many others to contact their representative. In this case, the marginal benefits from seeking private goods may decline relative to the marginal gains from seeking public goods. When the cost of sending messages is high, senders may assume that competition over the resources the politician controls is relatively small, and hence it is relatively more prudent to request private, or clientelistic, goods. We illustrate the core logic in the online appendix (Section 2.3).

This logic suggests that when the cost of contacting representatives decreases (through

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[9]In this paper we focus solely on the behavior of constituents (uptake and message type) as a function of the cost of contacting one's MP via SMS. We note, however, that we are currently collecting data for a companion paper in which we focus on the behavior of MPs.

a subsidy), citizens will be more likely to send requests for actions that are more public in nature.

H_4 **Voter-voter Strategic Effects:** Less expensive communication results in greater focus on public goods issues rather than private issues.

Beyond between-voter strategic considerations, simple political economy logics suggest that the engagement of citizens will depend on the *incentives politicians have to react* to the information provided. In addition to the core hypotheses listed above we also briefly assess the role of constituency and MP characteristics that are likely associated with greater responsiveness, examining specifically whether price effects are weaker for more competitive areas, for younger politicians, for government MPs and for NRM MPs.

Table 1 summarizes the hypotheses under examination; the next section describes how we seek to test them.

Table 1: **Hypotheses Summary**

#	Hypothesis	Test type
$H_{1.1}$	**Technology Induced Flattening 1**: The share of ICT based communication from marginalized groups is greater than it is for traditional channels of communication.	Observational
$H_{1.2}$	**Technology Induced Flattening 2**: The priority issues for ICT users are closer to those of the general population than are those raised by traditional high engagement groups.	Observational
H_2	**Demand**: Less expensive communication results in greater up-take across all groups.	Experimental (Price)
$H_{3.1}$	**Price Induced Flattening 1**: The effect of decreasing prices will be stronger for (a) poorer constituents and (b) constituents with alternative channels of access to politicians.	Heterogeneous Effects (Voter side)
$H_{3.2}$	**Price Induced Flattening 2**: Overall, lower prices result in a greater representation of marginalized populations	Heterogeneous Effects (Voter side)
H_4	**Voter-voter strategic effects**: Less expensive communication results in greater focus on public rather than private issues	Experimental effect

Note: Summary of hypotheses on the effects of the introduction of ICT based access to politicians.

Research Design

To assess the effects of ICT on political communication, we implemented a field experiment in Uganda in which we made an ICT platform available to a random sample of constituents at randomly determined prices. The experiment took place several months after the February 2011 Presidential and parliamentary elections. Ugandan MPs are elected in one of two ways; through *constituency* level majoritarian races where candidates of both sexes can participate and *district* level majoritarian races in which only women candidates can compete. Universal adult suffrage applies in both types of races. Currently there are 238 constituency representatives and 112 District woman MPs — the title of this piece is taken from a message from one constituent for one such women MP, or WMP.[10]

There are some good reasons to choose Uganda as our research site. First, claims to external validity are strengthened by the fact that Uganda shares characteristics with many low-income countries on some critical dimensions. It is ranked 162 in the latest HDI ranking (low human development countries are ranked between 143 and 188) and in the mid-range of the World Bank's Lower-middle-income economies in terms of GDP per capita. In addition, Uganda has middling scores in terms of ICT ownership, use and access among African countries (see online appendix, Sec 5.1). In terms of inequality, as measured by the GINI index, Uganda is ranked 46 out of 136 countries.[11] It has a weak democracy (a centrist score of -1 in polity IV scale) with a strong executive branch and a relatively weak parliament, a characteristic common to many developing countries in Africa and beyond.[12]

Second, some features of Uganda's political landscape make it a theoretically interesting place to examine whether there exists a latent demand for citizens to communicate their preferences to their representatives in parliament when democratic institutions are rather weak. On one hand, a single party, the ruling NRM, which won 70% of the seats in the last election, dominates the Ugandan parliament. In addition, competitiveness (defined as the percentage point difference between the winner and the runner up) is relatively low:

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[10]In addition there are both elected and appointed representatives of the youth, the army, the workers, and people with disabilities.

[11]Uganda is ranked high, however, in terms of ethnic heterogeneity. According to the most recent census (2002), the share of the nine largest ethnic groups combined is about 70% of the entire population.

[12]Yoweri Museveni, the leader of the NRM, has been the president of Uganda for 26 years.

on average 0.22 for constituency races and 0.26 for district races.

On the other hand, Uganda is not simply nominally democratic (turnout of 59% in the last elections that were considered relatively free and fair according to domestic and international observers), it is also in some ways functionally democratic (Grossman and Lewis, 2014). For example, there is high turnover, and even top performers have only 50% re-election rates (Humphreys and Weinstein, 2012). Interviews by the PIs with MPs reveal that MPs themselves interpret the loss of races by prominent incumbents in the most recent election as evidence of the costs for Ugandan MPs of being unresponsive to constituents.[13] Closely related, there is evidence suggesting that the current parliament has been reluctant to serve a rubber stamp of the executive, as evident, for example, in the debates surrounding the passage of the Petroleum (Exploration, Development and Production) Act in December 2012.[14]

In addition, Ugandan politicians have rather limited information on the preferences of voters. For example, over a third of Uganda's MPs admitted that when they vote on a bill or a motion, most of the time they do not feel that they have sufficient information on the way their constituents would like them to vote.[15] Citizens in Uganda report that MPs do not frequently elicit voter opinions, despite voters overwhelmingly claiming that this is an important component of their job as a representative. According to a survey we implemented, 81% of subjects said it was very important for their MP to regularly visit their constituency and 74% said it was very important they maintain an office in their constituency. Yet, less than 50% of constituents surveyed for this project knew of any opportunities to meet their constituency or district MP over the past year. Together these data suggest weaknesses in existing channels of communication between constituents and their representatives in parliament.

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[13]MPs that were vocal in the House but did not make it back in the 9th parliament include Prof. Ogenga Latigo, Lands Minister Omara Atubo, Aggrey Awori, Livingstone Okello Okello, Isha Otto, Oduman Okello, Michael Mabikke and William Oketcho.

[14]Daily Monitor, December 9, 2012, "Oil Bill passed but 198 MPs didn't vote."

[15]Based on a survey the research team conducted with Ugandan Members of Parliament, which we use in a companion paper.

Marginalized Populations and Political Empowerment in Uganda

Beginning in late April 2011, the research team worked with a group of Ugandan enumerators to conduct interviews with randomly sampled respondents in each of Uganda's 238 electoral constituencies. Cluster randomized sampling was used to select 4 villages in distinct sub-counties within each constituency. Within each village we conducted interviews with 8 villagers, for a total of 7,582 survey respondents.

Using this data we construct two indicators of political empowerment: a measure of *access*—the extent to which channels exist to communicate with politicians if need or want arises, and a measure of *engagement*—the extent to which individuals participate in political processes. We operationalize both *access* and *engagement* by grouping a number of related measures into a summary index, following Anderson (2008).[16] We relate these measures of access and engagement to commonly used indicators of marginalization in African polities: poverty, gender (female and cogender with MP), and ethnicity (being a non co-ethnic of one's MP) and remoteness; these last measures are also aggregated into a continuous *marginalization* index. For some analyses we divide the population into groups by dichotomizing the summary indices.

We operationalize *access* using variables that capture existing technologies that individuals could use to contact politicians: (1) an indicator of respondent's phone access; (2) a continuous measure capturing the frequency of SMS usage and (3) an indicator of respondent's access to a computer. In addition we have two measures of physical barriers to connecting with politicians: (4) an indicator of whether the respondent travels ten kilometers or more from the place where he or she lives now, at least a few times a month; and (5) a continuous variable measuring the geodetic distances from the respondent's home to the district capital.[17] We emphasize that our index captures existing access *technologies* available to voters and does not capture social channels such as family or ethnic ties; in addition we note that the access and the marginalization index are not independent since

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[16]The summary index is a weighted mean of several standardized outcomes, where the weights—the inverse of the covariance matrix of standardized variables—are used to maximize the amount of information captured by the index. The index is then standardized for a more intuitive interpretation of results.

[17]In the table we report descriptive statistics for a binary variable that is dichotomized at the median, where zero is assigned to the bottom half who live furthest away from the district capital.

they both include data on physical remoteness.

In Table 2 we illustrate our operationalization of the access index and how it, and each of its constituent variables, relate to traditional indicators of marginalization in African politics—wealth, gender, and being of the same gender or ethnicity as one's MP. The binary wealth index is constructed using a 'subjective' measure of wealth (coded as 1 if a respondent described themselves as having a "much higher" economic situation to those of other Ugandans) and an 'objective' measure formed from a set of items provided in Table 9. All items were grouped into a summary index as in Anderson (2008). To create a binary measure of poorer and richer respondents we use the median of the continuous wealth index as a cutoff point. Two important relations stand out. First, on all measures except coethnicity, marginalized voters are significantly less able to access their representative through existing channels of communication. Second, our data confirms the potential of mobile technology to connect citizens with their representatives in parliament. Whereas only 8% of survey respondents have *ever* used a computer, and a third rarely travel outside their village, 65% report that they use a mobile phone regularly and 86% report that they would personally be able to access a phone if they had to make an important call (even though only 48% of respondents report personally owning a mobile phone).

Table 2: **Access to Existing Communication Channels**

|	(1)	(2)	(3)	(4)	(5)	(6)
	Phone Access	SMS Access	Computer Access	Travel outside village	Proximity	Access Index (std)
	(q44)	(q47)	(q38b)	(q38d)	(GIS)	(1-5)
Poorer half	0.82	0.66	0.03	0.64	0.53	-0.21
Richer half	0.92	1.99	0.15	0.69	0.47	0.21
Difference	0.11*	0.66*	0.12*	0.06*	0.06*	0.42*
Female	0.84	1.04	0.06	0.60	0.5	-0.10
Male	0.89	1.60	0.12	0.72	0.5	0.10
Difference	0.05*	0.08*	0.05*	0.12*	0	0.19*
Noncogender	0.86	1.15	0.08	0.64	0.50	-0.04
Cogender	0.87	1.50	0.10	0.68	0.50	0.04
Difference	0.01	0.35*	0.02*	0.04*	0	0.08*
Noncoethnic	0.87	1.41	0.10	0.66	0.55	0.07
Coethnic	0.87	1.29	0.08	0.67	0.48	-0.02
Difference	0	-0.11	-0.01	0.01	-0.07*	-0.09*
Sample mean	0.86	1.32	0.08	0.66	0.5	0

Note: $*p^- < 0.05$. The access index is standardized (mean equals zero and standard deviation equals one). Number of observations: 7,582.

We operationalize *engagement* using ten indicator variables. These measures, which appear in Table 3, include: (1) active membership in any political party, (2) membership in the village governance committee, (3) attending a community meeting several times in the past year, (4) raising political issue with others at least once in the past year, (5) attending demonstrations and protest marches at least once in the past year, (6) attending elections rallies at least once in the past year, (7) writing letters to a newspaper or calling a radio show at least once in the past year, (8) voting in the recent parliamentary elections, (9) attending at least one MP organized meeting in the past year, and (10) personally talking to one's MP in the past year. We then use these variables to construct a summary index of *political engagement*, which appears in the last column.

As with access, there exist large and significant differences between the poor and non-poor, and male and female respondents with respect to political engagement. The difference between non-cogender and cogender respondents is somewhat smaller yet significant at the 95% level. However, and in contrast to classic accounts of the political economy of African development, our data do not suggest that political engagement (Table 3), like access (Table 2), is structured around ethnic lines.

Figure 1 shows how the measures of political engagement, relates to access, marginalization, wealth and age. As expected, engagement rises with political access and wealth and declines with marginalization, strengthening our confidence in the reliability of our measures. Variation in marginalization accounts for about 10% of the variation in engagement, with a one standard deviation increase in marginalization associated with a 0.1 standard deviation decline in engagement (t-stat=-8.68). Engagement is highest for voters in middle age ranges and declines for the youth and the elderly.

Figure 1: **Correlates of Traditional Political Engagement**
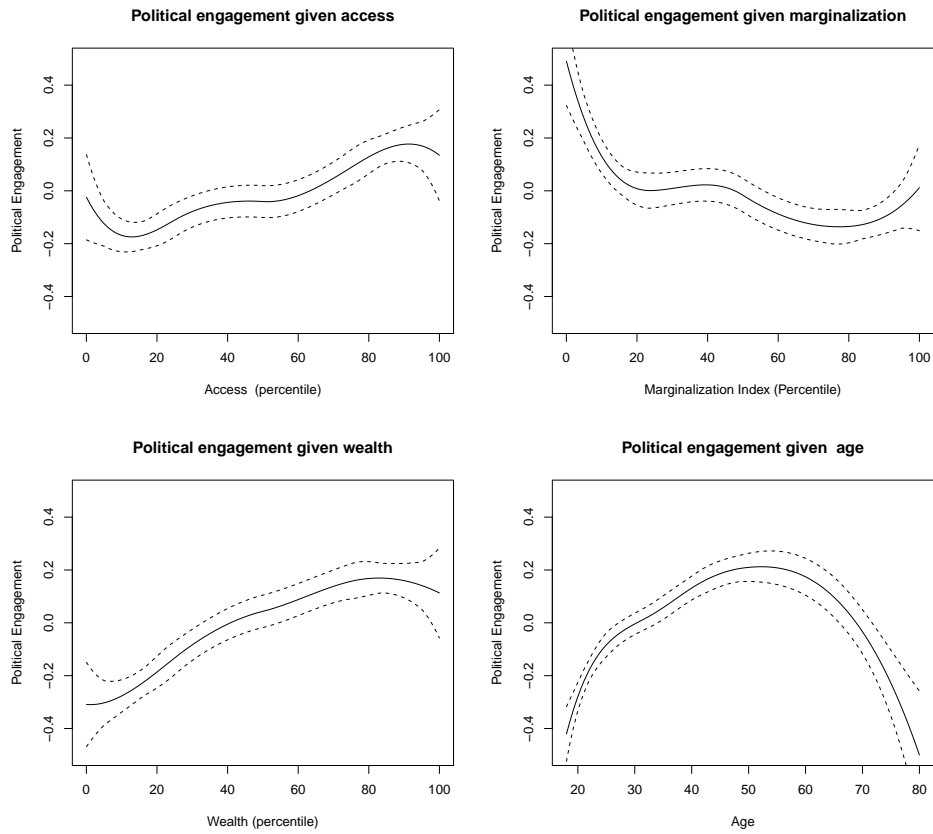
Note: Traditional political engagement as a function of our measures of political access and marginalization as well as of age and wealth. Estimation line including 95% confidence interval derived from local regression using the locfit procedure. No. of observations: 7,582.

Table 3: **Politically Engaged**

	(1) Party Member (q52)	(2) Village Committee (q53a)	(3) Community Meetings (q55a)	(4) Raise Issue (q55b)	(5) Protest March (q55c)	(6) Election Rally (q55d)	(7) Write Letter (q55e)	(8) MP meeting (q56)	(9) Voted MP elections (q66)	(10) Talked to MP (q109)	(11) Engaged Index (1-10)
Poorer half	0.17	0.23	0.55	0.62	0.05	0.76	0.07	0.24	0.94	0.20	-0.13
Richer half	0.24	0.26	0.54	0.66	0.07	0.79	0.16	0.30	0.95	0.26	0.13
Difference	0.08*	0.04*	-0.01	0.04*	0.02*	0.03*	0.09*	0.05*	0.01	0.06*	0.26*
Female	0.15	0.20	0.48	0.58	0.05	0.73	0.08	0.23	0.93	0.17	-0.23
Male	0.26	0.29	0.60	0.71	0.07	0.82	0.15	0.32	0.95	0.29	0.23
Difference	0.11*	0.09*	0.12*	0.13*	0.02*	0.09*	0.08*	0.09*	0.02*	0.12*	0.45*
Noncogender	0.19	0.23	0.52	0.62	0.05	0.76	0.11	0.25	0.94	0.19	-0.10
MP Cogender	0.22	0.26	0.57	0.66	0.07	0.79	0.13	0.29	0.95	0.27	0.10
Difference	0.03*	0.04*	0.05*	0.04*	0.02*	0.02*	0.02*	0.04*	0.01*	0.08*	0.19*
Noncoethnic	0.21	0.26	0.51	0.63	0.08	0.76	0.13	0.27	0.93	0.24	-0.01
MP Coethnic	0.20	0.24	0.56	0.65	0.05	0.79	0.13	0.27	0.95	0.23	0.01
Difference	0.01	-0.01	0.05*	0.02	-0.03*	0.03	-0.02*	0	0.02*	-0.01	0.02
Long distance	0.21	0.25	0.58	0.65	0.05	0.79	0.11	0.28	0.95	0.23	0.03
Sh. distance	0.20	0.24	0.51	0.64	0.07	0.76	0.12	0.26	0.93	0.24	-0.03
Difference	0.01	-0.01	-0.07*	-0.01	0.02*	-0.03	0.01	0.01	-0.02*	0.01	-0.05

Note: $*p^- < 0.05$. No. of observations: 7,582.

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Treatment Assignment: Price Variation

To test the study's hypotheses, in each village in the study area 4 respondents were offered the opportunity to SMS their MP at a price level which was randomly pre-assigned. In total 3,790 subjects participated in our experiment. Random assignment was use to assign subjects across the 3 treatment price groups within each constituency in equal numbers: (a) **Full price** (100 shillings); (b) **Partial subsidy** (50 shillings), and (c) **Full subsidy** (free).[18] We provide data on covariate balance in the appendix, Figure 6.[19] The service was introduced with the following script:

> We would like to offer you an opportunity to send your new (**constituency/ district**) MP a message using SMS. It is a chance to tell your incoming MP about issues that are important to you, or things you feel he/she should work on. This service is not associated with any political party or government agency. The service is (**free/50sh/100sh**).

In addition, experimental subjects were given a flyer that provided additional instructions on how to access the ICT system and send a text message to one's MP.[20] Examples of such flyers are provided in the online appendix.

Estimation Strategy

Estimation strategies for testing the study's hypotheses were developed in advance in a detailed plan that we posted on the Experiments in Governance and Politics (EGAP's)

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[18]At the time the experiment, 100 shillings (UGX), approximately 5 US cents, was the average cost of a SMS. In 2011, GDP per capita in Uganda was $1300 (PPP), and the exchange rate was about 2,200UGX for the dollar, which amounts to daily income of 7,835 UGX, on average. This means that in purchasing power, the full subsidy of 100 UGX amounts, on average, to about 1.2% of our respondents' daily income. This would be equivalent to a subsidy of $1.7 in purchasing power in the USA in 2011. To fix ideas, Ugandans could buy a pack of gum, a small packet of peanuts, or a single vegetable for 100 UGX. An ear of roasted corn on the street is about 300-500 UGX, and a package of biscuits or a mug of tea is in the 200-400 range. Thus, though not insignificant, 100 UGX does not go very far in terms of purchasing power.

[19]In addition to the price variation and the MP mandate variation, a third variation was introduced in which a random set of respondents were read examples of public goods messages collected during the NDI pilot in order to assess whether messaging is subject to complementarities. This second treatment is not the subject of the present analysis.

[20]The ICT platform, which is based on the open-source software FrontlineSMS, was customized to serve our needs with the outstanding help of Joseph Kaizzi.

Design Registration web page, prior to analysis. The plan specified the measures of variables and econometric specifications that we would use for testing the study's hypotheses. The core specifications include no controls; analysis of experimental effects is done using design based inference with tests implemented using randomization inference. In the online appendix we describe both fidelity and deviations from the pre-analysis plan and our rationale for the change in each case, where relevant.

Results

In total we received 243 messages, out of which 41 were dropped since participants failed to enter their identifying code and 29 messages dropped since they were the second, third or fourth message sent by the same participant.[21] Since 4 messages were blank, we are left with 173 identified message senders and 169 valid messages. Note that invalid messages do not constitute missing data in our analysis; they are simply not considered valid messages.

This set of messages corresponds to a 4.5 percent uptake. While this is clearly not a high ratio, it is not low relative to other types of political participation outside of election periods. The rate is similar to the share of respondents reporting having taken part in a protest and is marginally smaller than the share reporting having written a letter (in the previous 12 months, in an election year). It is a quarter as large as the share of people reporting having spoken to their MP, although this measure is taken specifically with respect to the two months leading up to the February election. It is only slightly lower than the share of voters participating in party primaries in the U.S (Gans, 2010), and similar to the number of attendees in relatively large scale public deliberations over oil revenues in São Tomé e Príncipe (Humphreys, Masters and Sandbu, 2006) and to the number of citizens joining online discussions during Iceland's deliberative process over a new constitution (Magnusson, 2013). 5% also matters in parliamentary politics in Uganda: if an additional 5% of voters in the 2010 Ugandan election chose to cast a vote for the candidate who was an eventual runner up in their constituency, the outcome of 17% of

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[21]One participant sent 4 messages, four participants sent 3 messages, and ten sent 2 unique messages. A unique time stamp allowed us to maintain the first message that a participant sent. The research team delivered all valid messages directly to the MPs.

constituency MP and 10% of women district MP races would have been changed. At scale, this rate would correspond to approximately one million messages sent to Uganda MPs. As we discuss in the conclusion this rate is also considerably higher than the rate achieved in the closely related uSpeak intervention implemented by the parliament of Uganda.[22]

The uptake recorded in this study thus suggests that a sizable number of citizens value the opportunity for interest articulation provided by the introduction of the SMS channel to MPs. In the remainder of this section we examine who is responsible for this uptake and in particular the relationship between system availability and both user *demographics* and *preferences*.

Technology effects

We saw above (Tables 2 and 3) that marginalized groups are significantly less engaged in political life across a broad range of political participation indicators. For example, compared to their male counterparts, women are about 11% less likely to be members of political parties, 12% less likely to attend community meetings and 10% less likely to report writing a letter to a newspaper or calling in a radio show. Can an opening of a new ICT channel, based on mobile technology, flatten access to national assembly representatives?

Our data suggests it could. Figure 2 illustrates the observed flattening. The left panel shows the relation between marginalization and political engagement that we saw before, emphasizing the negative correlation between these constructs. The right panel shows the analogous relationship between marginalization and the propensity to send an SMS message; broadly this relationship is flatter and the broad relation is weakly positive rather than negative, indicating that more marginalized subjects are more likely than non marginalized subjects to message.

To test hypothesis $H_{1.1}$ more formally, we compare the share of marginal respondents among the SMS sender population to the share of marginal respondents among politically

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[22]The rate is small relative to response rates for an SMS system introduced by UNICEF in Uganda (uReport). This system registers network members and elicits members' opinion on politically salient issues, by sending network members a weekly poll via text-messages to which members may respond. The initiatives reports a response rate (or uptake) of between 25 to 50 percent (Blaschke et al., 2013). The numbers are difficult to compare however with our numbers since these response rates are *conditional* on willingness to engage in the uReport system.

Figure 2: **Flattening**
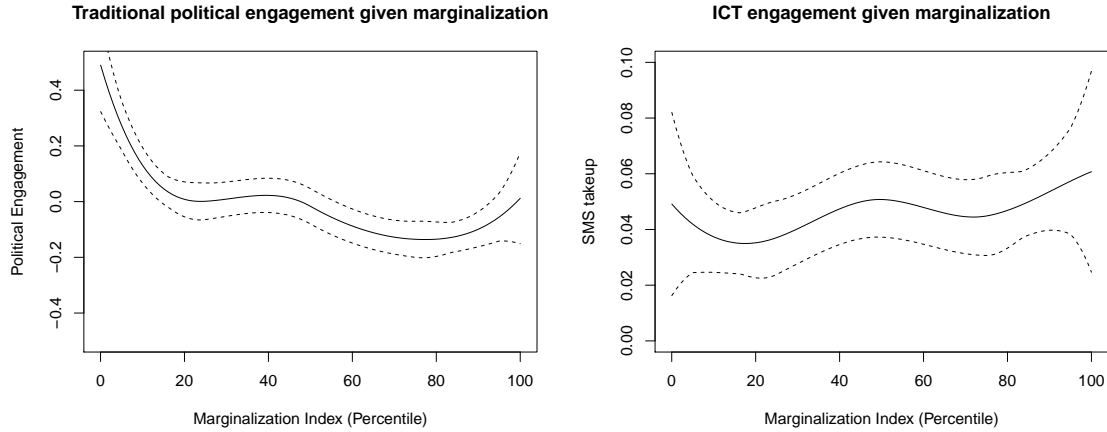
Note: Relationship between political marginalization and both traditional political engagement (left panel - 7,582 observations) and SMS take-up (right panel – 3,790 observations). Estimation line including 95% confidence interval derived from local regression using the locfit procedure that take advantage of all available data.

engaged types (those who report using traditional strategies of engagement). For this analysis and the next we define the "highly engaged" as those with scores in the top 4.5% of the engagement index.[23] This ensures that the engaged pool is set to be approximately the same size as the pool of SMS senders. To compare these shares we employ seemingly unrelated linear regressions; results from this analysis, reported in Table 4, suggests that the share of marginal respondents is indeed higher among the SMS sending group than among a comparably sized group of the most traditionally engaged subjects.

Table 4: **Flattening Participation: Test of Hypothesis 1**

Share of marginal respondents among the highly engaged types	0.38
Share of marginal respondents among the SMS sender population	0.54
Difference	0.15
(p)	(0.01)
(N)	3,790

Note: p value estimated using χ^2 test from seemingly unrelated regressions.

[23]In our pre-analysis plan we proposed a cutoff that divides the population at the median of the engagement index. The disadvantage of that approach however is that *by construction* the 50% most engaged types are more representative than the 4.5% of SMS senders. We show the sensitivity of results to these coding decisions below.

We deepen this analysis in three ways. First we assess the extent to which this relationship holds for different sub-components of the marginalization index. These results are provided in Table 2 in the online appendix. They suggest that opening a direct channel between citizens and their MPs using text-messaging is especially beneficial to poorer villagers, to women, and to citizens living in remote areas. As discussed above, this may be because those populations are less likely to travel to the district capital to meet their representative or his/her parliamentary assistant in person.

Figure 3: **Sensitivity of H_1 Results**
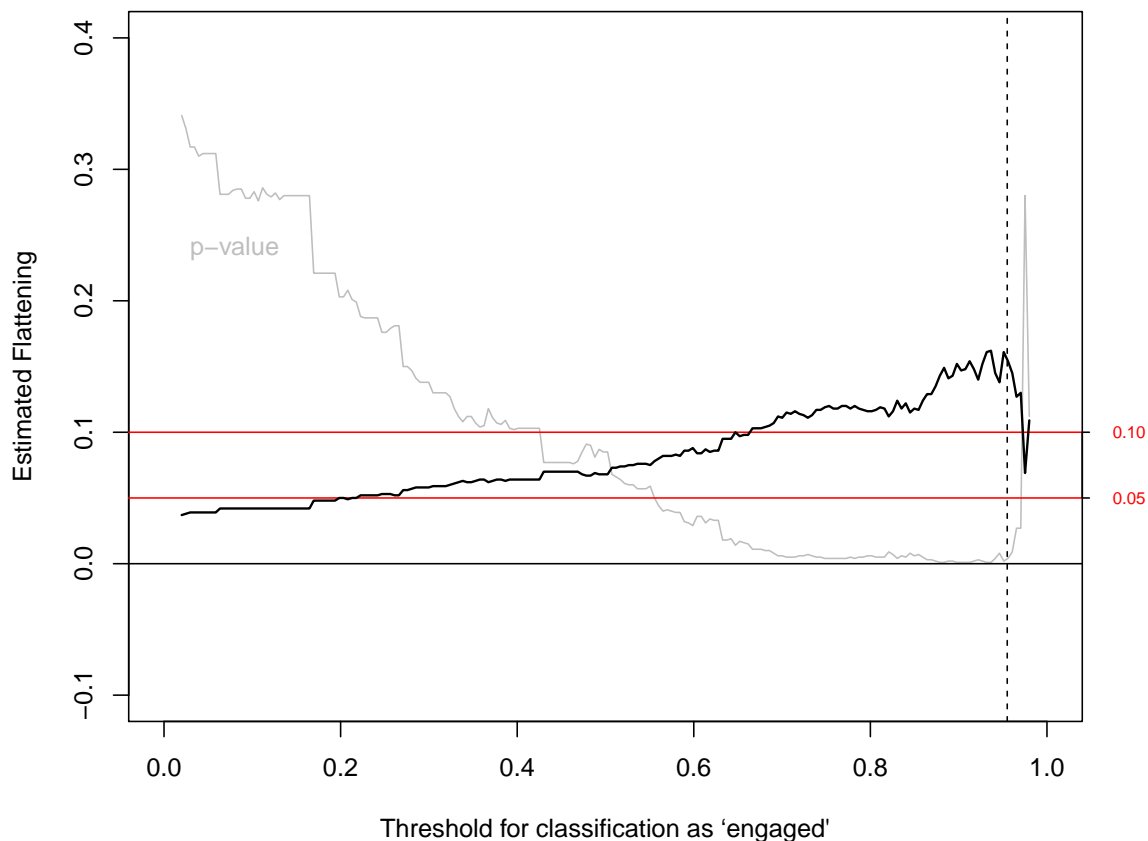
Note: Estimated difference in the share marginalized among SMS users to the share marginalized among the "most engaged" types. p-values are derived from two-tailed tests. The dotted vertical line indicates the top 4.5% threshold used in our main analysis.

Second we examine the sensitivity of our findings to the definition of "highly engaged." We do so by repeating the same analysis each time with a different threshold on the engagement index, calculating p-values in each iteration. The results of this sensitivity analysis are shown in Figure 3. We see here that the test of hypothesis 1 is not sensitive to large changes in the definition of "highly engaged" away from the 4.5% cutoff. Qualitatively a flattening effect holds throughout the range (reflecting the fact that marginalized populations message more than non-marginalized populations in absolute terms). Quantitatively, however, this effect weakens as the definition of engaged becomes less demanding and significance is lost at conventional levels around the midpoint. At the midpoint — the threshold we specified in our preanalysis plan — the flattening effect is significant only at the 5% level in a one-tailed test and only at the 10% level in a two-tailed test.

Finally we assess whether there is evidence specifically for greater uptake within the middle class. In classic accounts the middle class has served as a catalyst for democratization processes. Figure 2 shows a slight rise in SMS uptake among constituents with middling marginalization index scores. This pattern can be seen more strongly in the relation between wealth and uptake. Formal analysis suggests however that the non-monotonicity is weak and only on the border of statistical significance.[24]

We have found evidence that the share of politically marginalized respondents among SMS-users is larger than their share among the engaged types. This fact, however, does not alone tell us whether the priority issues for ICT users are closer to those of the general population than are those raised by traditional high engagement groups ($H_{1.2}$). To address this question Figure 4 provides information on the top priorities of all respondents against the priorities of two groups of interest: (a) experimental subjects choosing to use the SMS system to contact their MP, and (b) subjects that are located at the top 5% of the politically engagement summary index. Figure 4 shows that there exists little difference in the distribution of top priorities of the more politically engaged subjects and those of the general population (the complete sample of experimental subjects), and a slightly larger

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[24]To examine the middle class effect more formally we estimated a logit model in which a binary variable indicating take-up is regressed on a linear and quadratic term of our wealth composite index. Figure 6 (online appendix) demonstrates the stronger estimated effect for the middle class but also shows the statistical imprecision of this relationship.

discrepancy between the preferences of SMS users and the general population. For example, compared to the general population, SMS users are more likely to prioritize infrastructure and less likely to prioritize taxes. These differences likely reflect the fact that poorer constituents are over-represented in the SMS users group.

Figure 4: **Patterns of Representativeness of Messaging ($H_{1.2}$)**
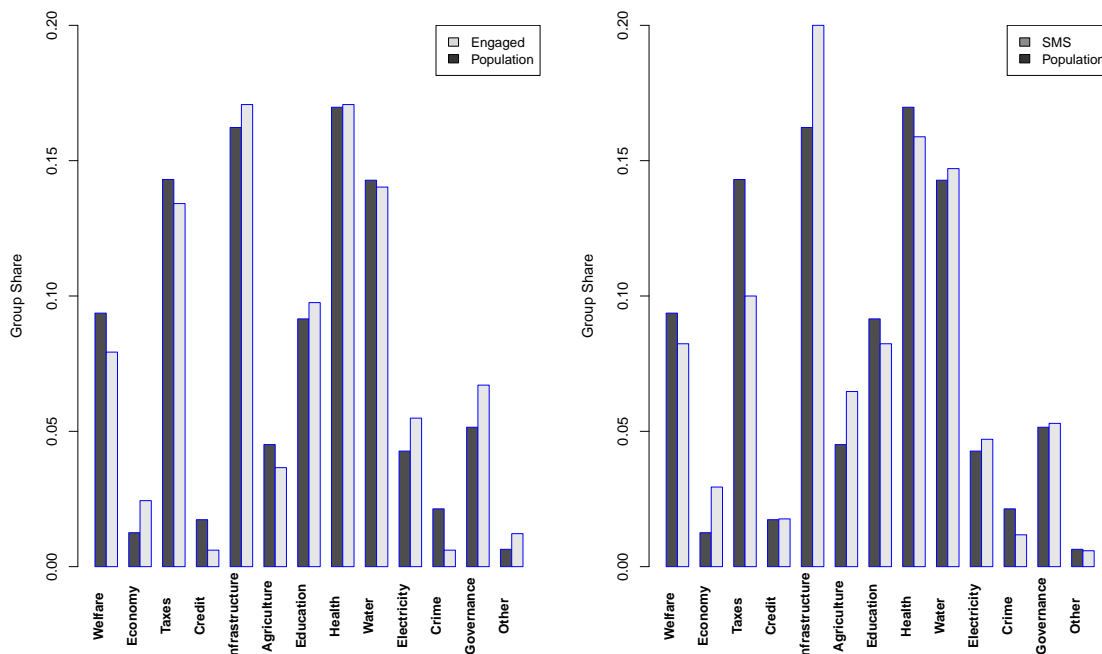
Note: Distribution of priority areas for government action for (a) the "most engaged", compared to the population (left panel), and (b) SMS users compared to the general population (right panel).

To test $H_{1.2}$ more formally, we construct a measure of the non-representativeness of preferences of engaged constituents relative to preferences of the population and a measure of the non-representativeness of SMS senders relative to preferences of the population and compare these two quantities. Our "non-representativeness statistic" (NRS) measures the distance between the distribution of responses from subpopulation A and (possibly overlapping) subpopulation B as:

$$NRS(A, B) = \frac{1}{2} \sum_{k=1}^{m} (\alpha_k^A - \alpha_k^B)^2$$

where α_k^j denotes the vector of share of members of group j selecting option k. The NR statistic is calculated then as half the sum of squared deviations of shares in each of m categories. The maximum deviation is 1, which would arise if the population A all valued one area while population B valued another.

To estimate the significance of *differences* in non-representativeness across the engaged and SMS-users groups we estimate a multinomial logit model of sector choice as a function of group membership and, using the estimated distribution of parameters, simulate a distribution of NR statistics relative to the reference distribution (population B) as well as a distribution of differences in NRS's relative to the reference distribution both for non-SMS (and non engaged) populations (population A) and non-engaged (but SMS sending) populations (population A').[25] This analysis suggests that although the NRS statistic is higher for the SMS group (0.0022) than the Engaged group (0.0007), the difference between these deviations is small and the probability of such a difference arising by chance if the two distributions were equally representative of the population is close to 1 (See online appendix for results and code).

We conclude that though opening a new ICT channel can increase the voice of marginalized populations relative to existing communication channels ($H_{1.1}$), we do not find, contra to our expectations ($H_{1.2}$), greater inclusion of a pool of citizens with priorities closer to those of the general population.

Price effects

New technologies can expand access, but how much does this depend on the price of these technologies? The key patterns can be seen in the top panel of Table 5 column 1, which

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[25] Letting x_1 denote membership in the SMS group and x_2 in the engaged group, we estimate a multinomial logit model under the assumption that $Pr(y = k|\beta) = \frac{e^{\beta_{k0} + \beta_{k1}x_1 + \beta_{k2}x_2}}{\sum_{k=1}^{m} e^{\beta_{k0} + \beta_{k1}x_1 + \beta_{k2}x_2}}$ (where we set $\beta_{1j} = 0$). We estimate $\hat{\beta}$ using maximum likelihood and use draws from the resulting distribution of $\hat{\beta}$ to estimate the distributions of $(\alpha|x_1 = 1, x_2 = 0)$ and $(\alpha|x_1 = 0, x_2 = 1)$ from which we estimate a distribution of NR statistics.

shows unconditional uptake by price category. Table 5 suggests that messaging uptake decreases in price, and that the shift from free to some positive price is more consequential than the shift from a partial subsidy to a full price. This non-linear demand curve induced by zero price is consistent with findings reported by Cohen and Dupas (2010) in the case of bed nets and by Kremer and Miguel (2007) in the case of deworming pills in Kenya.

To test hypotheses H_2 more formally, we estimate price effects on SMS uptake.[26] ATEs are calculated as mean difference, whereby coefficients and p-values are estimated using randomization inference, while taking account of the structure of blocking in the randomization scheme by using the experimental subjects' constituency as strata. To generate a summary measure of effects, we report, in addition, the linear trend in which the dependent variables are regressed on a three-category treatment variable. Linear trend (coefficients and p-values) are similarly derived using randomization inference and a linear model in which blocks are introduced as fixed effects. Key results are presented in the bottom panel of Table 5. Our findings provide support for H_2: less expensive communication results in greater uptake. Specifically, moving from a partial subsidy to a free price or from a full price to a free price results in an increase in uptake of about 2 percentage points, or an approximately 50 percent increase.

How prices affect who gets heard

To assess heterogeneous effects of price on uptake, we focus on the subsidy effects and the *differences* in subsidy effects for more and less marginalized citizens and specifically at differential effects for wealthier and poorer constituents and for those with greater or weaker access. Recall that we expect that the difference in uptake when moving from higher to lower prices (subsidy effect) will be larger for poorer constituents than richer constituents. Similarly we expect that a subsidy will result in increased use of the system

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[26]In the pre-analysis plan we treated the treatment effect as a price effect; i.e., calculating the change in uptake when prices go up from low to high. Here we modify the analysis such that the treatment effect captures the subsidy effect: change in uptake when prices move from high to low. Though this change does not affect the significance or magnitude of results it has the advantage of allowing a more intuitive interpretation of results, but also has a more natural meaning from a policy perspective: no intervention is full-price, whereas the relevant policy intervention is providing a subsidy for message senders.

Table 5: **Price Effects**

Treatment	Effect	(1) Any	(2) Public	(3) Private	(4) H_4 test (Col 2 - Col 3)
Full (N=1268)	Level	0.041	0.026	0.014	
Subsidy (N=1267)	Level	0.038	0.019	0.017	
Free (N=1255)	Level	0.058	0.033	0.025	
Subsidy vs. Full Price	ATE	-0.001	0.003	-0.005	
	(p^+)	(0.428)	(0.268)	(0.637)	
	(N)	2535	2535	2535	
Free vs. Subsidy	ATE	0.021	0.009	0.013	
	(p^+)	(0.072)	(0.163)	(0.125)	
	(N)	2522	2522	2522	
Free vs. Full Price	ATE	0.02	0.01	0.009	
	(p^+)	(0.05)	(0.079)	(0.212)	
	(N)	2523	2523	2523	
Linear Trend	Trend	0.01	0.005	0.004	0.001
	(p^+)	(0.014)	(0.021)	(0.124)	(0.327)
	(N)	3790	3790	3790	(3790, 3790)
		H_2 test			

Note: ATEs estimated using linear regression, p-values estimated using randomization inference (taking into account blocked assignment). N. simulations: 5,000. Throughout the paper p denotes two-sided test; p^+ and p^- denote one-sided tests for hypothesized positive and negative effects, respectively.

by individuals with greater alternative channels of access.[27]

We find, contrary to our expectations, that the subsidy effect on the uptake of poorer constituents (0.008)—defined as subjects who are located at the bottom half of the standardized wealth index—is smaller (though not significantly so) than the subsidy effect on the uptake of richer constituents (0.012). This suggests that poorer constituents are no more price-sensitive than richer constituencies when interest articulation is at stake. Turning to political access, as hypothesized, we find that the conditional difference in uptake as a function of price between high and low access constituents is positive. However, the subsidy effect difference is relatively small and again not significantly different than zero (p-value 0.436).

In order to assess the overall effect of price subsidization on flattening of political

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[27]Since wealthier constituents also tend to have, on average, higher levels of political access, we report in the online appendix (Table 5) an analysis of heterogeneous subsidy effect by poverty *conditional* on political access and vice versa.

Table 6: **Price induced flattening (1) ($H_{3.1}$)**

	Rich	Poor	$H_{3.1}$	
Marg. effect of subsidy	0.012	0.008	Difference	-0.004
by poverty	(0.006)	(0.006)	(p^+)	(0.670)
	Low Access	High Access		
Marg. effect of subsidy	0.009	0.01	Difference	0.001
by political access	(0.006)	(0.006)	(p^+)	(0.436)

Note: **Estimated marginal effect of a price subsidy**. Marginal effect of subsidy by poverty level controlling for access (top), and marginal effect of subsidy by access controlling for poverty. p values, that take into account the blocking design, are estimated using OLS. See also online appendix (Sec. 7) for a sensitivity test of these results in which we use randomization inference

access, we report in Table 7 first the marginal effect of price for more marginalized and less marginalized subjects (using the same measure of marginalization employed to test H_1, Table 4), as well as the difference between these (upper panel). We find that for the non-marginalized there is a strong and significant price effect (substantively this effect implies nearly a *doubling* in message sending rates from 3.7% uptake for the marginalized in the full price condition to the 6.3% in the free condition). For the marginalized, however, the effect is much weaker, contrary to our hypothesis.

The result is that the *share* of the population of SMS users that is marginalized is slightly higher under the high price condition—contrary to our expectations—at 56% compared to 51% (Table 7, bottom panel). This difference is not significant however at conventional levels: the associated p-value for this difference is 0.82 given our original one-sided test of the hypothesis of greater flattening from subsidization (p^+), and 0.43 on a two-sided test (p). The 51% share of marginalized in the low price condition, though lower than that in the high price condition, is however still higher (and significantly so) than the share marginalized among the most engaged group (see Table 4). These results suggest that there is flattening even under the low price condition but that the estimated effect of flattening is lower when messaging is free.

All in all, while system availability flattens access, we find no evidence for *additional*

flattening stemming from applying a subsidization scheme and indeed the results (weakly) point in the opposite direction.

Table 7: **Price induced flattening (2): Test of $H_{3.2}$**

Marginal effect of subsidy for marginalized (p^+)	0.005	(0.194)
Marginal effect of subsidy for non-marginalized (p^+)	0.014	(0.009)
Difference (p^+)	-0.009	(0.859)
Share of marginal respondents among full price senders	0.558	
Share of marginal respondents among partial subsidy price senders	0.562	
Share of marginal respondents among full subsidy (free) senders	0.507	
Trend from high price to free	-0.054	
p	(0.430)	
p^+ $H_{3.2}$	(0.822)	

Note: p values for the marginal effect of the subsidy are estimated using regression. The number of SMS users in the full-price treatment condition is 52, 48 in the partial subsidy price treatment condition, and 73 in the free condition.

How prices affect what gets heard

We have found that the cost of political communication alters the propensity of marginalized constituents to articulate their interests. Strategic logics, described above, suggest however that price may affect not just the quantity of communication but also the *type of message sent* (H_4). In the last piece of analysis we turn to examine whether price subsidy results in greater focus on public rather than private issues. Our estimand here is therefore the propensity to send messages of a given type ("private" or "public"). An initial classification of each of the 169 valid messages into five categories is presented in Table 8.

Table 8: **Types of Messages**

Type	Description	Obs
0. Personal messages	General greetings and praises.	4
1. Private requests	Messages intended to benefit the individual sender or their family only. Examples include senders asking directly for money for home construction, school fees, funerals, or support finding work.	13
2. Local geographic group benefit messages	Message intended to benefit a geographic group below the constituency level. The group can be defined by gender, location ("village residents") and profession ("farmers"). Note that messages that do not indicate a particular subgroup within the constituency, but that say "we need" are treated as local geographic group benefit for the purposes of coding. Examples include messages on the need for electricity in a village, or the need for infrastructure or equipment in subcounties.	85
3. Large geographic group messages	Messages that make requests or provide information on behalf of geographic groups corresponding to the constituency or district.	48
4. Large non geographic group messages	Message intended to benefit a group such as women, veterans, and farmers, beyond the constituency level.	8
5. Public messages	Messages with an unrestricted beneficiary group. This category includes items such as corruption, inflation, presidential term limits, cost of living and other features related to national policies.	11
	Total	**169**

After this initial classification, we further collapsed the more detailed categorization into a binary measure of public messaging, such that 0, 1 and 2 were coded as more private messages and categories 3, 4, 5 were coded as public messages. The rationale for choosing this cutoff is based on Lindberg (2010) that distinguishes between *core duties of MPs*—such as legislation, executive oversight and constituency representation—that have an inherent public good component, and *constituency services* in the form of personal favors and community development that have a private or club good component. Our cutoff point is also consistent with the work of Cammett and Issar (2010) and Smith, LaGatta and Bueno de Mesquita (2013) that view investments in community-level services, such as health and education, through a clientelistic framework. Note also that our choice of cutoff point has the additional benefit of maximizing the variance of the measure.

We note that a large number of messages are requests for local public good, especially water and electricity supply, health services, roads and education. Consistent with findings from recent studies (e.g., Lindberg (2010)), Ugandan voters view the lobbying for provision of community-level (club) goods as one of the key areas of responsibility of their representatives in parliament. MPs are increasingly expected to represent their constituents by lobbying for them in parliamentary committees, line ministries, and local government council meetings. The fact that most SMS-messages address what voters view as a core MP activity is consistent with the view that ICT, as a platform for interest articulation, can alter the nature of substance of political demands and serve as a vehicle to increasing the accountability of MPs in low-income countries, such as Uganda.

Figure 5 provides descriptive information on the full distribution of message types by price levels, suggesting a rather weak relationship between price and message type with marginally greater share of messages of a local nature, and fewer of a constituency nature, sent in the full price condition.[28]

Moving to a formal analysis of price effects, we find that using a binary variable to measure message type, the difference in the subsidy effect on the increase in public messages relative to private messages is small and statistically indistinguishable from zero (Table 5, columns 2–4). Importantly, as reported in the online appendix, our findings are the same for other plausible classifications, such as treating category 4 as "private." We conclude that there is no robust evidence suggesting that citizens are using information on the price of messaging strategically to tailor the content of their messages to expectations regarding uptake by others. In sum, an increase in price excludes potential users who opt out of contacting their MP, but without a significant change in the types of messages that get communicated.

These results thus provide little support for the strategic rationales described above. We find similar negative results for other hypotheses arising from strategic considerations. As reported in the online Appendix (Table 6), we do not find that voter sensitivity to price is a related to measures that we expect to predict the responsiveness of MPs.

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[28]Table 4 in the online appendix shows more detail with uptake broken down by private/public for various types of constituents, indicating only small differences between demographic groups.

Figure 5: **Message Content and Pricing**

Messaging by Type and Price
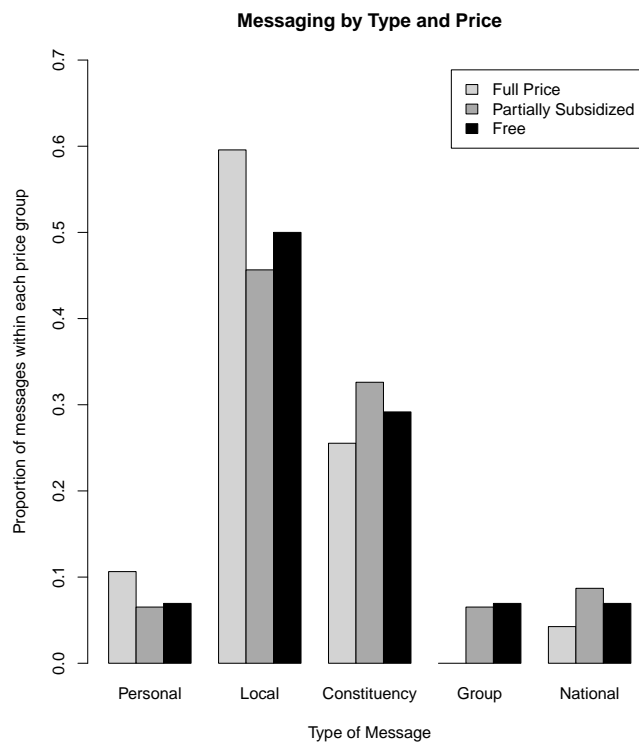
Note: Figure shows the distribution of message types under three different pricing conditions. Total number of messages: 165.

Conclusion

To assess how information technologies affect political interest articulation, we provided a representative sample of constituents with access to a communication platform akin to those being developed by national parliaments and nongovernmental organizations in a growing number of developing countries. In order to asses how cost affects interest articulation, we introduced random variations in the prices faced by constituents.

The experiment allows us to assess two concerns raised by many. Our results establish that there is underlying constituent demand to use ICTs to articulate interests and preferences to MPs, including among marginalized populations. As discussed above, the uptake recoded in this study (about 5%) though perhaps modest as a share of survey respondents, is reasonably large when compared to non-electoral participation in Uganda and elsewhere.

The second common concern we address is that new technologies will only exacerbate existing inequalities in access to politics. Our results suggest that this concern is misplaced. We find that opening a new low cost ICT channel can flatten interest articulation, as uptake among marginalized populations outpaces that by non-marginalized groups. In our study, marginalized citizens send costly SMSs at higher rates than the less marginalized, and they are relatively more likely to text-message their MP than they are to participate in various traditional forms of political engagement. Since we exogenously introduced the communication platform within a nationally representative sample—i.e., made the ICT system available independent of citizens' wealth, location, or other characteristics—our measurement of levels (uptake) is free from selection biases that limited past work on technology exposure and political behavior.

The experiment also allows us to assess the effect of cost on interest articulation. Simple theoretical models suggest that lower prices could affect both the *quantity* and the *type* of messaging. We assessed whether a subsidy would lead to an increase in the participation of poorer constituents, an increased focus on issues of concern to them, and a general shift towards communication relating to the provision of public rather than private goods. We find that providing a full-subsidy for messaging increases uptake—by 42% compared to uptake under market prices. However subsidization does not lead to greater flattening.

Contrary to our expectations, more marginalized voters are *no more* price-sensitive than more politically connected voters and the SMS sending population does not have different priorities than the traditionally engaged group. In other words, making access to the communication technology free increases uptake across all populations of interest, but it does not necessarily encourage the participation of populations with different set of priorities, compared to existing communication channels.

Our finding that poorer constituents are not more price-sensitive than richer constituents when interest articulation is at stake contrast with results generated from survey data. NDI found that voters' self-reported *intention* to contact their MP using SMS-messaging has significant heterogeneous *hypothetical* price effects by voters' income-level.[29] Our findings reaffirm the importance of measuring costly behavior rather than simply relying on survey responses, which are more likely to be affected by various biases.

We find little evidence that price affects the *type* of messages that get communicated by constituents. Though we find some evidence that information received when prices are low is of a more public nature, this result is weak. In sum, our findings suggest that subsidizing the price of using ICT systems will likely result in politicians facing more demands, in more marginalized constituents making their voice heard (though not relatively more), but the nature of these demands is not likely to fundamentally change. These combined findings have important policy implications as more governments are contemplating the introduction of ICT innovations.

We close with a discussion external validity. In our case we delivered a technology directly to a nationally representative sample of voters. We, therefore, have grounds to expect that the sample treatment effects identified here extend to the Ugandan population. However, like all results derived from single case studies, we need to be cautious regarding the implications for other sites and for other technologies. Ultimately confidence in the generality of the findings will depend upon replication elsewhere. We note however that our analysis of heterogeneous effects suggested that the patterns that we found did not depend sharply on features such as the competitiveness of constituencies or attributes of politicians; nor did price effects depend strongly on the wealth of voters or their existing

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[29]The PIs provided support to NDI on the administration of that survey.

channels of political access. Given the high level of inequality and the dominance of the ruling party, an experiment conducted in this environment is a particularly hard test of income and political effects. The lack of variation in effects by income or MP characteristics suggest that our results may not be very sensitive to features of the case at hand.

External validity depends however not just on the case but also on various design elements of the intervention studied. Our experiment was closely modeled on designs for a national system to be introduced by the Uganda parliament, and is also similar to one used in Botswana and elsewhere. This strengthens the relevance of our findings to other real world interventions. However data emanating from the Ugandan parliament SMS system suggests that uptake in the national system is lower than what we find in our experiment. According to reports from NDI, the uSpeak system generated approximately 2000 messages following a national radio dissemination campaign — a figure, while larger than ours in number, suggests a much lower uptake *rate*.[30]

What to make of these differences? First, differences — or more broadly, the generalizability of our results — may depend on core features of our design. Three stand out, emanating from the fact that the service we studied was introduced to voters individually, and in a private one-on-one interaction. One implication of this is that absent a dynamic structure, voters could not base participation decisions on learning about the views and behavior of politicians. Second, for marginalized voters, the personal invitation may provide an incentive to engage politically that is not typical of mass media campaigns. Third, the private delivery mechanism may not induce the common knowledge conditions or the opportunities for coordination that may be needed for strategic logics to take effect, whether these be logics of complementarities or substitution. Thus while we have a clear possibility result, whether technology can flatten interest articulation in the absence of an invitation to participate is still an open question.

Second, and more positively, much is learned from the very fact of a difference between participation levels in controlled and field settings. An interpretation of low take up by marginalized populations in the field setting, one that that is informed by considerations of the second and third faces of power, would suggest that low participation can be ex-

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[30]Personal communication from the National Democratic Institute (NDI) Uganda.

plained by the possibility that populations are unconscious of demands (or feel they have no rights to make any) or that they feel that initiating requests will be ineffective in the face of systemic biases. The results from our experiment suggest however that while low participation rates — particularly among marginalized populations — may be due to the second consideration, they cannot be simply attributed to the first.

References

Aday, Sean, Farrell Henry, Lynch Marc, Sides John and Deen Freelon. 2012. Blogs and Bullets II: New Media and Conflict after the Arab Spring. Technical report United States Institute of Peace.

Anderson, Michael L. 2008. "Multiple Inference and Gender Differences in the Effects of Early Intervention: A Reevaluation of the Abecedarian, Perry Preschool, and Early Training Projects." *Journal of the American Statistical Association* 103(484):1481–1495.

Ashworth, Scott. 2012. "Electoral Accountability: Recent Theoretical and Empirical Work." *Annual Review of Political Science* 15(1):183–201.

Bachrach, Peter and Morton S Baratz. 1962. "Two faces of power." *American political science review* 56(04):947–952.

Bailard, Catie Snow. 2009. "Mobile Phone Diffusion and Corruption in Africa." *Political Communication* 26(3):333–353.

Barbas, Jason and Jennifer Jerit. 2010. "Are Survey Experiments Externally Valid?" *American Political Science Review* 104(02):226–242.

Barkan, Joel D., Robert Mattes, Shaheen Mozaffar and Kimberly Smiddy. 2010. "The African Legislatures Project: First Findings." *CSSR Working Paper No. 277* .

Bartels, Larry M. 2008. *Unequal democracy: the political economy of the new gilded age.* New York: Russell Sage Foundation.

Bimber, Bruce and Lauren Copeland. 2013. "Digital Media and Traditional Political Participation Over Time in the U.S." *Journal of Information Technology & Politics* 10:125–137.

Blaschke, Sean M., Peter P. Carroll, Daniela Rojas Chaves, Michael G. Findley, Madeleine C. Gleave, Robert N. Morello and Daniel L. Nielson. 2013. "Extrinsic, Intrinsic, and Social Incentives for Crowdsourcing Development Information in Uganda: A Field Experiment." *Mimeo* .

Bleck, Jaimie and Nicolas van de Walle. 2012. "Valence Issues in African Elections: Navigating Uncertainty and the Weight of the Past." *Comparative Political Studies* .

Boulianne, Shelley. 2009. "Does Internet Use Affect Engagement? A Meta-Analysis of Research." *Political Communication* 26(2):193–211.

Breuer, Anita, Todd Landmann and Dorothea Farquhar. 2012. "Social Media and Protest Mobilization: Evidence from the Tunisian Revolution." *Mimeo* .

Cammett, Melani and Sukriti Issar. 2010. "Bricks and Mortar Clientelism: Sectarianism and the Logics of Welfare Allocation in Lebanon." *World Politics* 62(03):381–421.

Chattopadhyay, Raghabendra and Esther Duflo. 2004. "Women as Policy Makers: Evidence from a Randomized Policy Experiment in India." *Econometrica* 72(5):1409–1443.

Cochran, William G. 1968. "The effectiveness of adjustment by subclassification in removing bias in observational studies." *Biometrics* pp. 295–313.

Cohen, Jessica and Pascaline Dupas. 2010. "Free Distribution or Cost-Sharing? Evidence from a Randomized Malaria Prevention Experiment." *Quarterly Journal of Economics* 125(1):1–45.

Dahl, Robert A. 1958. "A Critique of the Ruling Elite Model." *American Political Science Review* 52(2):463–469.

Diamond, Larry. 2010. "Liberation Technology." *Journal of Democracy* 21(3):69–83.

Digeser, Peter. 1992. "The fourth face of power." *Journal of Politics* 54(4):977–1007.

Gans, Curtis. 2010. 2010 primary voter data research. Technical report Center for the Study of the American Electorate, American University's School of Public Affairs.

Grossman, Guy and Janet I. Lewis. 2014. "Administrative Unit Proliferation." *American Political Science Review* 108(1):196–217.

Hafkin, Nancy J. and Sophia Huyer. 2007. "Women and Gender in ICT Statistics and Indicators for Development." *Information Technologies and International Development* 4(2):25–41.

Humphreys, Macartan and Jeremy M. Weinstein. 2012. "Policing Politicians: Citizen Empowerment and Political Accountability in Uganda." *Working Paper* .

Humphreys, Macartan, William A. Masters and Martin E. Sandbu. 2006. "The Role of Leaders in Democratic Deliberations: Results from a Field Experiment in São Tomé and Príncipe." *World Politics* 58(4):583–622.

Imai, Kosuke, Gary King and Elizabeth A Stuart. 2008. "Misunderstandings between experimentalists and observationalists about causal inference." *Journal of the royal statistical society: series A (statistics in society)* 171(2):481–502.

Kessides, Christine. 2005. "The Urban Transition in Sub-Saharan Africa: Implications for Economic Growth and Poverty Reduction." *The World Bank, Africa Region Working Paper Series No. 97* .

Kremer, Michael and Edward Miguel. 2007. "The Illusion of Sustainability." *Quarterly Journal of Economics* 122(3):1007–1065.

Lindberg, Staffan I. 2010. "What accountability pressures do MPs in Africa face and how do they respond? Evidence from Ghana." *The Journal of Modern African Studies* 48(01):117–142.

Lukes, Steven. 1974. *Power: A radical view.* Vol. 1 London Macmillan.

Lupia, Arthur and Colin Elman. 2014. "Openness in Political Science: Data Access and Research Transparency." *PS: Political Science & Politics* 47:19–42.

Magnusson, Finnur. 2013. How to Write a Constitution in the 21st Century. In *Presented at Right to Information and Transparency in the Digital Age Conference.* Stanford University Palo Alto, CA: .

Meltzer, Allan H. and Scott F. Richard. 1981. "A Rational Theory of the Size of Government." *Journal of Political Economy* 89(5):914–927.

Miard, Fabien. 2009. "Call for Power? Mobile phones as facilitators of political activism." *ISA 50th Annual Convention* .

Miguel, E., C. Camerer, K. Casey, J. Cohen, K. M. Esterling, A. Gerber, R. Glennerster, D. P. Green, M. Humphreys, G. Imbens, D. Laitin, T. Madon, L. Nelson, B. A. Nosek, M. Petersen, R. Sedlmayr, J. P. Simmons, U. Simonsohn and M. Van der Laan. 2014. "Promoting Transparency in Social Science Research." *Science* 343(6166):30–31.

Oates, Briony J. 2003. "The potential contribution of ICTs to the political process." *Electronic Journal of e-Government* 1(1):31–39.

Pande, Rohini. 2011. "Can Informed Voters Enforce Better Governance? Experiments in Low-Income Democracies." *Annual Review of Economics* pp. 215–237.

Park, Sora. 2009. "Concentration of internet usage and its relation to exposure to negative content: Does the gender gap differ among adults and adolescents?" *Women's Studies International Forum* 32(2):98–107.

Pierskalla, Jan H. and Florian M. Hollenback. 2013. "Technology and Collective Action: The Effect of Cell Phone Coverage on Political Violence in Africa." *American Political Science Review* 107(02):207–224.

Shirazi, Farid, Ojelanki Ngwenyama and Olga Morawczynski. 2010. "ICT expansion and the digital divide in democratic freedoms: An analysis of the impact of ICT expansion, education and ICT filtering on democracy." *Telematics and Informatics* 27(1):21–31.

Shirky, Clay. 2011. "Political Power of Social Media - Technology, the Public Sphere Sphere, and Political Change." *Foreign Affairs* 90:28–41.

Smith, Alastair, Tom LaGatta and Bruce Bueno de Mesquita. 2013. "Prizes, Groups and Pivotality In a Poisson Voting Game Game." *Mimeo, NYU* .

Suárez, Sandra L. 2006. "Mobile democracy: text messages, voters turnout and the 2004 Spanish general election." *Representation* 42(2):117–128.

Thompson, Mark. 2008. "ICT and development studies: Towards development 2.0." *Journal of International Development* 20(6):821–835.

Wantchekon, Leonard. 2003. "Clientelism and Voting Behavior: Evidence from a Field Experiment in Benin." *World Politics* 55(3):399–422.

Appendices

A   Summary Statistics

Variable	n	Min	Mean	Median	Max	IQR	Miss
POOR	7553	-5.3	0.0	0.2	2.21	1.3	29
Radio ownership	7578	0.0	0.9	1.0	2.0	0.0	4
Television ownership	7578	0.0	0.1	0.0	1.0	0.0	4
Bicycle ownership	7579	0.0	0.5	0.0	1.0	1.0	3
Car / Motorbike ownership	7579	0.0	0.1	0.0	1.0	0.0	3
Mobile phone ownership	7581	0.0	0.9	1.0	2.0	1.0	1
Computer ownership	7572	0.0	0.1	0.0	1.0	0.0	10
Education	7569	0.0	2.8	2.0	9.0	2.0	13
House material	7527	1.0	1.9	2.0	3.0	2.0	55
Drinking water	7222	0.0	0.7	1.0	1.0	1.0	360
Distance to water	7500	-180.0	-23.0	-15.0	0.0	25.0	82
Employment status	7582	0.0	0.9	1.0	2.0	2.0	0
Last month's wage (in 1000 USH)	3704	0.0	133	56	1500	1420	3878
ACCESS	7582	-4.9	0.0	0.1	12.7	0.9	0
Frequency of travel	7582	0.0	0.7	1.0	1.0	1.0	0
Computer access	7582	0.0	0.1	0.0	1.0	0.0	0
Phone use	7579	0.0	0.9	1.0	1.0	0.0	3
Frequency SMS usage	7548	0.0	1.3	0.0	105.0	1.0	34
Proximity to district capital	7582	-169.5	-22.8	-17.1	0.0	19.5	0
ENGAGED	7582	-3.1	0.0	0.0	3.7	1.3	0
Talked to MP	5474	0.0	0.2	0.0	1.0	0.0	2108
Political party engagement	7582	0.0	0.2	0.0	1.0	0.0	0
Engagement with LC1	7582	0.0	0.2	0.0	1.0	0.0	0
Community meeting attendance	7577	0.0	0.5	1.0	1.0	1.0	5
Raise issues at community meetings	7582	0.0	0.6	1.0	1.0	1.0	0

Attend demonstrations	7550	0.0	0.1	0.0	1.0	0.0	32
MARGINALIZATION	7582	-2.0	0.0	0.0	5.4	1.4	0
Poor	7553	-5.3	0.0	0.2	2.7	1.3	29
Woman	7582	0.0	0.5	0.0	1.0	1.0	0
NonCoethnic	7335	0.0	0.3	0.0	1.0	1.0	247
NonCogender	7582	0.0	0.5	0.0	1.0	1.0	0
Distance to district capital	7582	0.0	22.8	17.1	169.5	19.5	0
Education	7569	0.0	2.8	2.0	9.0	2.0	13

Table 9: Table of Citizen Covariates

B   Balance

We report covariate balance across the three treatment groups for wealth (continuous), gender (binary), age (continuous) and education (ten category variable). In addition, we test the balance of the our access and engagement indicators. In Figure 6, for each variable we provide (a) standardized mean deviations by treatment, which allows us to use a similar scale for all covariates (row 1), and (b) the full distribution of the variables in their original scale by treatment status (rows 2-4). The differences in standardized mean deviations are quite small and meet accepted standards introduced by Cochran (1968) (see also the discussion in Imai, King and Stuart (2008)): that a mean difference should not differ by more than a quarter of a standard deviation.
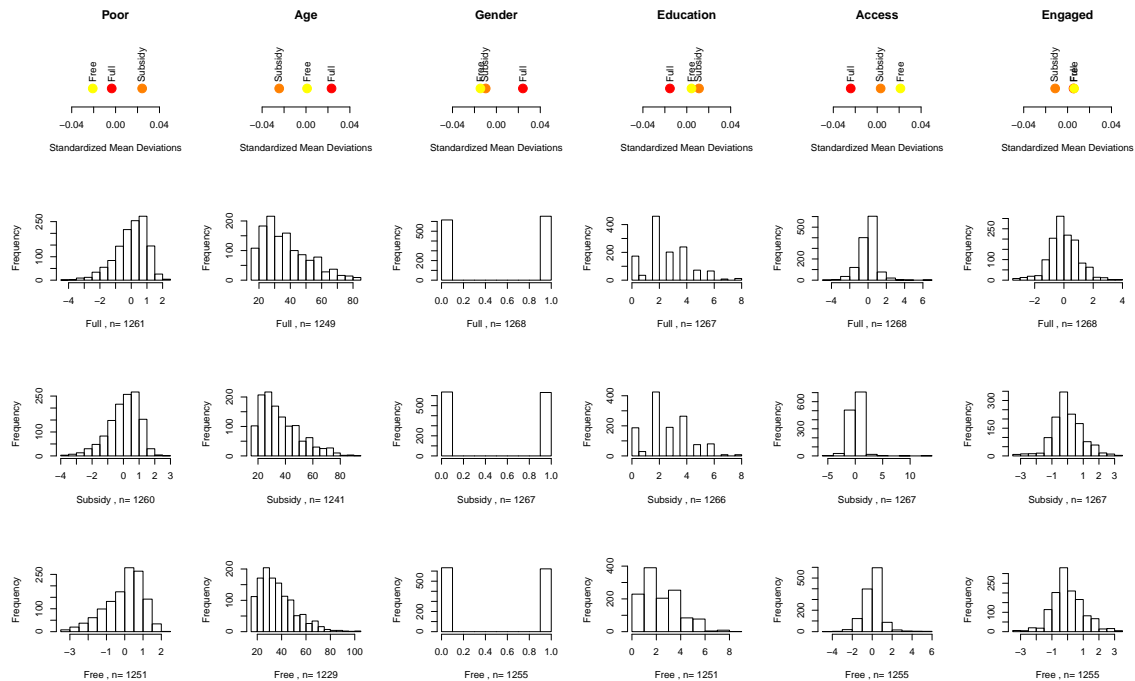
Figure 6: The distribution of key pretreatment covariates broken down by each price range (treatment groups). The top row shows means for each group in units of standard deviation of the covariate in question.