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A fiscal approach to the social contract in sub-Saharan African countries

Looking for opportunities to strengthen trust in government and tax compliance by analysing citizens' perception of governance

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Abstract: The COVID-19 pandemic showed that many developing countries could not respond effectively to crises due to their limited capacity to diversify their social protection responses. Social protection systems depend mainly on government tax revenue capacity. Raising domestic revenue still represents a priority for most sub-Saharan African countries, which continue to face high tax non-compliance. This research investigates whether there is a link between citizens' perceptions of governance and individual tax compliance in sub-Saharan Africa. We employ a logistic regression model and use Round 7 of the Afrobarometer, which contains information on Africans' views on democracy, governance, economic reform, civil society, and quality of life for 32 countries. Furthermore, in addition to a regression analysis, the study proposes a binary mediation analysis to investigate the direct and indirect effects of governance perception on individual tax compliance, with trust in institutions serving as a mediator. The main results suggest that perceptions of governance and attitudes towards tax compliance are positively associated, and their impact differs by country.

Key words: tax compliance, perception of governance, sub-Saharan Africa, tax revenue, regression analysis, binary mediation analysis

JEL classification: C21, C25, H26, Z18

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1 Introduction

Tax compliance in low-income countries has received increasing attention in recent decades, fuelling the debate on how to close the gap in tax receipts with developed countries (Bachas et al. 2021; Moore and Prichard 2017; Prichard et al. 2019; Santoro and Mascagni 2022). The COVID-19 pandemic highlighted the fact that most developing countries are unable to respond effectively to such emergencies and mitigate their economic impact, which in the case of the COVID-19 pandemic has resulted in income disruptions and deprivation for a significant proportion of households (Bundervoet and Davalos 2021).

While high-income countries (HICs) are beginning to recover after the pandemic, the World Bank warned, in 2021, that poverty will rise in low-income and sub-Saharan African (SSA) countries (Gerszon Mahler et al. 2021). According to the International Labour Organization (ILO), the crisis is also widening the economic gap between developed and developing countries. Low- and middle-income countries continue to suffer high levels of inactivity and significant reductions in working hours. The negative productivity growth in these countries has widened the productivity gap between advanced and developing economies, which has reached its highest level since 2005 (ILO 2021).

This difference in economic performance can be explained in part by low-income countries' limited ability to fund and diversify their policy responses. Nearly 90 per cent of low-income country (LIC) policy measures focus on social assistance (Gentilini et al. 2020). Coady (2018) argues that the difficulty these countries have in strengthening their social protection systems is due essentially to their low tax capacity. Raising more domestic revenue still represents a priority for most SSA countries (Drummond et al. 2012), which continue to face high rates of tax non-compliance (Ali et al. 2014).

While in HICs the tax-to-GDP ratio ranges around 30 per cent or higher, it sits around 15 per cent for the SSA region, with 29 countries below this threshold (Aslam et al. 2022). This gap translates into low levels of investment in public goods, such as infrastructure and governance, as well as low levels and limited coverage of social protection benefits, provoking a cycle in which low- and middle-income countries (MICs) continue to have high levels of poverty (Bachas et al. 2021).

The existing literature on taxation (Bahl and Bird 2008; Besley and Persson 2014; Kangave et al. 2016) attributes part of the blame to a culture of non-compliance. Questioning this claim, this study aims to investigate whether there is a relationship between citizens' perception of governance and individual tax compliance in SSA. In order to do this, we carry out a logistic regression using a cross-sectional dataset. Moreover, the study proposes a mediation analysis in order to investigate the direct and indirect effects of perception of governance on individual tax compliance, with trust in institutions as a mediator.

The research should contribute to the existing literature on individual tax compliance in SSA countries at three points. First, the work aims to expand knowledge on tax compliance in the SSA region. Second, it is the first to investigate individual tax compliance by considering tax-payers' narratives and proposing perception of governance as the main cause of non-compliance in the SSA region. Third, the study goes beyond the simple relationship between citizens' perception of governance and individual tax compliance by applying a mediation analysis, with trust in institutions as the mediation term.

The rest of the paper is organized as follows. Section 2 discusses the related literature on tax compliance in SSA countries. Section 3 describes the study setting and justifies why we focus on the SSA region. Section 4 provides an overview of the methodology and descriptive statistics. Section 5 explains the logistic regression analysis that we performed. Section 6 reports the logistic analysis results. Section 7 describes the binary mediation analysis and its outcomes. Section 8 concludes.

2 Previous studies on tax compliance in SSA countries

Recent literature on tax compliance provides two principal reasons why people pay taxes. The first theory argues that taxpayers are discouraged from evading taxes by police enforcement of policies and administrative checks on taxpayers. The second argument, deriving from research focused on the connection between trust and compliance (Batrancea et al. 2019; Bornman 2015; Levi and Stoker 2000; Scholz and Lubell 1998) is that a higher level of trust in the state corresponds with a higher level of willingness to pay taxes (tax morale) and consequently a higher level of tax compliance (Birskyte 2014). Citizens are more willing to pay taxes because they expect to receive public goods in return (Bräutigam et al. 2008; Daude et al. 2012; Levi 1998), thus establishing a social contract with the state (Birskyte 2014). Section 2.1 discusses the social contract established between citizens and the state, as well as its implications for taxation, Section 2.2 summarizes recent research on the relationship between trust and tax compliance, and Section 2.3 discusses the relationship between governance perception and tax compliance.

2.1 Fiscal social contract

The term fiscal social contract refers to an agreement between citizens and governments under which the former agrees to pay taxes that are used by the latter to carry out programmes and provide services for the common good (Umar et al. 2017). In the SSA region the fiscal social contract around taxation is flawed for two reasons. First, increased taxes do not appear to translate into significant improvements in the delivery of public services, and the benefits of governance appear to benefit only a select few (Commodore 2020). Second, revenue authorities' work in this region becomes more difficult when they are expected to mobilize revenues despite having limited information on how previous revenues were used. It is especially difficult to communicate with taxpayers about their tax responsibilities when there is no visible evidence of the benefits they receive from their taxes (Commodore 2020).

Recent literature (Razavi et al. 2020; Weinberg 2022) evidences that the COVID-19 pandemic has undermined the fiscal social contract in many countries. The limited capacity of many governments to respond effectively to the crisis, mitigate its shocks, or protect the most vulnerable has eroded this contract (Razavi et al. 2020). Rieger and Wang (2021) studied people's perceptions of government in 57 countries from March to April 2020 and found that the perception of a too-weak response to the crisis corresponds to a decrease in trust in government. Abumere (2021) uses Nigeria as an example of a broken fiscal social contract between taxpayers and government. Indeed, following the imposition of a lockdown and the subsequent closure of many businesses, business owners were required to honour their fiscal social contract by paying taxes despite having no source of revenue and receiving no benefit from the government.

Following a similar line of research, some authors (Denters et al. 2007; Ervasti et al. 2018; Torcal 2014) had already pointed out that poor performance and inaction of political institutions during a crisis are more important causes of declining trust than the crisis itself. Newton (2007) and

Polavieja (2013) demonstrated that economic crises, as well as rising unemployment and deteriorating living conditions, reduce people's trust in institutions.

COVID-19 in Africa has exacerbated an already weak fiscal social contract between citizens and the state. Different Afrobarometer surveys (Afrobarometer 2022; Kodiaga and Nannozi 2021; Seydou 2022) show that many citizens do not trust the government and claim that policy benefits are unfairly distributed. Given this context, citizens in SSA are understandably sceptical of their social obligation to contribute to a revenue system. They are concerned about who benefits from taxation and whether all citizens are contributing their fair share to the 'national cake' (Commodore 2020). The benefits of paying taxes are unclear in the face of poor public service delivery, massive corruption, misappropriation of funds, and unfair enforcement of tax laws (Commodore 2020).

2.2 Trust and tax compliance

Some scholars (e.g. Kangave et al. 2016) argue that the low capacity to generate adequate tax revenues in developing countries must be linked to non-compliance, especially by the wealthy. Following this line of thinking, some studies have attributed part of the blame to a culture of non-compliance among citizens in LICs (Bahl and Bird 2008; Besley and Persson 2014), maintaining that 'taxation is a strange, unwelcome and sometimes incomprehensible concept to many people in developing countries' (Burgess and Stern 1993: 799). Umar et al. (2017) reject these assertions, underlining that most of the studies on tax compliance in developing countries do not consider the taxpayers' narrative, leaving a gap in understanding of the phenomenon of tax compliance in these countries.

Some recent studies have focused on people's views in an attempt to understand what causes tax avoidance in Africa. Ali et al. (2014) conducted a cross-country analysis of taxpayers' attitudes in Kenya, South Africa, Tanzania, and Uganda, evidencing that citizens who are more satisfied with public service provision are more likely to have a tax-compliant attitude in all four countries. Jahnke and Weisser (2019) carried out a quantitative analysis of 33 African countries to investigate the impact of perceived corruption in the nation on citizens' tax morale, concluding that this has a negative impact. Additionally, Boly et al. (2020) addressed the relationship between corruption and tax compliance in Africa using Afrobarometer data and pointed out that quality of governance can influence tax morale.

Isbell (2017) showed that more than 60 per cent of Africans agree that taxes are essential for development and must be paid, but at the same time do not trust the tax department. Indeed, tax authorities are the second-least trusted among the state institutions in this region (Graham and Bamba 2020).

2.3 Perception of governance and tax compliance

Although various factors might influence tax compliance, the importance of governance should not be underestimated (Everest-Phillips and Sandall 2009). Alm et al. (1993) propose that, when people are satisfied with the level and quality of political goods financed by their tax investment, their tax compliance levels, *ceteris paribus*, are likely to increase. Khwaja et al. (2020) evidence that a low willingness to pay taxes is a symptom of citizens' disengagement due to inadequate service provision.

Everest-Phillips and Sandall (2009) underline that governance and taxation influence each other. Domestic taxation systems that are sound and fair promote good governance because raising taxes efficiently requires the consent of the tax-paying population. Alabede et al. (2011) assert that better tax systems with good governance improve compliance, whereas the failure of the government to

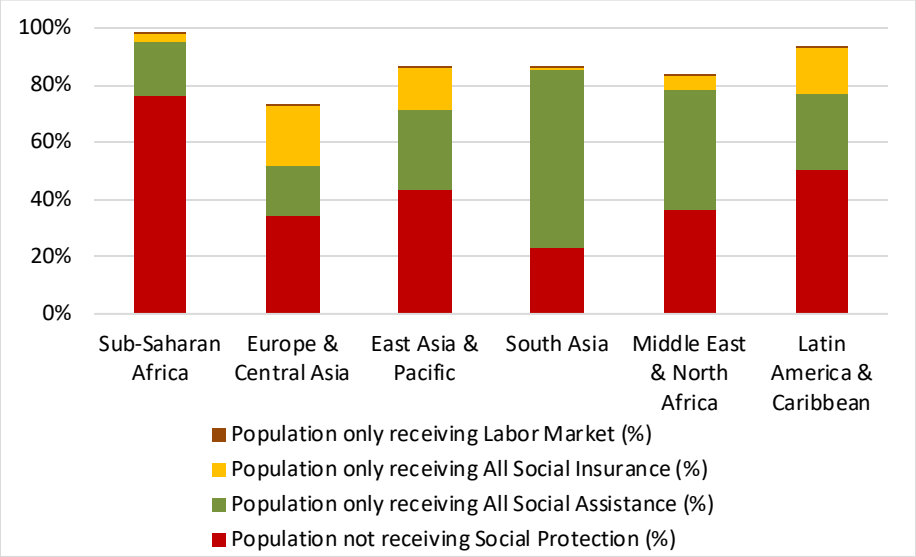
provide citizens with public amenities and infrastructure may induce them not to comply with tax provisions.

Torgler et al. (2007) demonstrate how governance has an impact on tax compliance. Cummings et al. (2009) find that individual perceptions of good governance increase tax compliance. However, the relationship between tax compliance and quality of governance, especially in developing countries, remains understudied in the literature (Sebele-Mpofu 2020). According to Everest-Phillips and Sandall (2009: 3), this is the 'least understood but most fundamental dimension of tax compliance'.

3 Study setting

Of the world's regions, SSA has the largest share of the lowest quintile of the population (76.3 per cent) not covered by social protection (Figure 1).

Figure 1: Share of lowest quintile of population covered by social protection and labour market services



Note: the bars do not add up to 100% because the share of the population that receives more than one type of social protection is excluded.

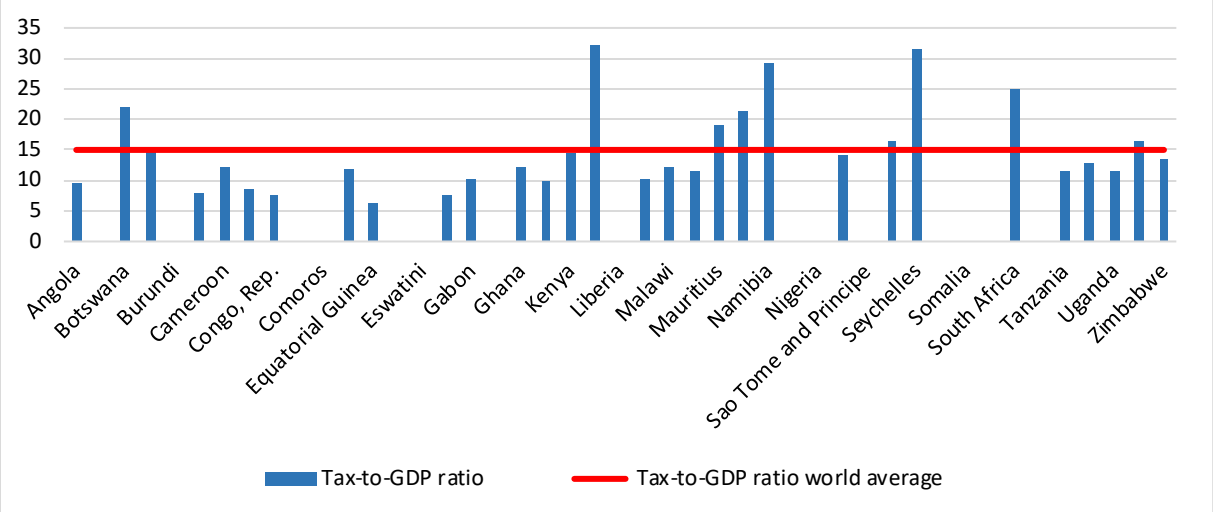
Source: authors' illustration based on World Bank (2021) data.

Only 19 per cent of the population in the lowest quintile (poorest) receive social assistance and 3 per cent social insurance. According to the World Bank's ASPIRE database, 72.4 per cent of the poorest are not covered by social protection. When compared with the other regions shown in Figure 1, this translates into the lowest poverty gap and poverty headcount reduction in the first quintile (World Bank 2021).

Ever since the UN created the category of least developed countries (LDCs) in 1971, SSA countries have dominated the list (Essoungou 2011). According to the World Bank, the slow progress in SSA is one reason for the global slowdown in extreme poverty reduction. Indeed, the poverty rate in SSA has not fallen fast enough to keep up with the region's population growth, and 433 million Africans were estimated to be living in extreme poverty in 2018, up from 284 milliom in 1990 (Schoch and Lakner 2020).

According to the World Bank (2022), the SSA region has a tax-to-GDP ratio that is lower than the global average of 15 per cent, which is normally associated with growth and development. In 2019, only 10 SSA countries (Botswana, Burundi, Lesotho, Mauritius, Mozambique, Namibia, Senegal, Seychelles, South Africa, and Zambia) were above this threshold (Figure 2).

Figure 2: Tax-to-GDP ratio in SSA countries



Source: authors' illustration based on World Bank (2022) data.

Low tax morale and limited capacity to tax income have been identified as the two main causes of the low tax-to-GDP ratio in the SSA region (Bastagli 2015). Although the countries of this region have made significant progress in tax revenue collection in recent years, they still face important difficulties. Income tax represents the main source of revenue, but in terms of revenue share it remains below the world average for 37 countries of this geographic area.

According to the World Bank (2022), the low levels of tax revenue in the SSA region can be traced back to colonial legacies. Governments adopted a taxation system inherited from developed countries but unsuitable for the African context, where informality is high. Also, imports consist primarily of necessities such as food and fuel, which are difficult to tax (Graham and Bamba 2020). Furthermore, recent research evidences that corruption (Jahnke and Wessier 2019), bureaucracy quality, government effectiveness, and political stability affect tax compliance (Fjeldstad et al. 2014; Günay and Topal 2021). According to the most recent findings of the International Monetary Fund, COVID-19 has exacerbated the already complex situation of the SSA region, adding financing pressure and collapsing tax and non-tax revenues. Indeed, since the beginning of the pandemic, most SSA countries have experienced a contraction of their tax revenues (Aslam et al. 2022).

A low level of tax revenue also has implications for a country's social protection system. Indeed, LICs and MICs spend lower shares of total social spending on social protection than HICs. Durán-Valverde et al. (2019) show that LICs and MICs faced a US$527 billion gap[1] in their social protection financing even before the pandemic.

In the SSA context the weakness of institutional capacity to design and deliver (especially at scale) social protection programmes is still a fundamental problem, especially in fragile contexts,

[1] The financing gap is the difference between the estimated total cost of a universal package of four SPF benefits (2.4 per cent of GDP in 2019; see Table A2 in the Appendix) and estimated social assistance expenditure in the same year (Durán et al. 2019).

provoking a paradox: the more need for social protection there is, the less the government is capable of delivering it (Holmes and Lwanga-Ntale 2012). According to the World Bank (2022), the human capital and infrastructure gap in SSA is one of the largest in the world. The region is currently using only 40 per cent of its potential human capital due to incomplete education and poor health among the population. If the existing infrastructure gap was closed, GDP per capita would increase by 2.6 per cent per annum. However, the World Bank's estimations suggest that Africa's infrastructure would need to exceed US$93 billion per year in the next decade to close that gap, and even if the countries increased spending, their governments would need to generate almost US$20 billion of fiscal revenues for investment in infrastructure (Graham and Bamba 2020).

African countries, especially those in SSA, present very low coverage in their social protection schemes, which are largely confined to workers in the formal economy. The difficulties they have in targeting people who need support, including the most vulnerable, reveal the low capacity to provide adequate social protection in these countries. In addition, governance and administrative problems in some existing social security schemes undermine trust and public support for social security (ILO n.d.).

4 Methodology and descriptive statistics

This study aims to contribute to understanding of individual tax avoidance by investigating the strength of the fiscal social contract established between citizens and governments in SSA. Specifically, it attempts to answer the following question: 'Does citizens' willingness to pay taxes depend on their perception of government's performance related to social and tax policy in sub-Saharan Africa?'

The analysis uses Round 7 of the Afrobarometer Survey, which refers to the year 2018 (the most recent available round), to estimate the likelihood of an individual paying taxes in relation to their perception of governance. The Afrobaromter is the most reliable source of data, given the general difficulty of finding high-quality cross-country surveys at the individual level in the SSA region. Indeed, Round 7 consists of a survey at the individual level, conducted face to face, which collected information on Africans' views on democracy, governance, economic reform, civil society, and quality of life. Afrobarometer surveys are based on national probability samples and contain country-specific questions while maintaining the precise wording of questions to preserve the comparability of results across countries and over time. The samples vary between 1,200 and 2,400 respondents of at least 18 years of age.

Round 7 offers a unique merged dataset that includes information on 32 SSA countries: Benin, Botswana, Burkina Faso, Cabo Verde, Cameroon, Côte d'Ivoire, Eswatini, Gabon, Gambia, Ghana, Guinea, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritius, Mozambique, Namibia, Niger, Nigeria, Sao Tome and Principe, Senegal, Sierra Leone, South Africa, Sudan, Tanzania, Togo, Uganda, Zambia, and Zimbabwe.

The dataset has 42,735 observations and contains demographic information about respondents' employment status, education, sex, age, and whether they live in urban or rural areas. Because the dataset does not provide information on individual income, the study built a wealth indicator using a proxy means test developed by Jahnke and Weisser (2019). The proxy variable includes information on whether respondents own a radio, television, automobile, or mobile phone, whether they have running water and a toilet, and what type of roof material is used in their homes. A person is considered poor if they lack three or more of these variables.

We identify as the dependent variable question 38C: 'For each of the following statements, please tell me whether you disagree or agree: people must pay taxes', answers to which are assigned a value of 0 if an individual avoids paying taxes and 1 otherwise. In line with other studies, such as Jahnke and Weisser (2019), we use this question as a proxy for tax compliance. If the respondent selected the answer indicating tax avoidance, a value of 0 is assigned to that individual for the dependent variable. Question Q26D—'Here is a list of actions that people sometimes take as citizens when they are dissatisfied with government performance. […] please tell me whether you, personally, have done any of these things during the past year. If not, would you do this if you had the chance: Refused to pay a tax or fee to government?'—has been selected as the main independent variable. This variable assigns a 0 to those who indicated a refusal to pay taxes and a 1 to those who did not.

Two additional independent variables are included in the model: trust in institutions (Q43A, B, and D) and opinion of government services (Q49B, E, and M). The following demographic variables are also added: gender, age, education, employment status, urban vs. rural.

Table 1 displays the descriptive statistics of all the variables included in the logistic regression model for Round 7. Table A1 in the Appendix shows the frequency and percentage of each socio-demographic variable and Table A2 reports the variables used to build the wealth indicator.

Table 1*:* Descriptive statistics

Variable	Mean	Minimum	Maximum	Observations
(1) Socio-demographic characteristics				
Gender	-	0	1	29,049
Age	41.49	18	106	29,049
Education	-	0	9	29,049
Occupational status	-	0	13	29,049
Country	17.61	1	34	29,049
Urban	0.57	0	1	29,049
Wealth	3.76	0	6	29,049
Individual tax compliance (dependent)	0.79	0	1	29,049
(2) Perception of governance				
Opinion on governance	0.71	0	1	29,049
(3) Other variables				
Trust in institutions	0.51	0	1	29,049

Source: authors' calculation based on Afrobarometer Round 7 (2018) data.

We employ a logistic regression analysis on Afrobarometer Round 7 to examine the likelihood of an individual paying taxes depending on their perception of governance in relation to social and tax policies. To improve consistency and confirm the logistic regression outcomes, the analysis applies the same model to Round 6 (Table A6). This step seeks to confirm that what was observed in Round 7 is not a single and distinct phenomenon that occurs at a particular time.

Reduced trust in institutions can be explained by the perception of governance. Therefore, following the analysis performed by Jahnke and Weisser (2019), we also conduct a binary mediation analysis to propose a mechanism by which the perception of governance may influence tax compliance. Using this framework, we can first show whether lower levels of trust in institutions are associated with lower tax compliance. The mediation analysis also enables us to separate the direct and indirect effects of perception of governance via trust in institutions, as well as the quantification of the effects' relative impact.

However, the analysis presents some limitations. The Afrobarometer Survey is not restricted to taxpayers but includes any person at least 18 years old. This may reduce the reliability of the results because the dataset focuses on citizens' perceptions of governance rather than taxpayers' perceptions of governance and individual tax compliance. Other Afrobarometer surveys, on the other hand, have been used for similar studies with valid and trustworthy results.

5 Logistic regression model analysis

The study conducts a logistic regression analysis to investigate the likelihood of an individual paying taxes on the basis of their perception of governance related to the tax and social systems in the SSA region. Even though the countries under study have different population characteristics, it has been possible to identify a unique logistic regression model capable of measuring this relationship in all countries.

Given the variables described in the previous section, from the general logistic regression model equation

$$E(Y) = P = \frac{\exp\ (\beta o + \beta 1x)}{1+\exp\ (\beta o + \beta 1x)} \quad (1)$$

we built the following equation for our logistic regression model:

$$E(Y) = P = \frac{\exp\ (\beta o + \beta 1x + \beta 2x + \beta 3x + \beta 4x + \beta 5x + \beta 6x + \beta 7x + \beta 8x + \beta 9x + \beta 10x)}{1+\exp(\beta o + \beta 1x + \beta 2x + \beta 3x + \beta 4x + \beta 5x + \beta 6x + \beta 7x + \beta 8x + \beta 9x + \beta 10x)} \quad (2)$$

where Y = taxes; 1 = opinion on governance; 2 = trust in institutions; 3 = government service score; 4 = wealth score; 5 = age; 6 = gender; 7 = urban/rural; 8 = education; 9 = occupational status; 10 = country.

6 Logistic regression results

Table 2 shows the results of our regression analysis, reporting the variables used, their coefficients, the standard deviation, p-value, and coefficient of interval.[2]

The null hypothesis in the analysis is that citizens' perceptions of governance in relation to social and tax systems influence individual tax compliance in SSA countries. The null hypothesis is rejected because the p-value of the variable perception of governance is statistically significant at the 0.01 level of significance. This means that in SSA countries, the relationship between perception of governance and individual tax compliance is statistically significant. That is, the more favourable the perception of governance, the more likely individuals are to pay their taxes.

[2] See Table A7 in the Appendix for the logistic regression model results specifying the dummy variables: country, education, and occupational status.

Table 2: Logistic regression model results

Individual tax compliance	Coef.	St. err.	p-value	Sig.
Perception of government	.282	.035	0	***
Trust in institutions	.764	.041	0	***
Government service score	-.118	.02	0	***
Wealth	.136	.012	0	***
Age	.001	.001	.204	
Female	-.047	.033	.157	
Urban	-.193	.036	0	***
Country	.019	.002	0	***
Education	.006	.004	.110	
Occupational status	.001	.001	.127	
Constant	.305	.107	.004	***

Note: age, country, gender, education, urban/rural, and occupational status fit effects; *** p<.01, ** p<.05, * p<.1

Source: authors' calculation based on Afrobarometer Round 7 (2018) data.

From here on, all the results highlighted in the text are statistically significant (Table 2 shows the significance level of each variable). The main independent variable, perception of governance, has a positive impact on the dependent variable. Indeed, holding all other independent variables constant, we expect a 0.282 increase in the log-odds of individual tax compliance if the opinion on governance is positive. Also, trust in institutions has a positive impact on the dependent variable. For any additional unit of trust in institutions, we expect a 0.764 increase in individual tax compliance.

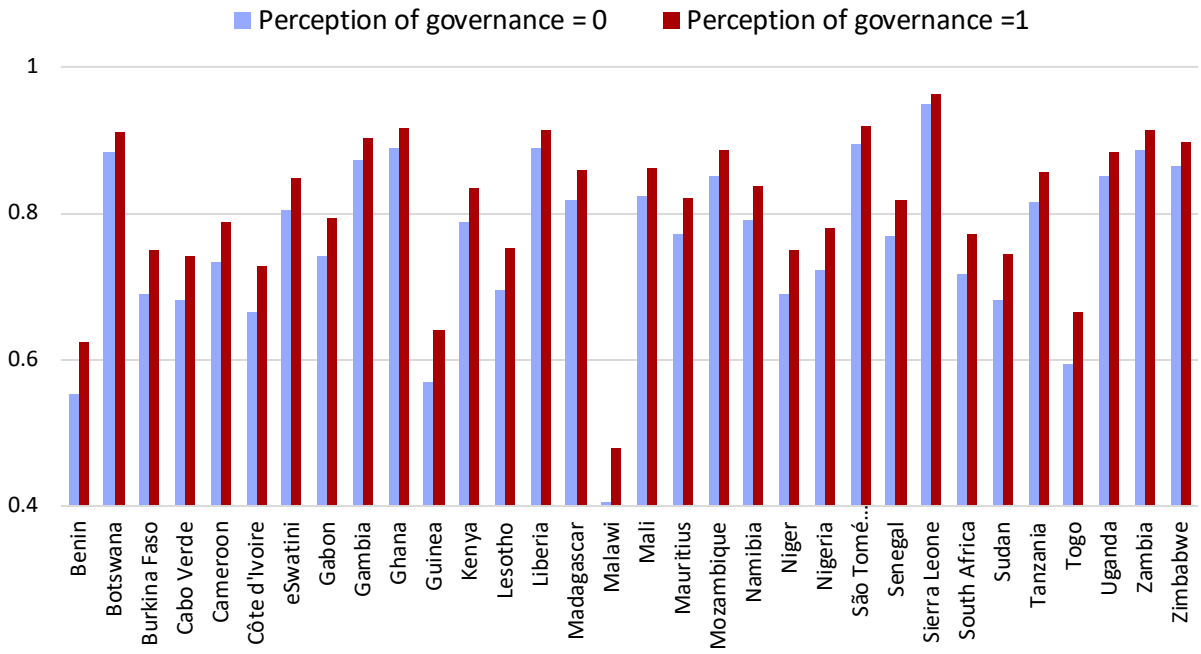
The opinion on government score indicates how easy it is for an individual to obtain a service from the government (with 1 indicating very easy and 4 indicating very difficult), and it has a negative effect on individual tax compliance. This means that if it is much more difficult for an individual to receive a government service, the log-odds of the dependent variable decrease by 0.118.

The variable wealth score, which is a proxy for individual income, is statistically significant. Holding all other independent variables constant, we expect a 0.136 increase in the log-odds of individual tax compliance for each additional unit of wealth score. The variable urban has a negative effect on the dependent variable. This means that for every additional unit of this variable (moving from rural to urban) we can expect a -0.193 decrease in the log-odds of the dependent variable, assuming all other variables remain constant. The variable country has a coefficient of 0.19. [3] All the other variables are not statistically significant.

Regarding this last result, we wanted to examine deeper the relationship between individual tax compliance and perception of governance by country. We estimated the probability of paying taxes for each level of perception of governance per each country. The line plot graph in Figure 3 shows the probability of tax compliance for both levels of the main independent variable by country.

[3] We ran a similar model without the variable country to see if any changes occurred (Table A3 in the Appendix). We noticed that the coefficients decreased slightly, but there was no statistical significance change. Furthermore, the pseudo-R squared decreased.

Figure 3: Probability of paying taxes by perception of governance across SSA countries



Source: authors' calculation based on Afrobarometer Round 7 (2018) data.

Figure 3 shows that positive perceptions of governance among citizens (red bars) are above negative perceptions (blue bars) for all of the SSA countries included in the analysis. We can also see that the likelihood of not paying taxes if citizens' perception of governance is negative (equal to zero) varies greatly across countries. Indeed, if the perception of governance is negative, the likelihood of paying taxes in Sierra Leone is nearly 100 per cent, while in Malawi it is just 40 per cent. This distinction also appears when the perception of governance is positive (equal to 1). In Malawi, the probability of paying taxes is 48 per cent if the perception of governance is positive, whereas in Sierra Leone, the probability is 96 per cent. When we talk about sub-Saharan Africa, we should consider the heterogeneity of the countries' settlements and their development trajectories (Cloutier 2022).

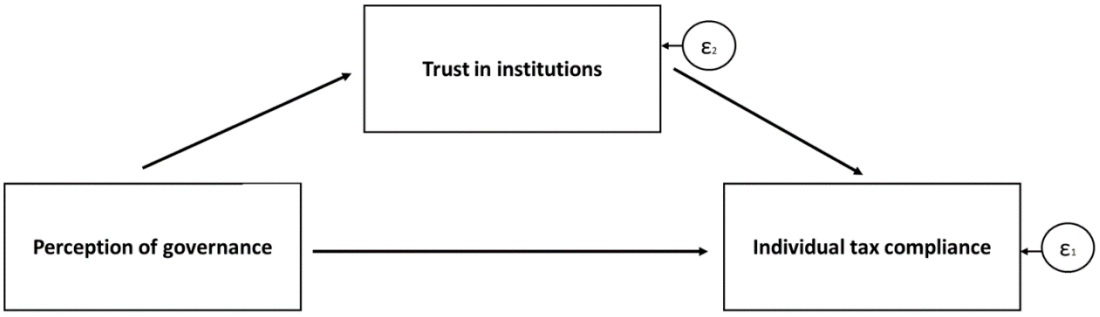
In order to check the robustness of the analysis, the following tests were performed and successfully passed: multicollinearity test, significant error test, Hosmer-Lemeshow test, Pearson chi-square test, and post-estimation and classification results. In addition, we conducted the analysis with robust standard error and found that the coefficients changed slightly but the p-value remained almost the same. Indeed, neither the nature of the variables effects nor their significance level changed.

7 Mediation analysis

Following the analysis presented in Jahnke and Weisser (2019), the study employs a binary mediation analysis to propose a mechanism through which the perception of governance can influence tax compliance. We chose trust in institutions as the mediator on the basis of previous studies (Isbell 2017; Jahnke and Weisser 2019). Specifically, this framework allows us to examine whether higher levels of trust in institutions are also associated with higher tax compliance and thereby to separate the direct association between governance perception and tax compliance from the indirect effects via trust in institutions. Perception of governance is considered to be an

exogenous factor that can influence individual tax compliance both directly and indirectly. The underlying scheme of the mediation analysis is depicted in Figure 4.

Figure 4: Framework for binary mediation analysis



Source: authors' illustration.

Mediation analysis allows for the de-composition of the observed correlation (c) between governance perception (X) on tax compliance (Y), using three equations that are interrelated in the form of a structural estimation model (SEM). The total effect is shown in Equation 3. In addition to the direct effect, governance perception has an indirect effect on tax compliance through a mediator (M), trust in institutions. Equation 4 estimates the association between governance perception and the mediator, while Equation 5 estimates both the direct and indirect associations between the mediator and tax compliance. The indirect effect captures the impact of both measures of trust in institutions.

$$Y = i_1 + cX + \varepsilon_1 \tag{3}$$

$$M_1 = i_3 + a_1 X + \varepsilon_3 \tag{4}$$

$$Y = i_2 + c'X + b_1 M_1 + \varepsilon_2 \tag{5}$$

The mediation analysis suggests that perception of governance and trust in institutions are both significantly correlated with individual tax compliance. Table 3 displays the results, with models 1 and 2 referring to Equations 3 and 5.

Table 3: Mediation analysis

Binary mediation model	Coefficient	Standard error
(1) Trust in institutions		
Perception of governance	0.51566***	(0.0045)
Constant	0.47260***	(0.0038)
(2) Individual tax compliance		
Trust in institutions	0.10114***	(0.0047)
Perception of governance	0.46108***	(0.0044)
Constant	0.71556 ***	(0.0043)
(3) Mean		
Perception of governance	0.71561***	(0.0022)
N	42,675	
Pseudo R^2	0.000	
Direct effect of perception of governance on individual tax compliance = 0.46		
Indirect effect of perception of governance on individual tax compliance = 0.052		
Total effect of perception of governance on individual tax compliance = 0.512		

Note: significance levels: *p<0.1, **p<0.05, ***p<0.01

Source: authors' illustration based on Afrobarometer Round 7 (2018) data.

Perception of governance has a total effect on individual tax compliance of 0.98, while its direct effect on is 0.46. The indirect effect of perception of governance on tax compliance through trust in institutions is equal to 0.052. All results are statistically significant.

8 Discussion

This paper provides evidence that citizens' perceptions of governance in relation to social and tax systems influence individual tax compliance. A positive perception of governance increases a citizen's willingness to pay taxes. Furthermore, we decomposed the total effect of the perception of governance by looking separately at its direct and indirect effects—the effect that perception of governance has directly on tax compliance and the effect of the perception of governance on tax compliance through trust in institutions, respectively. We found that perception of governance can affect trust in institutions, which in turn can affect tax compliance.

The analysis also shows that the majority of demographic variables have no effect on a citizen's likelihood of paying taxes. Age, gender, education, and occupation are not significant. Citizens who are wealthier, on the other hand, are more likely to pay taxes than poorer citizens, while citizens who live in urban areas are less likely to pay taxes than those who live in rural areas. The effects of socio-demographic variables on tax compliance remain unclear. While some studies (Ahmed and Braithwaite 2004; Bobek et al. 2007; Kastlunger et al. 2010; Wenzel 2007) show that their impact is significant, others (Adimassu and Jerene 2015; Ashby et al. 2009; Braithwaite and Ahmed 2005; Muehlbacher et al. 2011; Richardson 2006) indicate the opposite. Hofmann et al. (2017) state that socio-demographic variables in SSA are, nonetheless, weak predictors of tax compliance.

Our analysis shows that citizens who trust in institutions are more likely to pay taxes (trust in institutions has the highest coefficient in the logistic model), whereas those who have had difficulty receiving government services are less likely to pay taxes. Furthermore, our research shows that perceptions of governance vary significantly across countries, with positive perceptions outweighing negative perceptions in all 32 SSA countries.

We also investigate which perceptions of governance and trust in institutions (the President of the State, the Assembly of the State, the Tax Authority, or the Local Government) may jointly impact tax compliance. Approximately 90 per cent of the total effect observed is a direct effect, e.g. attributable to a negative perception of governance. This implies, eventually, that the adverse consequences of individual perception of governance do not solely affect trust in institutions but undermine the willingness to pay taxes in general.

These findings have significant implications for national governments' goal of ensuring that their citizens pay taxes. Our analysis of the relationship between citizens' perceptions of governance related to social and tax systems and tax morale finds that poor people who have had difficulty receiving government services and consequently do not trust institutions are more likely to avoid paying taxes. Countries with low levels of trust in institutions and poor perceptions of governance should perhaps revise their targeting techniques, improve their information campaigns and/or ensure greater transparency in how tax revenues are spent.

The significance of perceptions of governance in citizens' attitudes toward tax payments necessitates additional research in this area. It would be interesting to investigate the relationship between governance perception and individual tax compliance during the COVID-19 crisis to ascertain whether the pandemic affected this relationship. Furthermore, while the Afrobarometer

survey has some significant advantages, it does not include data only from taxpayers, which may affect the analysis. Also, although the analysis focuses on country comparison, all the data were collected at a specific time. Because we could not compare data from different years, we were not able to examine whether the relationship under study repeats across time. Further study of how this relationship has changed over time would therefore be valuable.

Determining which types of perception of governance factors elicit the strongest reactions would also be useful in determining appropriate policy recommendations to improve tax morale and compliance. Finally, given the heterogeneity that characterizes the SSA region and since this study does not pay specific attention to each country context that may be determinant in perceptions of governance and trust in institutions, an interesting additional step would be to focus deeper on some single countries and examine whether any macro aspects (e.g. system of government, media information, and public expenditure on social protection) might influence the analysis.

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Appendix

Table A1: Frequency and percentage of socio-demographic variables

Variables	Frequency	Percentage
Age		
18	1,434	3.36
25	10,076	23.58
35	12,136	28.4
45	8,283	19.38
55	5,150	12.05
65	3,379	7.91
85	2,132	4.99
95	96	0.22
106	49	0.11
Gender		
Male	21,339	49.93
Female	21,396	50.07
Urban vs. rural		
Urban	18,229	42.66
Rural	24,506	57.34
Education		
No formal schooling	6,557	15.34
Informal schooling only	1,941	4.54
Some primary schooling	6,340	14.84
Primary school completed	5,620	13.15
Some secondary school / high school	8,815	20.63
Secondary school / high school complete	7,078	16.56
Post-secondary qualifications	2,269	5.31
Some university	1,548	3.62
University completed	1,976	4.62
Post-graduate	347	0.81
Refused	102	0.24
Don't know	95	0.22
Missing	47	0.11
Occupational status		
Never had a job	4,240	9.92
Student	4,134	9.67
Housewife / homemaker	3,989	9.33
Agriculture / farming / fishing / forestry	10,895	25.49
Trader / hawker / vendor	4,735	11.08
Retail / shop	1,359	3.18
Unskilled manual worker	3,221	7.54
Artisan or skilled manual worker	3,045	7.13
Clerical or secretarial	532	1.24
Supervisor / foreman / senior manager	391	0.91
Security services	733	1.72
Mid-level professional	2,186	5.12
Upper-level professional	779	1.82
Other	2,253	5.27
Refused	134	0.31
Don't know	63	0.15
Missing	46	0.11

Source: authors' calculation based on Afrobarometer Round 7 (2018) data.

Table A2: Wealth indicator

Variable	Code	Code
Personally owns a radio	1 = Yes	0 = No
Personally owns a TV	1 = Yes	0 = No
Personally owns a motor vehicle, car, or motorcycle	1 = Yes	0 = No
Personally owns a mobile phone	1 = Yes	0 = No
Source of water	1 = Inside the house or compound	0 = Outside the compound
Toilet or latrine	1 = Inside the house or compound	0 = Outside the compound or not available
Roof material	1 = Metal, tin or zinc, tiles, shingles	0 = Thatch or grass, plastic sheets, asbestos, multiple materials

Source: authors' construction based on Afrobarometer Round 7 (2018) data.

Table A1: List of variables for logit regression model in Afrobarometer Round 6

Variable	Question	Coding
Taxes	Q44: Do you agree, partially agree, disagree, or partially disagree with the following statements: 1: Citizens must pay their taxes to the government in order for our country to develop. 2: The government can find enough resources for development from other sources without having to tax the people. Q75: For each of the following, please tell me whether you think the action is not wrong at all, wrong but understandable, or wrong and punishable A: Not paying for the services they receive from government B: Not paying the taxes they owe on their income	Taxes equals to 0 if the respondent chose option 3 (agree with statement 2) or 4 (agree very strongly with statement 2) for Q44; or option 1 or 2 for Q75A or Q75B. Taxes equals to 1 if 0 if the respondent chose option 1 (agree very strongly with statement 2) or 2 (agree with statement 1) for Q44; or option 2 (wrong but understandable) or 3 (wrong and punishable) for Q75A or Q75B.
Opinion on government (opinion_on_gov)	Q66: How well or badly would you say the current government is handling the following matters, or haven't you heard enough to say? B: Improving the living standards of the poor E: Narrowing gaps between rich and poor G: Improving basic health services H: Addressing educational needs I: Providing water and sanitation services J: Ensuring everyone has enough to eat	Opinion on government is the arithmetic mean (the average) across all the variables.
Wealth score (wealth_score)	Q93A: What is your main source of water for household use? Q93B: Do you have a toilet or latrine? Q105: What is the roof of your home or shelter made of? Q91: Which of these things do you personally own? A: Radio C: Motor vehicle or motorcycle D: Mobile phone	The wealth score is the sum of the values of each variable. For the coding process please refer to Jahnke and Weisser (2019).
Trust in institutions (trust_in_institutions)	Q52: How much do you trust each of the following, or haven't you heard enough about them to say? A: The President of the Republic B: Assembly of the Republic D: The Tax Authority E: Your Local Government	Trust in institutions is is the arithmetic mean (the average) across all the variables.
Government service score (gov_service_score)	Q55A: How easy or difficult was it to obtain the services you needed from teachers or school officials? Q55C: How easy or difficult was it to obtain the medical care you needed? Q55G: How easy or difficult was it to obtain the services you needed?	Government service score is the arithmetic mean (the average) across all the variables.

Variable	Question	Coding
Tax system efficiency (tax_system_efficiency)	Q70: Based on your experience, how easy or difficult is it to do each of the following? A: To find out what taxes and fees you are supposed to pay to the government? B: To avoid paying the income or property taxes that you owe to government?	Tax system efficiency equals to 0 if the respondent chose option 1 or 2 of Q70A or option 3 or 4 of Q70B. Tax system efficiency equals to 1 if the respondent chose option 3 or 4 of Q70A or option 1 or 2 of Q70B.
Increasing taxes (increasing_taxes)	Q65C: If the government decided to make people pay more taxes or user fees in order to increase spending on public health care, would you support this decision or oppose it?	Strongly oppose Somewhat oppose Neither support nor oppose Somewhat support Strongly support It depends
Gender	Q101: What is your gender?	Gender equals to 0 if male and 1 if female
Urban/rural (urbrur)	Q115: Do you come from a rural or urban area?	Urban/rural equals to 0 if urban and 1 if rural
Education	Q97: What is your highest level of education?	No formal schooling Informal schooling only (including Koranic schooling) Some primary schooling Primary school completed Intermediate school or some secondary school / high school Secondary school / high school completed Post-secondary qualifications, other than university e.g. a diploma or degree from a polytechnic or college Some university University completed Post-graduate
Occupational status (occupation_statuus)	Q96A: What is your occupational status?	Never had a job Student Housewife / homemaker Agriculture / farming / fishing / forestry Trader / hawker / vendor Retail / shop Unskilled manual worker (e.g., cleaner, labourer, domestic help) Artisan or skilled manual worker (e.g., electrician, mechanic) Clerical or secretarial Supervisor / foreman / senior manager Security services (police, army, private security) Mid-level professional (e.g., teacher, nurse, government officer) Upper-level professional (e.g., banker/finance, doctor, lawyer, engineer, accountant, professor, senior government officer)

Variable	Question	Coding
Region	Select appropriate code for Region/Province	List of regions of the country
Q95	Q95: Do you have a job that pays a cash income? *[If yes, ask:]* Is it full-time or part-time? *[If no, ask:]* Are you presently looking for a job?	No (not looking) No (looking) Yes, part time Yes, full time

Source: authors' illustration based on Afrobarometer Round 6 (2016) data.

Table A2: List of variables for logit regression model in Round 7

Variable	Question	Coding
Tax	Q38: For each of the following statements, please tell me whether you disagree or agree? C: The tax authorities always have the right to make people pay taxes.	Tax equals to 0 if the respondent chose option 1 or 2 of Q38C. Tax equals to 1 if the respondent chose option 3 or 4 or 5 of question Q38C
Opinion on government (opinion_on_gov)	Q26: Here is a list of actions that people sometimes take as citizens when they are dissatisfied with government performance. For each of these, please tell me whether you, personally, have done any of these things during the past year. D: Refused to pay a tax or fee to government.	Opinion on government equals to 0 if the respondent chose option 1 or 2 or 3 or 4 of Q26D. Opinion on government equals to 1 if the respondent chose option 0.
Trust in institutions (thrus_in_institutions)	Q43: How much do you trust each of the following, or haven't you heard enough about them to say? A: The President B: Parliament D: Your District Council	Trust in institutions is the arithmetic mean (the average) across all the variables.
Government service score (gov_service_score)	Q49: Now I would like to talk to you about experiences that some people have in accessing certain essential government services. B: How easy or difficult was it to obtain the services you needed from teachers or school officials? E: How easy or difficult was it to obtain the medical care you needed? M: How easy or difficult was it to obtain the services you needed?	Government service score is the arithmetic mean (the average) across all the variables.
Wealth score (wealth_score)	Q92A: What is your main source of water for household use? Q92B: Do you have a toilet or latrine ? Q105: What is the roof of your home or shelter made of?	The wealth score is the sum of the values of each variable. For the coding process please refer to Jahnke and Weisser (2019).
Occupational status (occupation_status)	Q95A: What is your main occupation?	Never had a job Student Housewife / homemaker Agriculture /farming / finishing / forestry Trader / hawker / vendor Retail / shop

Variable	Question	Coding
		Unskilled manual worker (e.g., cleaner, labourer, domestic help, unskilled manufacturing worker) Artisan or skilled manual worker (e.g., electrician, mechanic, machinist, skilled manufacturing worker) Clerical or secretarial Supervisor / foreman / senior manager Security services Mid-level professional (e.g. teacher, nurse) Upper-level professional (e.g., banker/finance, doctor, lawyer, engineer, accountant, professor, senior government officer)
Age	Q1: How old are you?	Respondent's age
Gender	Q86A: What is your gender?	Gender equals to 0 if male and 1 if female.
Urban/rural (urbrur)	Q115: Do you come from a rural or urban area?	Urban/rural equals to 0 if urban and 1 if rural
Education	Q97: What is your highest level of education?	No formal schooling Informal schooling Some primary schooling Primary school completed Intermediate school or some secondary school/high school Secondary school/high school completed Post-secondary qualifications Some university University completed Post-graduate

Source: authors' illustration based on Afrobarometer Round 7 (2018) data.

Table A3: Logistic regression model for Round 7 without the variable country

Tax	Coef.	St. err.	t-value	p-value	[95% conf.	interval]	Sig.
Perception on gov.	.286	.035	8.17	0	.217	.354	***
Trust in institutions	.758	.041	18.69	0	.679	.838	***
Gov._service_score	-.115	.02	-5.69	0	-.154	-.075	***
Wealth	.124	.012	10.05	0	.099	.148	***
Age	.001	.001	1.02	.31	-.001	.003	
Gender	-.051	.033	-1.53	.125	-.116	.014	
Urban/Rural	-.19	.036	-5.28	0	-.26	-.119	***
Education	.008	.005	1.66	.097	-.001	.017	*
Occupation	.001	.001	1.43	.154	0	.003	
Constant	.687	.101	6.79	0	.489	.885	***
Mean dependent var.		0.798		SD dependent var		0.402	
Pseudo r-squared		0.028		Number of obs		29081	
Chi-square		643.358		Prob > chi^2		0.000	
Akaike crit. (AIC)		28489.185		Bayesian crit. (BIC)		28571.964	

Note: *** p<.01, ** p<.05, * p<.1

Source: authors' calculation based on Afrobaroemter Round 7 (2018) data.

Table A4: Logistic regression model for Round 6

Individual tax compliance	Coef.	St. err.	t-value	p-value	[95% conf.	interval]	Sig.
Perception on gov.	.025	.023	1.10	.27	-.02	.071	
Trust in institutions	.262	.041	6.39	0	.181	.342	***
Gov. service score	-.092	.018	-5.15	0	-.127	-.057	***
Increasing taxes	.116	.009	13.43	0	.099	.133	***
Tax system efficiency	-.103	.034	-3.05	.002	-.169	-.037	***
Wealth	.02	.011	1.76	.078	-.002	.042	*
Age	.008	.001	8.16	0	.006	.009	***
Gender	-.117	.029	-4.01	0	-.175	-.06	***
Urban/Rural	-.162	.032	-5.02	0	-.225	-.098	***
Education	.004	.004	1.02	.308	-.004	.012	
Occupation	-.001	.001	-1.00	.316	-.003	.001	
Country	-.011	.001	-7.80	0	-.014	-.008	***
Employment	-.169	.031	-5.52	0	-.229	-.109	***
Constant	-1.048	.112	-9.34	0	-1.268	-.828	***
Mean dependent var.		0.297		SD dependent var		0.457	
Pseudo r-squared		0.019		Number of obs		29315	
Chi-square		509.628		Prob > chi^2		0.000	
Akaike crit. (AIC)		35046.687		Bayesian crit. (BIC)		35162.689	

Note: *** p<.01, ** p<.05, * p<.1

Source: authors' calculation based on Afrobaroemter Round 6 (2016) data.

Table A5: Logistic regression model for Round 7 specifying dummies variables

Tax	Coef.	St. err.	t-value	p-value	[95% conf.	interval]	Sig.
Perception on gov.	.303	.037	8.14	0	.23	.376	***
Trust in institutions	.604	.044	13.78	0	.518	.69	***
Gov. service score	-.108	.021	-5.05	0	-.15	-.066	***
Wealth	.078	.015	5.35	0	.049	.106	***
Age	.003	.001	2.43	.015	.001	.005	**
Gender	-.053	.038	-1.41	.158	-.127	.021	
Urban/Rural	-.045	.041	-1.11	.267	-.125	.035	
Country: base Benin	0	.	.	.	.	.	
Botswana	1.762	.199	8.86	0	1.372	2.152	***
Burkina Faso	.644	.119	5.41	0	.411	.878	***
Cabo Verde	.491	.112	4.38	0	.271	.711	***
Cameroon	.744	.127	5.87	0	.496	.993	***
Côte d'Ivoire	.459	.122	3.75	0	.219	.699	***
eSwatini	1.113	.132	8.44	0	.855	1.372	***
Gabon	.737	.121	6.07	0	.499	.975	***
Gambia	1.742	.155	11.24	0	1.438	2.045	***
Ghana	1.839	.142	12.98	0	1.561	2.117	***
Guinea	.088	.107	0.82	.41	-.122	.298	
Kenya	1.037	.116	8.97	0	.81	1.264	***
Lesotho	.525	.12	4.37	0	.289	.76	***
Liberia	1.82	.15	12.13	0	1.526	2.113	***
Madagascar	1.267	.131	9.68	0	1.01	1.523	***
Malawi	-.676	.116	-5.83	0	-.904	-.449	***
Mali	1.417	.14	10.13	0	1.143	1.691	***
Mauritius	.937	.138	6.77	0	.666	1.208	***
Mozambique	1.508	.114	13.19	0	1.284	1.732	***
Namibia	1.018	.134	7.59	0	.755	1.28	***
Niger	.61	.119	5.11	0	.376	.845	***
Nigeria	.655	.112	5.83	0	.435	.876	***
Sao Tome and Principe	1.891	.143	13.19	0	1.61	2.172	***
Senegal	1.026	.128	8.01	0	.775	1.277	***
Sierra Leone	2.696	.198	13.62	0	2.308	3.084	***
South Africa	.637	.116	5.50	0	.41	.864	***
Sudan	.392	.125	3.15	.002	.148	.636	***
Tanzania	1.274	.112	11.39	0	1.055	1.494	***
Togo	.097	.115	0.85	.397	-.128	.322	
Uganda	1.488	.138	10.80	0	1.218	1.758	***
Zambia	1.812	.144	12.57	0	1.53	2.094	***
Zimbabwe	1.516	.143	10.60	0	1.236	1.797	***
Education	0	.	.	.	.	.	
Informal	0	.087	-0.00	.998	-.171	.171	
Some primary	.085	.064	1.32	.187	-.041	.211	
Primary school	.14	.07	2.00	.046	.003	.278	**
Some secondary	.238	.066	3.60	0	.109	.368	***
Secondary school	.341	.074	4.60	0	.196	.486	***
Post-secondary	.43	.104	4.13	0	.226	.634	***
Some university	.656	.116	5.67	0	.429	.883	***
University completed	.436	.107	4.08	0	.226	.645	***
Post-graduate	.308	.23	1.34	.181	-.143	.759	

Tax	Coef.	St. err.	t-value	p-value	[95% conf.	interval]	Sig.
Refused	.129	.395	0.33	.744	-.646	.904	
Don't know	-.228	.331	-0.69	.491	-.877	.421	
Occupation	0	.	.	.	.	.	
Student	-.203	.084	-2.41	.016	-.368	-.038	**
Housewife / home	-.072	.081	-0.89	.371	-.23	.086	
Agriculture / farm	-.11	.07	-1.58	.115	-.248	.027	
Trader	.067	.079	0.84	.399	-.089	.222	
Retail / shop	-.24	.114	-2.11	.035	-.463	-.017	**
Unskilled manual	-.1	.084	-1.19	.235	-.264	.065	
Artisan or skilled	-.124	.088	-1.41	.158	-.297	.048	
Clerical	.102	.176	0.58	.562	-.243	.448	
Supervisor	-.076	.21	-0.36	.716	-.488	.335	
Security services	.209	.156	1.34	.18	-.097	.514	
Mid-level profession	.044	.102	0.43	.67	-.157	.244	
Upper-level profession	.081	.165	0.49	.625	-.243	.405	
Other	.009	.096	0.10	.922	-.18	.199	
Refused	-.263	.361	-0.73	.466	-.971	.445	
Don't know	-.293	.39	-0.75	.452	-1.057	.471	
Constant	-.271	.145	-1.87	.062	-.557	.014	*
Mean dependent var.	0.798		SD dependent var.			0.402	
Pseudo r-squared	0.098		Number of obs.			29049	
Chi-square	2029.121		Prob > chi^2			0.00	
Akaike crit. (AIC)	26514.050		Bayesian crit. (BIC)			27052.038	

Note: *** p<.01, ** p<.05, * p<.1

Source: authors' calculation based on Afrobaroemter Round 7 (2018) data.