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Taxpayer behaviour and institutions in Sub-Saharan Africa[1]

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Content

List of acronyms

Abbreviation	Explanation
SSA	Sub-Saharan Africa
GSEM	Generalized Structural Equation modelling
SEM	Structural Equation Modelling
OECD	Organisation for Economic Co-operation and Development
GDP	Gross Domestic Program
OLS	Ordinary Least Square
VAT	Value Added Tax
AEO	African Economic Outlook
ADB	African Development Bank
MIMIC	Multiple Indicators Multiple Causes

List of tables

List of figures

Abstract

Taxation is crucial for national governments to finance key public goods and services. But in developing countries, tax mobilization levels are quite low. This research analyses taxpayer behaviour in Sub-Saharan Africa as a result of weak institutions. Using the generalized structural equation modelling with Afrobarometer's round 5 (2011/2013) survey data in 29 SSA countries, the results show that individuals' attitudes towards paying tax are significantly dependent on the quality of institutions. More precisely, when the quality of institutions is perceived as good, individuals are more likely to pay taxes. Results also indicate indirect effects of quality of institutions across different institutional components. Individuals' perceptions on cheating, on the quality of public services and social interactions affect their behaviour

JEL Classification Codes: H3, O43.

Keywords: Taxpayer behaviour, Institutions, Generalized Structural Equation Modelling, Sub-Saharan Africa

0 | Introduction

Taxation is crucial for national governments to finance key public goods and services such as education, health and infrastructure. In developing countries, especially in Sub-Saharan Africa (SSA) characterized by weak institutions, tax mobilization levels are quite low. Indeed, the tax revenue on gross domestic product (GDP) is only 15% in SSA versus 35% in the OECD countries (OECD, 2010). Therefore, understanding taxpayer behaviour, attitudes of individuals toward paying taxes remains an important issue in SSA. Why do some people avoid paying tax? The answer to this question will help many countries in tax policy implementation. However, explaining taxpayer behaviour remains a difficult and somehow unresolved problem (Fjeldstad et *al.* 2012).

Institutional theories show that the quality of institution can explain tax resources mobilisation. Institutions are rules, enforcement characteristics of rules, and norms of behaviour that structure repeated interaction of people (North, 1989). Good institutions are those that are inclusive and characterized by secure property rights, fair system of law, public services that are suitably provided, sufficiently centralized, and are pluralistic; while poor quality institutions are those that are extractive and characterized by bad economic and political incentives (Acemoglu and Robinson, 2012). Institutions in SSA are typically extractive (Acemoglu and Robinson, 2012) and may explain why countries failed to mobilize more tax resources. We assume that the more individuals perceive the quality of institutions as good, the more they are likely to pay taxes.

At individual level, three main institutional theories can be used to explain taxpayer behaviour: economic deterrence, fiscal exchange and interactions between individuals in society. The principle of economic deterrence explains tax behaviour primarily by acts of force or penalties introduced by the tax authorities to compel individuals to pay their taxes. Alm and Mckee (2006) found an empirical evidence of this theory while Frey (2003) did not. Fiscal exchange theory explains taxpayer behaviour by the expectations regarding the delivery of public goods and services by the government. Empirical evidence of this theory is found by Bodea and Lebas (2014) contrary to Fjelstad (2004) who did not. For the principle of social interactions, taxpayer behaviour is explained by individuals' perceptions of their treatment in society compared to others, their confidence in tax authorities and any other social relationship in society. Torgler (2003) found an empirical evidence while Ali et *al.* (2013) did not find it for Kenya and Uganda. In addition to the fact that empirical results are mixed, each of these theories alone seems insufficient to fully explain the taxpayer behaviour (Ali et *al.*, 2013). Thus, a reasonable analytical framework to integrate them is needed.

This paper analyses the impact of the quality of institution on taxpayer behaviour using data from Afrobarometer's survey (round 5) on individuals' perceptions in 29 SSA countries. Measuring the quality of institutions is a challenge since it is subjective and not directly observable. We consider in this paper the quality of institutions as a latent variable justifying the method that we adopt, the Generalized Structural Equation Modelling (GSEM). The GSEM is well adapted to the context of this study since it allows taking into account latent variables in the analysis and the possibility to integrate many dimensions of the quality of institutions. A binary logit model is used to analyse the impact of the quality of institutions on taxpayer behaviour. An ordinal logit for robustness check is also considered in this paper.

Our results indicate that when an individual has a perception of a good quality of institutions, his odds to pay the tax is 1.718 times higher compared to a person who perceive the quality of institutions as poor. We also show some indirect effects of the perception of the institutional quality on the chance of paying taxes. More specifically, when an individual has a perception that it is difficult to evade taxes, his chance to pay tax becomes greater than the individual having a perception of ease to cheat. Also, the quality of public services offered by the state influences the payment of taxes. Confidence in the tax authorities, whether partial or total, the transparency, the

ethnic treatment and the comparison of people's behaviour on taxation explain significantly individuals' behaviour.

The paper enlarges the literature on taxpayer behaviour and institutions. It offers a different way to analyse tax behaviour that previously was not adopted. Beyond the contribution of different institutional variables on tax, the paper provides an aggregated impact of institutions on tax which can help to better understand why countries should strengthen the quality of institutions in all sectors.

The rest of the paper is organized as follows. Section 2 deals with the theoretical and empirical debate of the relationship between taxpayer behaviour and institutions. Section 3 reviews the data and the method of analysis. In Section 4, the results are presented. Section 5 concludes, highlighting some policy implications.

1 | Related literature

Taxpayer behaviour has retained a huge attention in the literature. Five institutional theories can be retained in the literature of the taxpayer behaviour; economic deterrence, fiscal exchange, social influences, comparative treatment and political legitimacy. Since the last three points are interweaved (Ali et *al.*, 2013), they will be grouped into a single theory; the theory of social interactions.

1.1 Theory of economic deterrence

The economic deterrence's theory refers to elements that influence the taxpayer behaviour such as tax rates and penalties related to tax evasion. One refers to Allingham and Sandmo (1972) as a precursor of this theory. Indeed, they were the first to provide a theoretical model on the taxpayer behaviour based on Becker (1968)'s model on the economics of crime. These authors assume that the tax payer has the choice between i) declaring all his income related to taxation and ii) partially declare it. If he partially reveals his income, the amount of tax he pays will depend on whether or not the tax authority makes an investigation on his honesty and there is a penalty when he is caught. The authors conclude that the higher the tax rate is, the higher the agent tends not to fully declare his assets because high tax reduces income and the risk aversion. Indeed, when income is low, agents tend to take more risks. They also conclude that an increase in the penalty rate leads to an increase in income statement and consequently an increase in the probability of detection causes more reported income. In this theory individuals make a kind of cost-benefit analysis.

This influential work by Alligham and Sandmo (1972) has generated a large amount of follow-up research that aimed to understand deeply the taxpayer behaviour even though it has been criticized, especially about the simplicity of its assumptions (Devos, 2014)[2]. Clotfelter (1983), using survey data from United States in 1969, finds empirical evidence of this thesis. He finds that the marginal tax rate significantly affects the income statement and a higher tax rate stimulates tax evasion. Alm et *al.* (1992) reached the same conclusion using laboratory experiments. Also, Alm and McKee (2006) using laboratory experiments indicated that when individuals know they will be audited they act in accordance with the tax law. These experimental studies however used students rather than real taxpayers; which may lead to biased results. They also used low level of observations and it is difficult to generalize the findings for a national policy issue (Mascagni et *al.,* 2015).

Other empirical studies have not validated this theory. Indeed, authors as Blumenthal et *al.* (2001) did not find a strong evidence of the aggregate effect of normative appeals on tax' payments using new methods on tax experiments in Minnesota. These tax experiments provide large scale data and capture real behaviour since they deal directly with taxpayers (Mascagni, 2015). However, they need a strong collaboration with tax authority which may be problematic in some SSA countries since the tax authority may be corrupt. For Frey (2003), sanctions cannot motivate people to pay tax because paying tax is a matter of civic virtue and morality, almost voluntary. He stated that deterrence is undesirable because it is contrary to democratic values and very expensive as it promotes the underground economy. Also, Reckers et *al.* (1994) showed that the ethical values strongly influence the tax behaviour, but seem to be absent in the decision-making models. In the same vein, several authors (Cowell and Gordon, 1988; Frey, 2003; Kirchler et *al.,* 2011) show that fiscal policy should not be based solely on that theory. These concerns have stimulated a search of other fundamental causes of fiscal behaviour.

2 Yitzhaki (1974) considers that the penalty is calculated on evaded tax rather than undeclared income as in Allingham and Sandmo (1972)'s paper; which is more realistic (Fooken et *al.,* 2014).

1.2 Theory of fiscal exchange

This theory assumes that agents' behaviours are motivated by the effort of the government to provide public goods and services. Individuals pay taxes when they perceive that it actually serves to finance public goods. They think that their contributions could be used for purposes other than intended and would need evidence or motivations. This thesis is similar to the gift theory where the government receives taxpayer resources and in return provides public goods. It could also refer to the notion of "tax of Lindahl[3]".

The empirical results of this theory are mixed. Das et *al.* (2014) showed that in India, the annual tax cost related to the lack of primary teachers is 1.5 billion dollars. The quality of education services provided by the state seems to be very important in explaining the tax behaviour. According to these authors, increasing the number of inspectors to monitor teachers will reduce the tax loss. For Cowell and Gordon (1988), the delivery of public goods in large quantities relatively to private goods promotes the payment of the tax. They also indicate that even in a dynamic analysis of tax where the rise of the tax rate leads to underground economy, tax evasion decreases when public goods are sufficiently provided.

In the same vein, Bodea and LeBas (2014), in a study of the Urban Area in Nigeria, found that individuals pay taxes with regard to the supply of public goods. Using logit regression on survey data, they showed that when individuals acquire club goods without the intervention of the state, they are less likely to take payment of the tax as an obligation. Authors also concluded that in conflict areas, where the delivery of club goods is limited, individuals perceive the tax as a duty. Furthermore, authors as Alm et *al.* (1992) and Timmons (2005) found empirical evidence of this theory. Ali et *al.* (2013) indicated that in Tanzania and Uganda, individuals who are satisfied with the government's provision of basic health services and educational needs are more likely to have compliant attitude. They also found that in Kenya, individuals who are more satisfied with the provision of infrastructure, such as roads and electricity, are more likely to have a tax compliant attitude, while in South Africa, individuals who are more satisfied with the issuing of identity card and obtaining household and police services, are more likely to have a tax compliant attitude. In contrast, Fjeldstad (2004) found no solid empirical evidence of this theory in South Africa.

D'Arcy (2011) pointed out that tax behaviour goes beyond the simple relationship between two actors; taxpayer and tax administration. The decision to evade taxes depends not only on the relation between a citizen and the tax authorities but also between the citizen and all the other citizens in the country as their taxes will be used to finance public goods for their own consumption but also for the consumption of other individuals in society. This is partially explained by the nature of "non-exclusion" of public goods. This explanation puts forward a selfish vision of the taxpayer and could explain the use of non-economic explanations of the taxpayer behaviour.

1.3 Theory of social interactions

This theory emphasizes the relationship between social interactions and tax payment. Indeed, the agent acts relatively to the behaviour of his peers such as parents, neighbours and friends. He will be tempted to imitate the behaviour of the latter. Also, because of social relationships (neighbourhood for instance), individuals could determine their behaviour on the extent to which they will be more easily caught in cases of fraud or tax evasion. The agent may be discouraged to avoid paying tax for fear of social sanctions (Besley et *al.*, 2014). This theory might be very relevant in the case of SSA given the importance of social relations and family.

3 A tax of Lindahl is a form of taxation in which individuals pay for public goods following the marginal benefit they receive.

Empirically, Torgler (2003) pointed out that if individuals perceive that others have an attitude of tax compliance, this will have a positive effect on their own tax payment, while the perception that others cheat hinders their payment of tax in Costa Rica. Ali et *al.* (2013) found a significant effect of social influence on the payment of the tax in Tanzania, unlike in South Africa, Kenya and Uganda where the effect was not significant. With an experimental method, Alm et *al.* (2013) show that the information that individuals have about others strongly determines their own behaviour. Referring to Banerjee (1992) who developed a model of "herd behaviour", the equilibrium coming from copycat behaviour is inefficient.

The theory of social interactions is also related to the perception of individuals about their treatment compared to other individuals in society. It refers to the fairness of the rules in society. When there is an equality of the law among individuals within a country, people tend to pay the tax. They refuse to pay it when the law is unfair. D'Arcy (2011) found empirical evidence of this thesis. She found that fair treatment by the state, both of individuals and of groups, increases assent to pay tax. Kirchler et *al.* (2011) also confirmed this view by showing that confidence in the tax becomes greater when the system is impartial. Ali et *al.* (2013) confirmed this theory in the case of Tanzania and South Africa but they did not find any significant effect in Kenya and Uganda.

At the government level, the theory indicates that high government accountability leads to higher tax revenues. Indeed, the confidence that people have towards the tax authority is very decisive in their tax behaviour (Kirchler et *al.,* 2011) since tax area is characterized by an asymmetry of information. This can explain why more recently developed countries adopt the so-called third party reporting which helps to overcome asymmetry of information and improve tax compliance. But this technique required a more formal context and high cost to implement it and will not be perfect in SSA countries.

From an empirical point of view, Torgler (2005) and Torgler and Schneider (2007) have found evidence for this theory. They indicate that individuals perceive the increase of corruption as misuse of their tax burden. This will probably discourage tax contribution in a situation of high corruption and encourage the expansion of the informal sector (Buehn and Schneider, 2009). Alm et *al.* (2014) found an interrelation between corruption and tax evasion. They show that when the tax administration is corrupt, the reporting rate of turnover for tax decrease between 4 and 10%.

Despite this large body of theory, understanding tax behaviour remains ambiguous. The empirical literature is mixed. Also, given that these theories can be interconnected (Ali et *al.,* 2013) and given the holistic decisions of individuals (D'Arcy, 2011), it is difficult to make tax policy with these theories separately. It is therefore necessary to find an analytical framework to deal with these problems. This study try to solve these problems. The following section shows how to handle with the relationship between taxpayer behaviour and institutions.

2 | Data and methodology

This section deals with data and descriptive statistics. It also indicates the method of analysis and estimation techniques used in this paper.

2.1 Data and descriptive statistics

In this sub-section, the nature of the data used in the paper is explained. Also a descriptive analysis of the data is done to have an idea about the relationship between the variables before the estimations.

2.1.1 Data

Data come from the Afrobarometer survey round 5 for the period 2011/2013[4]. The survey evaluates citizens' attitudes toward democracy and governance, taxes, markets and civil society, etc. It covers 34 SSA countries with at least 1,200 individuals per country aged 18 and over. Countries sampled were selected by the Afrobarometer mainly on the basis of three criteria. Firstly, selection is based on the country political climate. Indeed, countries must have a political environment which allows individuals to express themselves freely. Next, the country must have a nationally representative sample. Each country must have the required number of individuals for the survey; in addition to security and logistics to reach the target population at a lower cost. Finally, there must be a national partner in each country to ensure an appropriate progress of the survey.

For the choice of individuals, Afrobarometer uses a random method in each area and the average sampling error is plus or minus 3% if the sample is 1200 individuals and plus or minus 2% for 2400 individuals. The questionnaire for each country is the same which allows us to do the cross-country analysis. The interviews were conducted by trained interviewers in local languages. The answers to the questions identify variables we need for the study. Given the availability of some of our variables of interest, 29 countries were selected in this study with a total of 40,023 individuals.

Dependent Variable

One of the questions asked to the respondent is "did you personally in the past 12 months refuse to pay a tax / fee to the government?" It is tempting to take the answer of this question as a variable indicating the payment or non-payment of tax. However, Ali et *al.* (2013) pointed out that since the fact of not paying taxes is socially frowned upon, responses to direct questions will be biased. Indeed, the highest constraint in tax compliance studies is the methodological issues related mainly to the difficulty of measurement (Mascagni, 2015). Individuals who refuse to pay the tax will tend to give false answers. One way to deal with this bias is to use indirect questions.

Our dependent variable is therefore the answer to the indirect question "please tell me whether you think the action is not wrong at all, wrong but understandable, or wrong and punishable: Not paying the taxes they owe on their income ". There were four modalities for the answer to this question: 1) not wrong at all, 2) wrong but understandable, 3) wrong and punishable, 4) do not know. Ali et *al.* (2013)'s dependent variable comes from this question. However, this question can still lead to bias because one can still think that tax avoidance is bad but still do it. However because of the modality "wrong but understandable", this bias can be little since those people may give this

4Data freely available on http://www.afrobarometer.org

response. So, individuals who think the action is wrong and punishable are supposed to be people paying the tax. Those who think that the action is not at all wrong or is wrong but understandable are supposed to be individuals who refuse to pay the tax. Also, those who claim not to have an answer to this question are assumed to be people refusing to pay tax since individual who pays taxes and has never refused to pay it should not claim not to know the answer. We group these answers into two terms.

We assume that an individual pays the tax if his answer corresponds to "wrong and punishable" and refuses otherwise. Then, we define a binary variable "tax" taking the modality 1 if the individual pays the tax and 0 otherwise, with 0 being the reference value. However multiple modalities have been taken into account for robustness check. The variable tax was therefore subsequently considered as an ordinal variable (taxes) taking the value 2 if the answer is "wrong and punishable", 1 if the answer is "wrong but understandable" and 0 if the answer is "not wrong at all" or "do not know". The value 0 is the base value. As explain below, individuals who do not know the response are considered as taking the fact of not paying taxes not wrong at all. Variables "tax" and "taxes" constructed is explained by independent variables indicating the quality of institutions and some control variables.

Institutional quality variables

Institutional variables as dependent variable are derived from answers to some questions in the questionnaire. Our objective here is to determine the impact of institutional quality on the behaviour of individuals in tax payment. To do so, we construct an index of the quality of institutions which we assume to be a latent variable. A latent variable is a variable that is not directly observed or measured and is deduced from a set of observed variables that are measured by tests, surveys, etc. (Lomax and Schumacker, 2010).

Our latent variable, quality of institutions, is measured by variables that we have captured through the responses to the questionnaire and in relation to the elements identified in the literature. Indeed, "cheat" is considered as a variable affecting the quality of institutions and has been considered by Ali et *al.* (2013). It is a binary variable taking the value 1 if there is difficulty to cheat and 0 otherwise. When it is difficult to cheat, the ability of the state to collect taxes is stronger and this indicates a good performance in tax collection institutions. Considering the theory of deterrence, the difficulty to fraud causes an increase in the payment of the tax. We therefore expect a positive relationship between these variables.

In addition, variables expressing the quality of education, healthcare, water and electricity services are retained. They take the value 1 when the quality is good and 0 otherwise. In accordance with the fiscal exchange theory, the more these services are in good quality, the more it is considered that the institutions are good and promote the payment of tax. A positive relationship is expected between these variables.

Variables such as confidence in tax administration, perception of the individual on the tax payment frequency from other individuals in the country, perception of corruption in tax administration, transparency and ethnic discrimination are considered. These variables refer to the theory of social interactions. Indeed, confidence in the tax administration and the perception that other people have a tax compliance attitude would imply an improvement in the quality of institutions. Similarly, when there is transparency in the management of fiscal resources, absence of corruption and fair ethnic treatment, institutional quality improves and individuals pay taxes. All these variables are binary variables taking the value 0 and 1 except for trust which might take three values 0, 1 and 2. We expect a positive sign between these variables and the quality of institutions and therefore between these variables and the tax.

Control variables

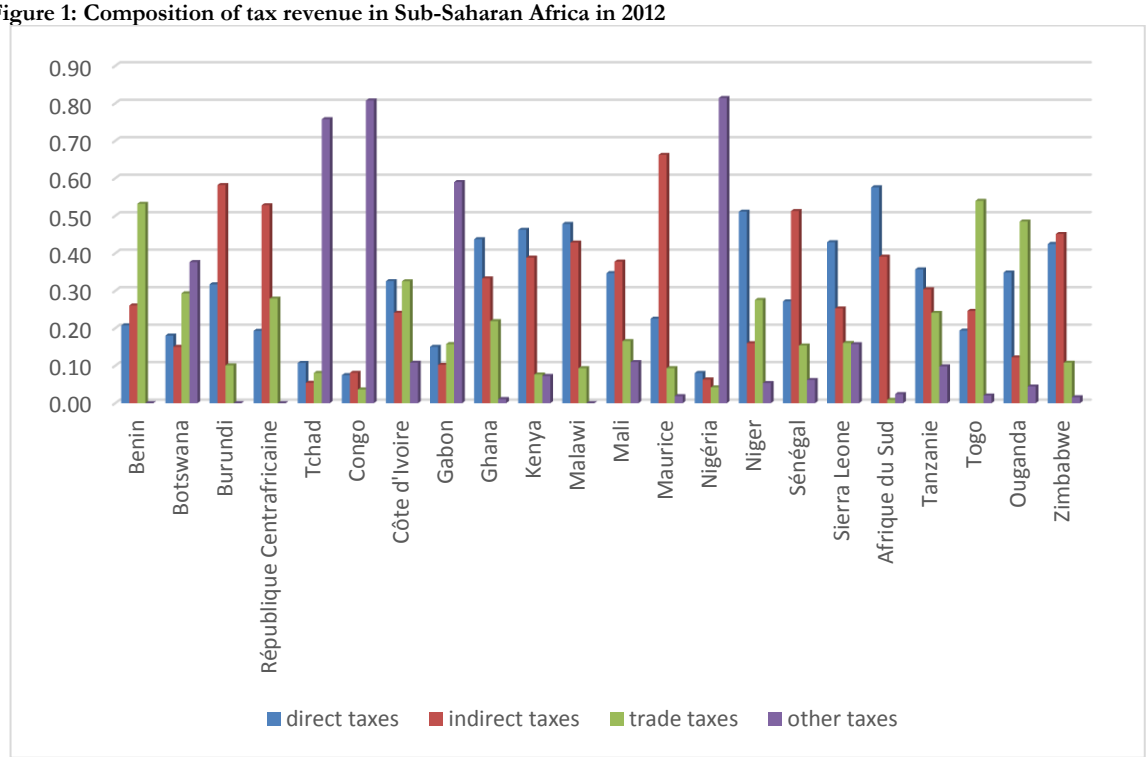
Control variables indicate the characteristics of individuals which may influence their decision to pay the tax. Referring to Torgler (2003), variables such as gender and education explain the taxpayer behaviour. He has shown that women tend to respect their tax burden better relatively to men and that education promotes the payment of tax. The gender variable is set to 0 for men and 1 for women. Education takes ordinal values from 0 to 3, reflecting the lack of formal education to post-secondary level. A positive relationship is expected between these variables and the quality of institutions.

We also retain variables such as age and housing area (Urban or not). The area takes the values 0 and 1. Country fixed effects such as GDP per capita and regional dummy variables are included. The definition of all variables used in this paper is in the Appendix.

2.1.2 Descriptive Analysis

Descriptive analysis provides an overview of the perceptions of individuals on tax payment. Before analysing individual perceptions, looking at macroeconomic indicators may help to better understand SSA countries tax structure. The structure of tax revenues is quite varied but their nature depends on the country. Figure 1 shows the composition of tax revenues in 22 SSA countries in 2012. It indicates that countries such as Chad, Congo, Gabon, and Nigeria rely more on others taxes (resources rents mainly). Botswana, Côte d'Ivoire and Sierra Leone have a fairly balanced tax structure. Despite the liberalization policies, trade taxes still occupy a relatively important place due to the relative ease to collect them. Indeed, given the wide coverage of the informal sector, collection of income taxes is very difficult. This fact explains why industrialized countries, due to the relative ease of their administrations to collect taxes and the characteristics of their labour markets, collect more income tax than consumption tax.

Figure 1: Composition of tax revenue in Sub-Saharan Africa in 2012



Source: authors with Africa Economic Outlook data, 2015[5].

The differences in the tax structure in Sub-Saharan African countries shown in figure 1 can also be explained by the structural characteristics of the countries. According to Keen (2012), geographical characteristics influence the tax structure. Small countries and distant islands, can more easily collect taxes at the border than large landlocked ones. So, despite having more efficient VATs, small countries seem to collect relatively more under the form of customs duties. Keen (2012) also pointed out that the geographical profile of the country could affect the tax structure. Gambia for example can collect a lot of taxes related to the re-export activities. According to this author, differences in tax structures also exist depending on the former colonial power. The tax structure is different for instance between Anglophone and Francophone countries and even those that are Lusophone.

In addition to the difference in tax structure, the level of tax revenues vary from one country to another one. Indeed, in the Seychelles and Equatorial Guinea, the annual tax reached 3,600 US dollars per capita, while countries like Burundi, Ethiopia and Guinea Bissau mobilized per year only 11 US dollars per capita (ADB, 2010). This difference could be explained by the extraction of natural resources which is probably the most important element (Keen, 2012). For example, between 1980 and 2005, while the tax burden for resource-poor countries has stagnated, the one of resource-rich countries increased by 7% (Keen and Mansour, 2010). Equatorial Guinea has raised about US $ 4,865 per capita in 2008, mainly due to oil products (ADB, 2010).

However, despite the varied level of tax revenue, countries have essentially the same challenges. One challenge is the informality of the economy. Indeed, the wide coverage of informal and unregistered employment makes it difficult to identify agents to pay tax and the associated amount. This problem is especially accentuated since there is a cadastral problem in most countries in Sub-Saharan Africa. The cadastral survey is very expensive both financially and time consuming and is often beyond the capacity of the government (Brun et *al.,* 2014). Over the period 1999 to 2006, according to Schneider et *al.* (2010), the average size of the informal economy in SSA was 38.4%,

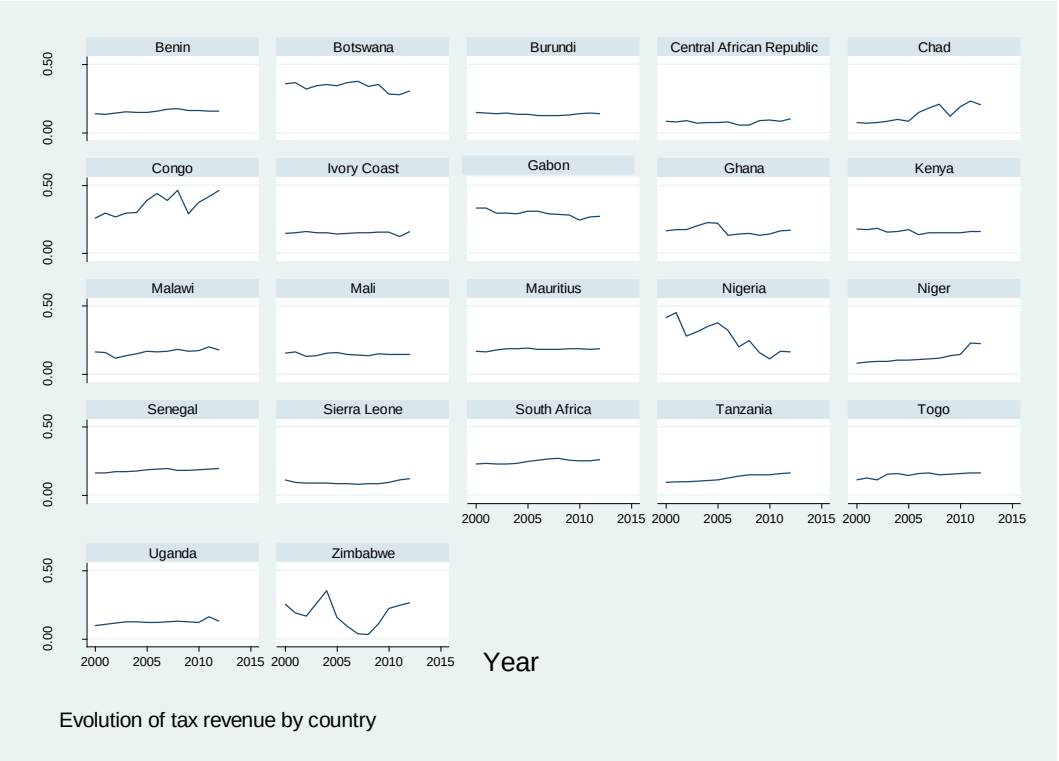
5 www.africaneconomicoutlook.org

with large differences among countries. Nigeria and Benin, for instance, respectively have an average size of the informal sector of 56.2% and 50.6%. Also, the agricultural sector, which employs many rural people, is difficult to tax as it is usually scattered, small in size and the average agricultural income is low. Despite the modernization of some tax administrations, there is also always a problem of lack of qualified personnel and appropriate technology.

Another challenge is related to the tax base. Essentially based on natural resources, the tax base is very weak and is facing tax havens problems. Negotiations are limited and are made opaquely between the political authorities and companies; favouring the latter. Given the competition in developing countries to attract foreign capital, multinationals manipulate transfer prices in order to benefit from tax reduction. In fact, developing countries recorded an annual loss of income exceeding three times the amount of external assistance received by the manipulation of transfer prices (Mascagni et al., 2014).

A huge challenge for SSA countries is the mobilization of sufficient fiscal resources to meet national needs and to have economic and financial independence. Indeed, resource-rich countries have more tax revenue. However, compared to other countries, their tax structure remains highly vulnerable to the volatility of raw material prices and other external shocks. In addition, they often fail to maximize revenue compared to their potential. In resource-poor countries, it is difficult to collect taxes since they rely more on direct taxes. Figure 2 shows the evolution of tax revenue as a share of gross domestic product from 2000 to 2012 in 22 SSA countries. It shows different efforts between countries in tax collection; especially; in Botswana, Chad, Nigeria, Ghana and Zimbabwe. While structural characteristics of countries may partly explain these differences, non-structural factors such as governance also matter. For example, the drastic decline of tax revenue in 2008 in Zimbabwe may be attributed to the electoral crisis at this period.

Figure 2: Evolution of tax revenue (%GDP) from 2000 to 2012



Source: Authors, based Economic Outlook for Africa and World Bank data, 2015

At the microeconomic level, the survey gives some information on individual's perception on tax payment. Table 1 shows the answers of questions related to the dependent variable. It indicates that more than half, 52.33% of the individuals, refuse to pay tax against 47.67% who pay. This situation is very worrying especially for poor countries struggling for economic and financial independence. Understanding the individuals' behaviour would be an advantage for these countries. See Annex 4 for this question by country.

Table 1: wrong or not wrong to not paying taxes

please tell me whether you think the action is not wrong at all, wrong but understandable, or wrong and punishable : Not paying the taxes they owe on their income		
	Observation	Percentage
Not wrong at all	4,566	11.36
Wrong but understandable	14,362	35.73
Wrong and punishable	19,193	47.67
Do not know	2,108	5.24
Total	**40,199**	**100,00**

Source: Authors, with Afrobarometer round 5 data.

2.2 Methodology

To determine the relationship between individuals' perceptions of the quality of institutions and their behaviour in the payment of taxes, we use Generalized Structural Equation Modelling (GSEM). Indeed, the variable denoting the quality of institutions is a latent variable[6]. This implies that the conventional methods of modelling qualitative variables fail to answer the question because they do not incorporate explicitly latent variables. GSEM allows the inclusion of latent variables.

Presentation of the GSEM

GSEM is an extension of the structural equation modelling (SEM) that was developed in the psychometric literature and introduced for the first time by Wright (1920) and covers now all discipline since 1994 (Lomax and Schumacker, 2010). Indeed, SEM is as an extension of multiple regression models. It allows introducing endogenous or exogenous latent variables in analyses. In the SEM, the dependent variable is continuous responses and the regression model is linear. The GSEM is more general because the dependent variable in the regression may contain continuous, binary, ordinal, countable or multinomial responses and regression models can be linear or nonlinear.

Since dependent variables are binary, a binary logit regression is used. For the robustness check, we use an ordered logit regression. However, we first use ordinary least square regression to see the tendency of the estimates. Also, logit estimation without considering the latent variable is used to compare results.

Model specification

The specification of GSEM consists of two parts. The first is the specification of the structural equation of the latent variable and the second is the specification of the measurement model. The nature of the latent variable does not allow to have a reciprocal relationship between the variable tax and the latent variable. Also, even if it may have a bidirectional relation between these variables, we do not expect it to be contemporaneous. So, since we have one period data, we just have one direction equation. The data we have could encourage using a multilevel model. But as in D'Arcy (2011), we will not use it because it is the individual level that interests us in this paper.

Structural equation of the latent variable

The problem is similar to a model with multiple indicators multiple causes (MIMIC), except that here we have only one indicator which is the variable "tax" and multiple causes that are all explicative variables. Referring to Joreskog and Goldberger (1975) and by convention (Muthén, 1984), the latent variable is assumed to be explained by a linear relationship and can be specified as follows:

$$\eta = \alpha + B\eta + \Gamma\xi + \zeta \qquad (1)$$

Where α is a vector indicating the constant term, B represent a matrix of parameters which show relation between latent variables η. $\xi_i, i = 1, \dots, n$ are exogenous variables for latent variable. Matrix Γ describes relation between latent variable and exogenous variables. ζ is error term with zero mean and covariance matrix ψ.

6 A latent variable is a variable that is not directly observed or measured and is deducted from a set of observed variables that are measured by tests, surveys, etc. (Schumacker and Lomax, 2010).

However, since we have only one latent variable that is explained only by observed variables ($B = 0$), more explicitly, for an individual j, the latent variable equation is:

$$\eta_j = \alpha + \Gamma\xi_j + \zeta_j, \quad \zeta_j \rightsquigarrow N(0, \psi) \quad (2)$$

After the specification of the latent variable, the determination of the measurement model follows.

Measurement model

The measurement model links explained variable (tax) to latent variable (quality of institutions) and covariates. Basically the measurement model is given by:

$$Y_j = \Phi + \Lambda\eta_j + Kx_j + \varepsilon_j \quad (3)$$

Where Y_j is a vector of responses of individuals j, Φ a matrix of constant terms, Λ is a matrix of parameters related to the latent variable η_j , K is a matrix of parameters related to exogenous covariates x_j and ε_j are unique factors.

When the dependent variable is categorical as in our case, the conventional model must be changed (Rabe-Hesketh and Skrondal, 2005). Indeed, the term indicating the unique factors no longer appears explicitly. Also, the answers are, as specified implicitly, conditional on the latent variable ($\mu_j = \text{pr}(Y_j = 1|\eta_j)$). The following equation shows the measurement model for the logit.

$$Y_j^* = g(u_j) = \Phi + \Lambda\eta_j + Kx_j \ (4)$$

Or

$$logit(\mu_j) = \ln\left(\frac{\text{pr}(\mu_j)}{1 - \text{pr}(\mu_j)}\right) = \phi_i + \Lambda\eta_j + Kx_j \ (5)$$

With μ_j a vector of conditional mean of responses given $\eta_j \ et \ x_j$.

The model parameters are estimated using the information in the variance-covariance matrix of the observed variables. GSEM takes observed variables as a given and cannot estimate the covariance between them. The direct effect of the quality of institution is given by Λ and the indirect effects are given by $\Lambda * \Gamma \ (6)$.

Model Identification

The identification refers to constraints on the parameters of the model which are necessary to have a unique solution. A model is said to be unidentified if these constraints are not compensated. These constraints are two types. These are substantive constraints and regulatory constraints. For substantive constraints, a model will be identified if the number of parameter P based on the moment of order 2 which can be estimated does not exceed $K(k + 1)/2$, where K is the number of observed variables (Schumacker and Lomax, 2010).

However, even if P is less than or equal to $K(k + 1)/2$, the model may not be identified because identification not only depends on the number of path but also of their location (Schumacker and Lomax, 2010). For regulatory constraints, GSEM automatically solves the problem by imposing the coefficient from the latent variable to be equal to 1 (StataCorp (2013).

3 | Results

The ordinary least square results presented in the Appendix give an overall indication of the effect of institutional variables on taxpayer behaviour. Results show that variables such as the perception of corruption, cheat, quality of health, quality of education, quality of electricity, confidence in tax authority, ethnic discrimination and comparison of attitudes have a significant effect and an expected sign on tax payment except the perception of the corruption which has an unexpected effect. The logit estimation without considering institutions as latent variable is also presented in the appendix and has the same overall results as the OLS estimation. Next, table 5 reports the odds ratio of the binary and ordinal logit.

Institutional variables

Results in table 5 show that the odds to pay taxes for an individual with a perception of good quality of institutions is 1.718 times more than for the one not having a perception of good quality. So, improving institutional quality will help to stimulate the mobilization of tax revenue. This result implies that when all conditions for good quality institutions are satisfied, the government can easily mobilize taxes as individuals have a tax compliant attitude. The improvement of the quality of institutions helps individuals to reduce transaction cost and be more productive and comfortable. This fact increases tax compliance since individuals have interest in contributing. The results may explain why developed countries mobilize more tax revenue. Results also indicate the indirect effects of quality of institutions across different institutional components.

In fact, an individual having the perception that it is not easy to cheat has 0.324 times more chance to pay tax against the one having a perception that it is easy to cheat[7]. This result confirms the hypothesis of economic deterrence. Given the existence of penalties for detection, individuals behave in accordance with the quality of the authority in charge for detection. When these institutions are effective, meaning that it is difficult to cheat without detection, people tend to pay tax. This result allows to state that effort should be made to help authorities strengthen their capacity to detect fraud or to discourage it. One solution that might work is to collect taxes indirectly through employers. But this means that all employees need to be identified. This illustrates the hampering impact of an informal economy on tax mobilization. Another key solution would be to strengthen 'indirect' taxes such as sales or VAT taxes.

Our results also point out that an individual who perceives education services to be of good of good quality has 0.242 times more chances to pay taxes compared to an individual who thinks that services are of poor quality. Similarly, an individual having a perception of a good quality of electricity service has 0.188 times more odds to pay the tax compared to the one having a perception of poor quality. This odds is .286 times more for the perception of good quality of healthcare services. These results suggest that when these public services are suitably provided people will honour their taxes. Also, health, education and electricity are major concerns in SSA and people can really have an interest in contributing to the enhancement of the quality of these goods. Thus, fiscal exchange's hypothesis is confirmed. However, the impact of quality of water and sanitation services is not significant. This result is supported by Ali et *al.* (2013) findings. These authors indicated that fiscal exchange theory is verified according to the nature of public goods and services.

For the assumption of social interactions, results show that individuals with confidence towards tax authorities, even if that confidence is partial, are more likely to pay taxes compared to those

7 Indirect effect= odds of latent variable*odds of the variable: .324= 1.718*0.189

having no confidence. Indeed, for an individual with a high confidence towards tax authority, the chance to pay the tax is 0.919 times more than having no confidence. Similarly, for an individual having little or partial confidence towards the tax authority that chance is 0.185 times more than having no confidence. This result shows how trust is an important element in tax policy even when trust is not complete. It implies that the tax authority should work to obtain the confidence of taxpayers. Being more transparent could be a way to increase this confidence as the results show that the odds to pay the tax are 0.326 when individuals perceive that tax authority is transparent. Likewise, factors such as the ethnic treatment are also very important to explain taxpayer behaviour. The results show that an individual with a perception of a fair treatment of his ethnic group has 0.115 times more odds to pay the tax compared to those who perceive the inverse, confirming the importance of non-discrimination. Moreover, results show that the odds to pay tax by people thinking that other people do not avoid paying the tax is .388 times more than those having the perception that other avoid paying tax. This is easily understandable since people in SSA are very cohesive.

Nevertheless, the perception of corruption is significant in explaining tax behaviour but has an unexpected sign. The odds to pay the tax is 0.147 times less when individuals perceive that tax authority is corrupt than when they perceive that the latter is not corrupt. The result seems surprising especially when we think that less corruption increase individuals" confidence and encourage them to pay government's tax. However, this result may be understandable and can be explain by the fact that individuals perceive the corruption as an opportunity to pay less taxes. They may prefer a corrupt administration in order to pay less taxes themselves rather than pay all taxes they owe. Then one should think deeply about this effect. A further analysis related to the relation between corruption and taxpayer behaviour may be helpful.

Control variables

Control variables indicating the characteristics of the individual are also crucial in the decision to pay tax. These variables include age, gender and the level of education. Indeed, the odds to pay taxes related to the age is 0.005. This result shows that as people get older, they become more conscious of their tax liability. It confirms the results of Kirchler et al. (2011). Awareness policies should therefore be more directed towards young people. The results also indicate that women have 0.103 times less odds to pay the tax than men. This result is contrary to the one of Torgler (2003) which showed that women are more honest than men in tax payment in Costa Rica. We can explain this by the fact that in SSA, poverty concerns more female than male and could consequently lead to women's tax evasion. Policies reducing inequality would therefore support tax policy. Another possible explanation may be the fact that women are more connected to the informal sector than men in SSA.

As the quality of services in education, the level of education is an important factor in explaining the tax behaviour. Results show positive and significant effects of education on taxpayer behaviour. More specifically, the odds to pay tax are respectively 0.138, 0.222 and 0.469 times more for individuals with primary, secondary and post-secondary level of education compared to a person who has no formal education. Policies which encourage education contribute to strengthen tax policies. However, the geographical area (urban or rural) is not significant in explaining tax payment.

Robustness Check

The ordinal logit, for robustness check, confirms results except for the effect of area which becomes significant. The odds to pay tax is 0.066 times more for an individual living in urban area that the one living in rural or semi-rural area.

Table 2: GSEM Results

		binary logit	ordinal logit
		Odds-Ratio	Odds-Ratio
	Latent variable (Quality of institution)		
Deterrence			
	Cheat	1.190***	1.342***
		(.032)	(.035)
Fiscal exchange			
	Quality of health	1.167***	1.145***
		(.033)	(.031)
	Quality of water	0.993	1.007
		(0.026)	(0.035)
	Quality of education	1.141***	1.152***
		(.033)	(.031)
	Quality of electricity	1.110***	1.098***
		(.030)	(.028)
Social interactions			
	Partial confidence	1.108***	1.202***
		(.030)	(.031)
	Total confidence	1.535***	1.617****
		(.054)	(.056)
	Transparency	1.190***	1.201***
		(.044)	(.043)
	Ethnic	1.067***	1.020
		(.026)	(.023)
	Comparison of attitudes	1.226***	1.282***
		(.030)	(.029)
	Corruption	.914***	.797***
		(.026)	(.022)
	Dependent variable (tax/taxes)		
	Quality of institution	2.718(constrained)	2.718(constrained)
	Age	1.005***	1.005***
		(.000)	(.000)
	Area	1.049*	1.068***
		(.027)	(.026)
	Gender	0.897***	.900***
		(.021)	(.020)
	Primary education	1.138***	1.172***
		(.040)	(.040)
	Secondary education	1.22***	1.308***
		(.045)	(.046)
	Post-secondary education	1.469***	1.623***
		(0.070)	(.073)
	Country fixed effects	yes	Yes
	Regional fixed effects	yes	Yes
	Taxes_cut1		0.919
			(0.061)
	Taxes_cut2		5.424***
			(0.359)
	Observations	40,023	40,012

Linearized SE in parenthesis- *p<0,10 **p<0,05 ***p<0,01

4 | Conclusion

Understanding the behaviour of individuals in their decisions to pay taxes is a challenge in Sub-Saharan Africa countries. This study attempted to explain the role of institutional quality on the behaviour of individuals for paying tax. An indicator of the quality of institutions is constructed and is supposed to be a latent variable since quality of institutions is not directly observable. With a logit regression, using the generalized structural equations modelling with the Afrobarometer round 5 survey data in sample of 29 SSA countries, the study indicated direct impact of the quality of institutions and indirect impact through variables related to theoretical founded determinant such as the theory of economic deterrence, fiscal exchange and social interactions.

Results show that the odds to pay taxes is higher for an individual with a good perception of the quality of institutions than for the one not having a good perception. Results also show the contribution of the perception of the quality of each institutional variable on the payment of the tax. Indeed, the study showed that the chance to pay taxes is higher for an individual having the perception of difficulty to cheat than the chance for the one having the perception of ease to cheat; confirming the hypothesis of economic deterrence.

Regarding the fiscal exchange theory, estimates have validated the hypothesis. When public services are well funded, people honour their tax burden. In fact, an individual's perception of a good quality of education, healthcare and electricity services increase the odds to pay taxes compared to an individual having the perception of poor quality of public services. However the quality of water and sanitation services is non-significant, which is supported by Ali et *al.* (2013) findings. These authors indicated that fiscal exchange theory is verified by some public goods and services and not verify by others given the priority in individuals' needs.

Social interactions assumptions are validated except for the presence of corruption which has an unexpected effect. A further analysis related to the relation between corruption and taxpayer behaviour may be helpful. Factors such as confidence, total or incomplete, comparison of attitudes and ethnic treatment are all significant determinant of taxpayer behaviour and have expected sign.

In sum, the study shows that the quality of institutions has an effect, both direct and indirect, on the decision to pay taxes. Results indicate that studies using proxies of quality of institutions underestimate the effect of the quality of institutions. Results suggest that tax policy should take into account individual behaviour in policy implementation. Also tax policy should be mixed that is to say taking into account all variables that influence individuals' decisions. Efforts should be made at the level of the tax authorities to mobilize resources to finance economic growth.

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6 | Annexes

Annex 1: Countries sample

Countries	Observations	Percentage
Benin	990	2.46
Botswana	1,063	2.64
Burkina Faso	1,083	2.69
Burundi	1,082	2.69
Cameroon	1,098	2.73
Cape Verde	1,101	2.73
Cote D'Ivoire	1,102	2.74
Ghana	2,204	5.46
Guinea	1,079	2.68
Kenya	2,162	5.37
Lesotho	1,028	2.55
Liberia	1,073	2.66
Madagascar	1,065	2.65
Malawi	2,098	5.21
Mali	1,089	2.70
Mauritius	1,033	2.57
Mozambique	2,042	5.07
Namibia	811	2.01
Niger	1,082	2.69
Nigeria	2,136	5.31
Senegal	1,108	2.75
Sierra Leone	1,066	2.65
South Africa	2,064	5.13
Swaziland	1,087	2.70
Tanzania	2,153	5.35
Togo	1,109	2.75
Uganda	2,115	5.25
Zambia	1,027	2.55
Zimbabwe	2,113	5.25
Total	**40,263**	**100**

Annex 2: definition of variables

Variables	Questions	Definitions
Dependent Variable		
Tax	Please tell me whether you think the action is not wrong at all, wrong but understandable or wrong and punishable: not paying the tax they owe on their income.	1= wrong and punishable; 0= not wrong at all, wrong but understandable or don't know.
Taxes	Please tell me whether you think the action is not wrong at all, wrong but understandable or wrong and punishable: not paying the tax they owe on their income.	2= wrong and punishable; 1= wrong but understandable; 0= do not know or not wrong at all.
Institutional variables		
Confidence	How much do you trust the tax department or haven't you heard enough about them to say?	2= A lot ; 1= Just a little or somewhat ; 0= Not at all, do not know
quality of health	How well or badly would you say the current government is handling for improving basic health services?	1= very well or fairly well; 0= very badly, fairly badly, do not know or haven't heard enough.
quality of water	How well or badly would you say the current government is handling for improving water and sanitation services?	1= very well or fairly well; 0= very badly, fairly badly, do not know or haven't heard enough.
comparison of attitudes	In your opinion, how often, in this country do people avoid paying the taxes that they owe the government?	1= rarely, never, do not know ; 0= Always, often
Corruption	How many of the tax officials' people do you think are involved in corruption or haven't you heard enough about them to say?	1= none; do not know, or haven't heard; 0= some of them, most of them
cheat	Based on your experience, how easy or difficult to avoid paying the income of property taxes you owe to government?	0= very easy or easy; 1 =difficult, very difficult or do not know.
Transparency	Based on your experience, how easy or difficult is it to find out how government uses the revenues from people's taxes and fees?	1= very easy or easy; 0 =difficult, very difficult or do not know.
quality of education	How well or badly would you say the current government is handling for addressing educational needs?	1= very well or fairly well; 0= very badly, fairly badly, do not know or haven't heard enough.
quality of electricity	How well or badly would you say the current government is handling for providing a reliable supply of electricity?	1= very well or fairly well; 0= very badly, fairly badly, do not know or haven't heard enough.
ethnic	In your opinion, how often, in this country are your ethnic group treated unfairly by the government?	1=never or rarely; 0= often, sometimes, always or do not know.
Control variables		
Age	How old are you?	Age
gender	Respondent's gender	1=female ; 0=male
Education	What is the highest level of education you have completed?	3= post-graduate, university completed, some university, post-secondary qualifications other than university ; 2= secondary school/high school completed, some secondary school/ high school completed ; 1= primary school completed, some primary schooling; 0= no formal school, informal schooling only, do not know.
Area	Do you come from rural, semi-urban or urban area?	1=urban ; 0= semi-urban or rural
Country fixed effects	Gross domestic product per capita 2012	
Regional fixed effects	Region	Western Africa, East Africa, Southern Africa

Annex 3: summary statistics

Variables	Mean	Std. Dev.	Min	Max
Tax	.476	.499	0	1
Taxes	1.310	.738	0	2
Age	37.09	14.55	18	105
Area	.370	.482	0	1
Gender	.493	.499	0	1
Primary education	.321	.467	0	1
Secondary education	.363	.480	0	1
Post-secondary education	.115	.319	0	1
GDP	1314.951	1827.524	151.996	6491.488
Institutional variables				
partial confidence	.503	.499	0	1
total confidence	.194	.395	0	1
quality of education	.624	.484	0	1
transparency	.115	.319	0	1
quality of water	.414	.492	0	1
cheat	.725	.446	0	1
quality of electricity	.368	.482	0	1
ethnic	.610	.487	0	1
comparison of attitudes	.598	.490	0	1
corruption	.246	.431	0	1
quality of health	.598	.490	0	1
Number of observations	**: 40,023**			

Source: Authors' computation with Afrobarometer data round 5

Annex 4: Wrong or not to refuse to pay taxes (by country)

Please tell me whether you think the action is not wrong at all, wrong but understandable, or wrong and punishable : Not paying the taxes they owe on their income								
	Benin	Botswana	Burkina Faso	Cape Verde	Ghana	Kenya	Lesotho	Liberia
Not wrong at all	42	67	93	220	136	231	283	95
	(4.24)	(6.33)	(8.59)	(20.24)	(6.17)	(10.68)	(27.53)	(8.76)
Wrong but understandable	403	334	486	414	640	708	195	256
	(40.71)	(31.54)	(44.88)	(38.09)	(29.04)	(32.73)	(18.97)	(23.62)
Wrong and punishable	537	571	441	379	1,386	1,111	390	619
	(54.24)	(53.92)	(40.72)	(34.87)	(62.89)	(51.36)	(37.94)	(57.10)
Do not know	8	87	63	74	42	113	160	114
	(0.81)	(8.22)	(5.82)	(6.81)	(1.91)	(5.22)	(15.56)	(10.52)
Total	**990**	**1,059**	**1,083**	**1,087**	**2,204**	**2,163**	**1,028**	**1,084**

Please tell me whether you think the action is not wrong at all, wrong but understandable, or wrong and punishable : Not paying the taxes they owe on their income								
	Madagascar	Malawi	Mali	Mozambique	Namibia	Nigeria	Senegal	South Africa
Not wrong at all	175	545	49	314	86	223	45	96
	(16.43)	(25.70)	(4.50)	(15.40)	(10.57)	(10.44)	(4.06)	(4.65)
Wrong but understandable	348	932	330	679	314	1,005	425	731
	(32.68)	(43.94)	(30.30)	(33.30)	(38.57)	(47.05)	(38.32)	(35.42)
Wrong and punishable	397	597	704	674	383	863	612	1,130
	(37.28)	(28.15)	(64.65)	(33.06)	(47.05)	(40.40)	(55.18)	(54.75)
Do not know	145	47	6	372	31	45	27	107
	(13.62)	(2.22)	(0.55)	(18.24)	(3.81)	(2.11)	(2.43)	(5.18)
Total	**1,065**	**2,121**	**1,089**	**2,039**	**814**	**2,136**	**1,109**	**2,064**

Note: values in parenthesis are percentage in column

Annexe 3: continued

Please tell me whether you think the action is not wrong at all, wrong but understandable, or wrong and punishable : Not paying the taxes they owe on their income								
	Tanzania	Uganda	Zambia	Zimbabwe	Mauritius	Sierra Leone	Niger	Togo
Not wrong at all	424	390	76	217	26	58	119	92
	(19.69)	(18.42)	(7.39)	(10.26)	(2.52)	(5.44)	(11.00)	(8.30)
Wrong but understandable	705	980	462	999	244	395	262	504
	(32.75)	(46.29)	(44.94)	(47.23)	(23.62)	(37.05)	(24.21)	(45.45)
Wrong and punishable	979	677	421	805	744	580	635	453
	(45.47)	(31.98)	(40.95)	(38.06)	(72.02)	(54.41)	(58.69)	(40.85)
Do not know	45	70	69	94	19	33	66	60
	(2.09)	(3.31)	(6.71)	(4.44)	(1.84)	(3.10)	(6.10)	(5.41)
Total	**2,153**	**2,117**	**1,028**	**2,115**	**1,033**	**1,066**	**1,082**	**1,109**

Please tell me whether you think the action is not wrong at all, wrong but understandable, or wrong and punishable : Not paying the taxes they owe on their income					
	Burundi	Cameroon	Ivory Coast	Guinea	Swaziland
Not wrong at all	188	38	59	153	40
	(17.38)	(3.47)	(5.35)	(14.18)	(3.68)
Wrong but understandable	218	311	398	313	395
	(20.15)	(28.43)	(36.08)	(29.01)	(36.34)
Wrong and punishable	662	689	574	564	619
	(61.18)	(62.98)	(52.04)	(52.27)	(56.95)
Do not know	14	56	72	49	33
	(1.29)	(5.12)	(6.53)	(4.54)	(3.04)
Total	**1,082**	**1,094**	**1,103**	**1,079**	**1,087**

Note: values in parenthesis are percentage in column

Annex 5: OLS and Logit regression

Dependent variable : Tax		OLS	Binary logit (Odds-ratio)	
Deterrence				
	Cheat	. 044***	.044***	
		(.005)	(.005)	
Fiscal exchange				
	Quality of health	. 027***	.028***	
		(.006)	(.006)	
	Quality of education	.030 ***	. 030***	
		(.006)	(.006)	
	Quality of water	.0002	0.0002	
		(0.005)	(0.005)	
	Quality of electricity	. 029***	. 028***	
		(.005)	(.005)	
Social interactions				
	Partial confidence	. 029***	.029***	
		(.005)	(.005)	
	Total confidence	.106***	. 106***	
		(.007)	(.007)	
	Transparency	. 047***	.047***	
		(.007)	(.007)	
	ethnic	. 024***	.023***	
		(.005)	(.005)	
	comparison of attitudes	. 040***	.040***	
		(.005)	(.005)	
	Corruption	-.016	-. 017***	
		(.006)	(.006)	
Control variables				
	Age	. 001***	. 001***	
		(.000)	(.000)	
	Area	.018 ***	. 018***	
		(.005)	(.005)	
	Gender	-.021***	-.021***	
		(.004)	(.004)	
	Primary education	.036***	.035**	
		(.007)	(.007)	
	Secondary education	.051***	.051***	
		(.007)	(.004)	
	Post-secondary education	. 097***	.096***	
		(.010)	(.009)	
	Constant	. 107***		
		(.013)		
	Country fixed effects	Yes	Yes	
	Regional fixed effects	yes	yes	
	Observations	40,023	40,023	
	Prob> F	0.000		
	Prob > chi2		0.000	

Robust SE in parenthesis- *p<0,10 **p<0,05 ***p<0,01