

A Work Project, presented as part of the requirements for the Award of a Master's degree in
International Development and Public Policy from the Nova School of Business and
Economics.

Digital divide, citizen engagement and political participation in Guinea Bissau

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12/09/2023

Abstract

What is the impact of mobile internet usage on citizen engagement and political participation in Guinea Bissau? This paper seeks to address this question by utilizing data from Guinea Bissau's 2018 inaugural public opinion poll and employing an instrumental variable analysis. The results indicate that mobile internet usage enhances the probability of individuals participating in political meetings, voicing their concerns through complaints to authorities, and raises awareness concerning the prohibition of political dissent demonstrations.

Keywords: Public policy, Citizen engagement, Political participation, Digital divide, Mobile internet

This work used infrastructure and resources funded by Fundação para a Ciência e a Tecnologia (UID/ECO/00124/2013, UID/ECO/00124/2019 and Social Sciences DataLab, Project 22209), POR Lisboa (LISBOA-01-0145-FEDER-007722 and Social Sciences DataLab, Project 22209) and POR Norte (Social Sciences DataLab, Project 22209).

I. Introduction

This paper aims at understanding the effect of mobile internet usage on citizen engagement and political participation in Guinea Bissau. In point of fact, these dimensions are crucial in “helping to make public institutions more transparent, accountable, and effective, and contributing innovative solutions to complex development challenges” (World Bank, 2023). Citizen engagement and political participation can be alternatively defined as the attempts promoted by the members of a community to influence politics by making information flow between public stakeholders and the government. This influence can be exerted “either by affecting the choice of government personnel or by affecting the choices made by government personnel” (Verba and Nie, 1978). Both of these endeavors share the common goal of promoting improved governance and enhanced public services for the benefit of society. Consequently, a virtuous cycle emerges, wherein citizens demand greater accountability and responsiveness from their government while also actively contributing more to the political process. For this reason, community-driven development programs frequently rely on this type of mechanism, often based on bottom-up approaches.

Nevertheless, it is worth noting that citizen engagement and political participation inherently encompass elements of inequality due to the substantial variance in the extent to which citizens can influence politics. Participation is often conditional on socioeconomic resources. Citizens from privileged backgrounds shape predominantly politics. Consequently, this can lead to governance structures that mainly cater to the interests of the most affluent members of society. (Verba, Nie and Kim, 1987; Solter, 2008).

This element of inequality in disproportionate political participation is also mirrored in the unequal access to digital technologies, which can serve as a valuable means to gather information and amplify voices. Modern technology and the internet empower citizens to engage in politics actively and participate more effectively (D’Avanzo, 2020).

This research delves into the impact of mobile internet usage on citizen engagement and political participation, focusing on three distinct metrics: attendance at political gatherings, the lodging of complaints with authorities, and awareness of restrictions on protest marches, which reflect the “exit, voice and loyalty” scheme by Hirschman. Indeed, this paper argues that access to a multitude of information sources and the ability to exchange them encourage citizens to become more engaged in the political life of their community and more prone to take concrete actions to achieve improved governance.

The dataset employed to examine the link between the aforementioned variables is derived from DEMOS' inaugural public opinion survey, conducted across 150 districts in Guinea-Bissau in 2018. Through face-to-face interviews, a sample size of 1184 individuals was assembled. The study employs an instrumental variable analysis, with mobile internet usage being instrumented using the availability of mobile phone services. This approach is adopted to mitigate the endogeneity of the regressor, given that access to the internet is closely tied to economic resources.

The findings show that on average the availability of mobile phone service, which acts as a facilitator of internet access, is positively related to the three measures of citizen engagement and political participation under scrutiny. Specifically, the availability of mobile phone services enhances the likelihood of individuals attending political gatherings, initiating dialogues with authorities concerning societal issues, and gaining insight into how authorities handle manifestations of dissent.

These results align with the predominant narrative. There is a large literature that reflects on the relationship between the internet and different aspects of citizen engagement and political participation. A comprehensive assessment of the major contributions to it can be found in “Political Effects of the Internet and Social Media” by Zhuravskaya, Petrova and Enikolopov (2020). Guriev, Melnikov and Zhuravskaya use Gallup World Poll (GWP) data to study the

implications of 3G internet but focus on measures of government approval. Donati (2017) looks at the South African and concentrate on election turnout.

Part of this rich literature pays particular attention to the same metrics analyzed in this paper. Among it, Manacorda and Tesei (2020) take up the literature on the “liberation technology”, showing how mobile phones serve as a catalyst for political demonstration, particularly during times of economic downturn, either by making citizens more aware or more proactive. In recession times people face lower opportunity costs in participating in acts of dissent. Data used is for the whole African continent (with the exclusion of a few countries considered as outliers), yielding to great external validity. Time spent browsing on internet is found to increase political participation in the United Kingdom: individuals, especially younger ones, are more prone to collect information about politics (Di Gennaro and Dutton, 2006).

A study analyzing the Italian context between 1996 and 2003 suggests that the internet has complex and varied effects on political participation. It initially led to a decrease in voter turnout in the short term, a trend primarily associated with disillusionment, which later reversed. However, it also contributed to the enhancement of other forms of political participation, as evidenced by the emergence of online protest movements (Campante, Durante and Sobbrío, 2018). Rojas and Puig-i-Abril (2009) show that in Colombia digital technologies enhance citizen engagement and argue how online political participation can have spillover effects also on the offline reality.

Two research papers, both drawing upon Afrobarometer data, endeavor to examine the connection between technological access and political participation, as well as civic engagement. The first one, encompassing data from 36 African nations between the years 2014-2015, employs a simple regression analysis. Its findings reveal a positive association between internet utilization and individuals' tendencies to voice concerns to authorities and express dissatisfaction through political demonstrations (Chirwa et al., 2023). The second

study narrows its focus to the specific context of South Africa and to the metrics of civic engagement and civic deviance. It displays that mobile phones exert a favorable influence on both these dimensions (Ingrams, 2015).

As for the instrumental variable utilized, mobile phone service has already been praised as a good way to enhance the internet (Singh and Sahu, 2008). It should serve the purpose also in this context, since Guinea Bissau is lacking landline infrastructure that was damaged during past conflicts. Mobile phone service is supposed to be a valid instrument since proximity to mobile phone services has nothing to do with the individual's decisions and it should be as good as randomly assigned.

The paper is structured in different sections. Section II provides an explanation of the context in which the study takes place, Guinea Bissau. The third one provides details on the data and methodology used, while the fourth shows and discusses the results of the analysis. Section IV addresses the limitations of the study. The last section draws conclusions.

II. Explanation of context

Guinea Bissau is often labeled as “one of the world's poorest and most fragile countries” (World Bank, 2023). Within the country, significant inequalities persist, as evidenced by disparities such as unequal access to technology. It is imperative to bridge this disparity, particularly in the context of the United Nations' Sustainable Development Goals (SDGs), which place great emphasis on the need to reduce inequalities and encourage innovation. This is underscored by the goal of attaining “universal and affordable access to the Internet in least developed countries” (United Nations, 2023).

In Guinea Bissau only 33.3 percent of the population has access to electricity (DataReportal, 2023). The country's electricity sector ranks among the most inefficient in West Africa, due

to inadequate investments, outdated power distribution infrastructures and a mismatch between demand and supply (Africa Energy Portal, 2023).

The year 2023 witnessed a 2.2 percent expansion in internet users, yet a significant portion, nearly 65 percent of the population, remained disconnected from the online world at the year's outset. Among the internet users, 32.2 percent engaged with at least one social network platform in January 2023. Social media usage is not that frequent, with Facebook being the most popular social network website, despite the big decline in users experienced over the past twelve months.

The landline network in Guinea-Bissau is not operational, hence mobile phone services are currently the pillar of the country's communications infrastructure. The mobile network providers are MTN and Orange, supplying services for phone and 3G coverage, and money transfers (Logistic clusters, 2022).

Phone service provision is therefore crucial. Nonetheless, it empowers citizenship and political action in many ways. It has already been shown that SMS communicating information about the functioning of the elections was effective in increasing election turnout and reducing problems in the electoral process (Aker, Collier and Vicente, 2017). This finding comes from a field experiment set in Mozambique, which shares issues of political accountability with the country object of this study. SMS conveying voting turnout messages are found to increase political participation also in Gracio and Vicente (2021).

Mobile phone service also acts as a fundamental enabler of m-government and e-government initiatives, facilitating the provision of public services via mobile and internet technology. Not surprisingly, Guinea Bissau right now ranks at the bottom of the e-government and e-participation indexes. The former summarizes the three dimensions of human capital, online

service and telecommunications indexes, on all of which the country registers notably poor scores.

Defined as the digital divide, unequal access to internet actually conceals various aspects, such as “internet proficiency” and lack of digital skills (Van Deursen and Van Dijk, 2015). However, this study narrows the scope of its investigation solely to internet usage access, as expressed in terms of time spent online.

III. Data and Empirical Strategy

Main variables

The analysis in question draws its data from the inaugural public opinion poll, conducted across 150 districts in Guinea Bissau during 2018, under the auspices of DEMOS. This dataset was meticulously curated via face-to-face interviews, yielding a sample size of 1184 individuals. The survey covered a broad spectrum of topics, encompassing governance, politics, climate, and societal issues.

The outcome variables are defined as engaging in political meetings, lodging complaints with authorities (particularly government or ministry executives), and possessing knowledge regarding the prohibition of political demonstrations. The dependent variables under scrutiny are derived from three specific survey questions: firstly, "Recalling the last national election in 2014, did you participate in a political meeting?" - a binary query with a simple “yes” or “no” response format. Secondly, "Over the past 12 months, how frequently did you engage with a leader from the National Government or a Ministry to address significant concerns or express your viewpoint?" - a multi-choice question with response options including “never”, “once”, “rarely”, “often”, and “always”. Lastly, "How frequently does the government prohibit protest demonstrations in this country?" - another multi-choice query. To enhance

interpretability, the latter two questions were coded into dummy variables. These variables take on a value of 0 if the individual has never engaged in these actions, and 1 otherwise.

The independent variable in focus pertains to internet accessibility. Data concerning internet access was obtained from the question, "How frequently do you access the internet?". This response was transformed into a binary variable, taking the value of 1 if the individual accesses the internet daily or several times a week, and 0 otherwise. To mitigate the omitted variable bias, an instrumental variable was employed. This instrumental variable was also drawn from the survey questionnaire and relied on the response to the question, "Are mobile phone services available in the Primary Survey Unit/DR?". As such, the analysis's integrity hinges on the accuracy of the data collected by the team responsible for data collection.

The table below describes the variables in full detail.

Variable	Description
Participate in political meetings	Binary variable = 1 if respondent participates; = 0 if respondent doesn't participate
Complain to Government or Ministry executive	Binary variable = 1 if respondent complains once, rarely, often; = 0 if respondent doesn't complain
Know about prohibition of protest marches	Binary variable = 1 if respondent thinks marches are prohibited rarely, often, always; = 0 if respondent thinks marches are never prohibited
Use the internet	Binary variable = 1 if respondent uses the internet many times a week, everyday; = 0 if respondent uses the internet few times a month, less than once a month, never
Age	Continuous variable
Gender	Binary variable = 1 if male; = 0 if female
Education	Categorical variable = 0 if no formal education, = 1 if informal education; = 2 if incomplete primary education; = 3 if complete

	primary education; = 4 if incomplete secondary education; = 5 if complete secondary education; = 6 if after-secondary education qualification; = 7 if incomplete higher education; = 8 if complete higher education; = 9 if postgraduate
Place of residence	Binary variable = 1 if urban; = 0 if rural
Region	Categorical variable = 0 if = Bissau; = 1 if Tombali; = 2 if Quinara; = 3 if Oio; = 4 if Biombo; = 5 if Bolama/Bijagòs; = 6 if Bafatà; = 7 if Gabu; = 8 if Cacheu

Main specifications

This paper estimates the effect of the mobile internet usage on a set of outcome variables relating to citizen engagement, political participation, and political knowledge.

To get rid of endogeneity, caused by the omitted variable bias, the paper relies on instrumental variable analysis. The instrumental variable refers to the presence of mobile phone services that houses can access, as browsing the internet on the phone is conditional on having mobile phone services available. As a good instrumental variable needs to be correlated with the endogenous one, a first stage equation is used to measure the effect of the instrument on the explanatory variable:

$$Internet_use_i = \beta_0 + \beta_1 Phone_service_i + X_i + \varepsilon$$

$Internet_use_i$ is a dummy variable that displays whether people use the internet a lot. $Phone_service_i$ is the instrumental variable that indicates the presence of mobile phone services. X_i represents a vector of control variables, encompassing factors such as age, gender, education, an indicator for urban or rural place of residence, and region. This identical vector will be consistently applied in the subsequent models. Standard errors, both in this and in the

forthcoming models, are clustered by village in order to account for within-region correlation, as per the methodology outlined by Abadie et al. (2023).

The underlying assumption in this approach posits that the influence of mobile phone services on political outcomes is exclusively mediated by its impact on internet usage, holding all other covariates constant.

The reduced form relates attitudes toward politics to phone service using an ordinary least square (OLS) model:

$$Y_i = \alpha_0 + \alpha_1 Phone_service_i + X_i + \varepsilon$$

where i stands for individuals. Y_i indicates the outcome variables of interest, namely participating in political meetings, making complaints to the authorities and knowledge about the prohibition of protest marches.

Then, in the structural equation the endogenous variable is instrumented with the availability of mobile phone services to estimate a linear regression through an OLS model:

$$Y_i = \gamma_0 + \gamma_1 Internet_use_i + X_i + \varepsilon$$

IV. Results

The table below presents an analysis of the impact of mobile phone service on internet usage. This first-stage regression was crucial to determine the suitability of mobile phone service as an instrumental variable for internet usage, as it is used to assess the relevance condition of the instrument. Indeed, the regression of the endogenous variable on the instrument is necessary to detect the first causal effect. The relevance of the instrument can be tested by looking at the F-statistic. The calculated F-statistic stands at 11.232, indicating the instrument's effectiveness, even though the correlation between the regressor and the

instrument is not exceptionally high. As for the coefficient, it is statistically significant and different from 0, and reveals that possessing mobile phone service leads to an increase in internet usage.

Table 1

The effect of mobile phone service on mobile internet usage	
Dep. Var.:	Use the internet
Mobile phone service	0.088*** (0.028)
Observations	1140
F-statistic	11.232

*Notes. *** $p < .01$, ** $p < .05$, * $p < .1$. The table presents the results of the estimation of the first specification. Controls include age, gender, dummies for education, region of birth. Standard errors in parentheses are corrected for clusters at the level of the villages (to address within-region correlation).*

The reduced form estimation involves performing an OLS regression, wherein the dependent variable is regressed on the instrumental variable. Notably, the integrity of the reduced form analysis remains unaffected even when the instruments are weak, since it doesn't imply the first-stage regression.

Table 2 displays the results of this approach. Each column relates to a different outcome variable. On average, the provision of mobile phone services exhibits a positive association with individuals' involvement in the political sphere of their community. The availability of mobile phone service is observed to having increased the likelihood of people attending political gatherings by 9 percent, as well as enhancing the probability of individuals reaching out to government or ministry officials to express their concerns or offer their opinions, with a 7 percent points increase. Moreover, mobile phone service increases political awareness. Indeed, individuals are 9.5 percent more likely to know about the ban of protest marches. All results are statistically significant.

Table 2
The effect of mobile phone service on different measures of citizen engagement, political participation,
and political knowledge

Dep. Var.:	Participate in political meetings (1)	Complain to Government or Ministry executive (2)	Know about prohibition of political demonstrations (3)
Mobile phone service	0.090** (0.044)	0.070*** (0.020)	0.095** (0.040)
Observations	1140	1138	1009
R-squared	0.061	0.070	0.041

*Notes. *** $p < .01$, ** $p < .05$, * $p < .1$. The table presents the results of the estimation of the second specification. Controls include age, gender, dummies for education, urban/rural status, region of birth. Standard errors in parentheses are corrected for clusters at the level of the villages (to address within-region correlation).*

The last table displays results for the structural equation, in which the availability of mobile phone services acts as an instrumental variable for mobile internet usage. The F-statistic is above the pivotal value of 10 for the first two regressions. However, this is not true for the last specification (column (3)). Even though the F-statistic is below 10 (namely 7.941), the study relies on the other assessments of the relevance of the instrument employed, as shown in columns (1) and (2) and in the first-stage regression.

Browsing the internet on the phone is found to be positively linked with all three measures of citizen engagement, political participation, and political knowledge. The results are statistically significant. However, the coefficients are very high, close to 1 (columns (1) and (2)) and even above (column (3)). This poses threats to the interpretation, as the outcome variables were coded into binary variables and coefficients greater than 1 would suggest an increase of over 100 percent attributed to mobile internet usage. Nonetheless, the robust standard errors partly explain this finding. Indeed, large asymptotic standard errors may result from instruments which are not so powerful. This also elucidates why the coefficients in Table 3 differ from those in Table 2. A high standard error indicates significant data variability or a potentially small sample size, which can make it challenging to draw definitive conclusions regarding the magnitude of the impact of mobile internet usage on the outcome variables.

Table 3
The effect of internet usage on different measures of citizen engagement, political participation,
and political knowledge

Dep. Var.:	Participate in political meetings (1)	Complain to Government or Ministry executive (2)	Know about prohibition of political demonstrations (3)
Use the internet	0.997** (0.496)	0.762*** (0.284)	1.132** (0.573)
Observations	1128	1126	996
F-statistic	11.232	10.233	7.941

*Notes. *** $p < .01$, ** $p < .05$, * $p < .1$. The table presents the results of the estimation of the third specification. Controls include age, gender, dummies for education, region of birth. Standard errors in parentheses are corrected for clusters at the level of the villages (to address within-region correlation).*

V. Limitations

There are several factors that pose challenges to the interpretation of the findings presented in this paper. Firstly, the survey upon which the study is based lacked specific geographical data, which hindered the precision of the instrumental variable. In fact, the instrumental variable employed in our analysis is based on the availability of mobile phone services that households could easily access. This information was assessed by interviewers and supervisors, therefore it's necessary to rely on their accuracy in data collection.

Consequently, the instrument utilized may not be the most ideal choice, which can result in imprecise coefficient estimates. Indeed, there is a notable discrepancy between the results obtained from the reduced form and the structural equation, with the latter yielding substantially higher coefficients. This disparity in coefficient size could be attributed to spillover effects. The availability of phone services undoubtedly influences mobile internet usage, which, in turn, impacts the outcome variables. However, it may also affect other factors that, in turn, exert effects on the outcome variables. For example, consider the influence of internet usage by family and friends: while one individual may not be using mobile internet, their family members or friends might be, and this individual could be indirectly influenced

by their activities. Consequently, the coefficients derived from the structural equation analysis should not be interpreted as indicative of the true magnitude of the effect. Instead, they should be viewed as affirmations of the directional relationship between internet usage and the outcome variables, a relationship that is already evident from the reduced form analysis.

VI. Conclusions

This paper aimed at exploring the link between mobile internet usage and both citizen engagement and political participation for the specific context of Guinea Bissau.

Using evidence from the inaugural public opinion survey conducted in the country in 2018, the study shows that Bissau-Guineans were more likely to attend political gatherings and to express their opinion over societal issues to government executives. They were also more aware of the prohibition of political riots happening in the country. Even though this relationship proved to be true and statistically significant, the magnitude of the effect is not as definite.

However, these findings provide support to the already existing literature on the topic, pointing toward the relevance of internet to improve citizen engagement and political participation, which can in turn empower virtuous cycles resulting in better governance, improved services deliver and greater accountability.

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