Working Group in African Political Economy (WGAPE) Spring 2016

WORK IN PROGRESS

FISCAL BEHAVIOUR AND INSTITUTIONS IN SUB-SAHARAN AFRICA

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Abstract: Despite the importance of fiscal resources on economic growth, their mobilization remains low in Sub-Saharan Africa (SSA) countries. This research analyses fiscal behaviour in SSA 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. The study also gives indirect effects through which quality of institutions affect taxes.

JEL Classification Codes: H3, O43.

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

1 Introduction

Taxation is crucial for national governments to finance key public goods such as education, health and infrastructure. But 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 fiscal behaviour, attitudes of individuals toward paying the tax, in SSA remains an important issue. Why do some people avoid paying the tax? The answer to this question will help many countries in tax policy implementation. However, explaining fiscal behaviour remains a difficult and somehow unresolved problem (Fjeldstad et *al.* 2012). This paper analyses fiscal behaviour using data from Afrobarometer's survey (round 5) on individuals' perceptions in 29 SSA countries.

Three main theories can be used to explain fiscal 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 fiscal behaviour by individuals' 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

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Fjelstad (2004) who did not. For the principle of social interactions, fiscal 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 fiscal behaviour (Ali et *al.*, 2013). A reasonable analytical framework to integrate them is needed. Thus, one related framework could be the institutional approach.

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 secured property right, fair system of law, public services suitably provided and sufficiently centralized and 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. However, 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. A binary logit model is used to analyse the impact of the quality of institutions on fiscal 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 9.767 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 the tax becomes greater than the one of an 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 quality of information and the comparison of people's behaviour on taxation explain significantly individuals' behaviour.

The paper enlarges the literature on fiscal behaviour and institutions. It offers a 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 may allow comparing countries and 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 fiscal behaviour and institutions. Section 3 reviews the

method of analysis and estimation techniques. In Section 4, the results are presented. Section 5 concludes, highlighting some policy implications.

2   Related literature

Fiscal behaviour has retained a huge attention in the literature. Five main theories can be retained in the literature of the fiscal behaviour (Ali et *al.*, 2013): 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.

2.1   Theory of economic deterrence

The economic deterrence's theory refers to elements that influence the fiscal 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 fiscal 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 fiscal behaviour even though it has been criticized, especially about the simplicity of its assumptions (Devos, 2014)[1]. 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) with laboratory experiments indicated that when individuals know they will be audited they act in accordance with the tax law. These experiments studies used students rather than real taxpayers; which may leads 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's

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[1] 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).

payment using new method on tax experiments in Minnesota. These tax experiments use large scale 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 area does not implicate only taxpayers. 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.

2.2   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 taxes actually serve 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 provide public goods. It could also refer to the notion of "tax of Lindahl[2]."

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, good governance policy to increase the number of inspectors for monitoring 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 the 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 regarding 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), Timmons (2005) found empirical evidence of this theory. As Ali et *al.* (2013), they indicated that this thesis is validated according to the nature of goods, according to the needs of individuals. In contrast, Fjeldstad (2004) found no solid empirical evidence of this theory in South Africa.

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

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 citizen and the tax authorities but also on the relationship between the citizen and all people in the country because 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 fiscal behaviour.

2.3   Theory of social interactions

This theory emphasizes on the relationship between social interactions and the payment of the tax. Indeed, the agent acts relatively to the behaviour of his peers such as parents, neighbours and friends. He will be tempted to imitate the fiscal behaviour of the latter. Also, because of social relationships, individuals could determine their behaviour to the extent that they will be easily detected 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.

Empirically, Torgler (2003) pointed that the perception of individuals that other individuals have tax compliance attitude has a positive effect on their own tax payment while a perception that other individuals 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 experiment method, Alm et *al.* (2013) show that the information that individuals have on 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 comparatively to the one of 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. 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 has not validated it for Kenya and Uganda.

In 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. 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, to understand the 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 this problem. Thus, fiscal behaviour may be explained by the institutional method.

The institutional approach point out the role of the quality of institutions in fiscal behaviour. Taking the above most common definition of institutions, that is to say the definition of North (1989), fiscal behaviour can be analysed by the institutional approach. According to North (1994), institutions are responsible of the incentive structure of economy and determine transactions costs which are crucial determinants of economic performance. The following section shows how to handle with the relationship between fiscal behaviour and institutions.

3   Modelling the impact of the quality of institutions on fiscal behaviour in SSA

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

3.1   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 in order to have an idea about the relationship between the variables before the estimations.

Data

Data come from the Afrobarometer survey round 5 for the period 2011/2013[3]. The survey evaluates citizens' attitudes toward democracy and governance, taxes, markets and civil society, etc. It covers 34 SSA countries with 1,200 observations per country (2400 observations in some countries) aged 18 and over. Countries sample were selected by the Afrobarometer on the basis of three criteria mainly. 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. This means that each country must have the required number of individuals for the survey; in addition to security and

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[3]Data freely available on http://www.afrobarometer.org

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 margin of 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 40,349 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) reported 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 refused to pay the tax will tend to give false answers. One way to deal with this bias is to use indirect questions.

The dependent variable is 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. But, this question can also lead to bias because one can think that action is bad but will still do it. However because of the modality 2 this bias can be little since those people may give this 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 3 and refuses otherwise. We give the modality 1 if the individual pays the tax and 0 otherwise, with 0 the reference value. The tax is therefore a binary variable taking the value 0 and 1. 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 3, 1 if the answer is 2 and 0 if the answers are 4 and 1. 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.

Independent variables: institutional quality variables

Institutional variables 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, the difficulty to 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 difficulty to cheat and 0 otherwise. When it is difficult to cheat, the ability of the state to collect taxes is strengthen and thus 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 to the difficulty to cheat, the variables expressing the quality of education, healthcare 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 the tax administration, the perception of the individual on the tax payment frequency from other agents in the country, the perception of corruption in tax administration, the quality of information, transparency and the 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, good quality information, 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 trust with 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 fiscal behaviour. He has shown that women tend to respect their tax burden relatively to men and that education promotes the payment of the 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, employment and housing area (rural, semi-urban or urban). These are variables taking the values 0 and 1 for employment and the values 0, 1, 2 for age and area. 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.

Descriptive Analysis

Descriptive analysis provides an overview of the perception of individuals on tax payment. Before analysing individual perception, looking at macroeconomic indicators may help to better understand SSA countries tax structure. The structure of tax revenue is quite varied but their nature depend on the country. The 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 or resources rents. 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 in the country 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
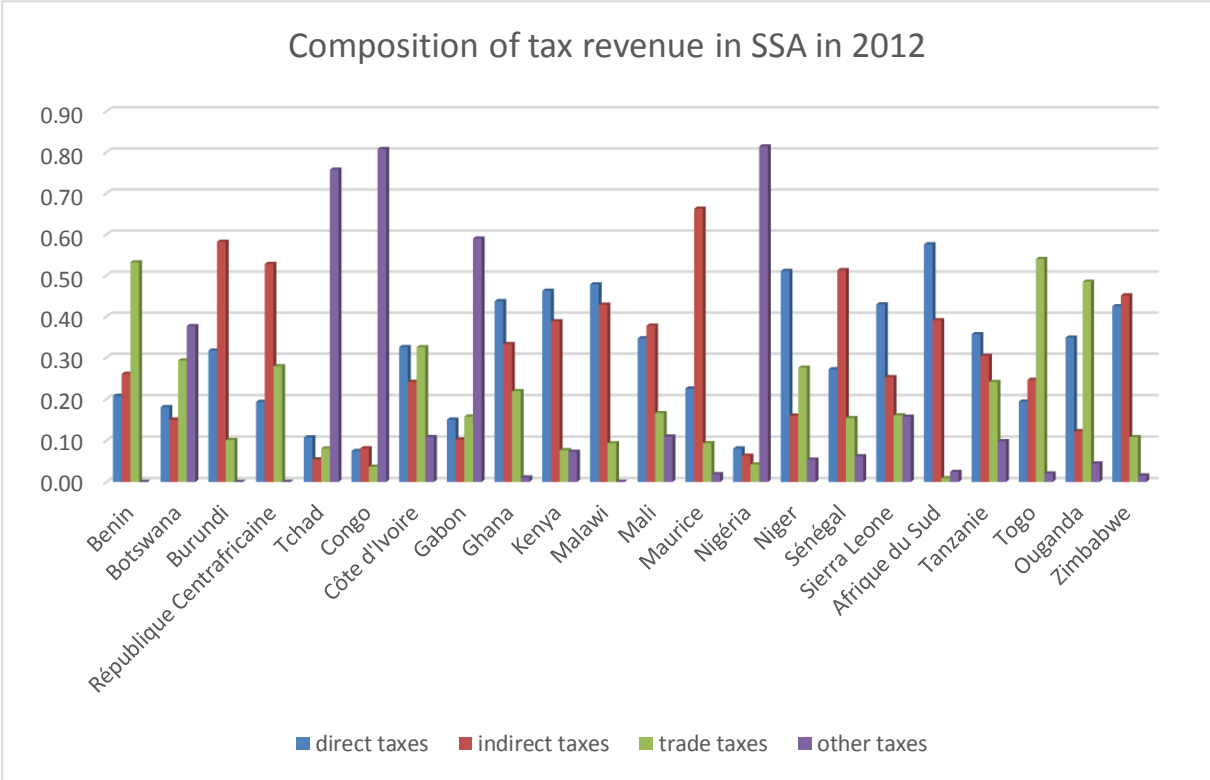
Source: author with Africa Economic Outlook data, 2015.

The difference in the tax structure in sub-Saharan Africa countries as shown in figure 1 can also be explained by the structural characteristics of the country. According to Keen (2012), geographical characteristics influence the tax structure. Small countries, distant island, can collect easily tax from border than large landlocked one. So despite having more efficient VATs, small countries seems to collect more customs duties. Keen (2012) also pointed out that the shape of the country could affect the tax structure such as the shape of the Gambia that allows it to collect a lot of taxes related to the re-export activities. According to this author, differences in tax structures exist between the different colonies. The tax structure is different for instance between Anglophone and Francophone countries and even those 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 (AEO, 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 above the capacity of the government (Brun et *al.,* 2014). Over the period 1999 to 2006, according to Buehn et *al.* (2010), the average size of the informal economy in SSA was 38.4%. This size is often very large in some countries. Nigeria and Benin respectively have an average size of the informal of 56.2% and 50.6%. Also, agricultural sector which employ many rural population is difficult to tax as it is usually scattered, small size and the average agricultural income is low. Despite the modernization of some tax administrations there is 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 to a certain extent an economic and financial independence. Indeed, resource-rich countries have certainly more tax revenue, but 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 are collected more directly. The

figure 2 shows the evolution of the tax revenue as a share of gross domestic product from 2000 to 2012 in 22 SSA countries. It shows different tax effort between countries especially in Botswana, Chad, Nigeria, Ghana and Zimbabwe. However, even if structural characteristics of countries may explain taxes mobilisation, 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

Evolution of tax revenue by country
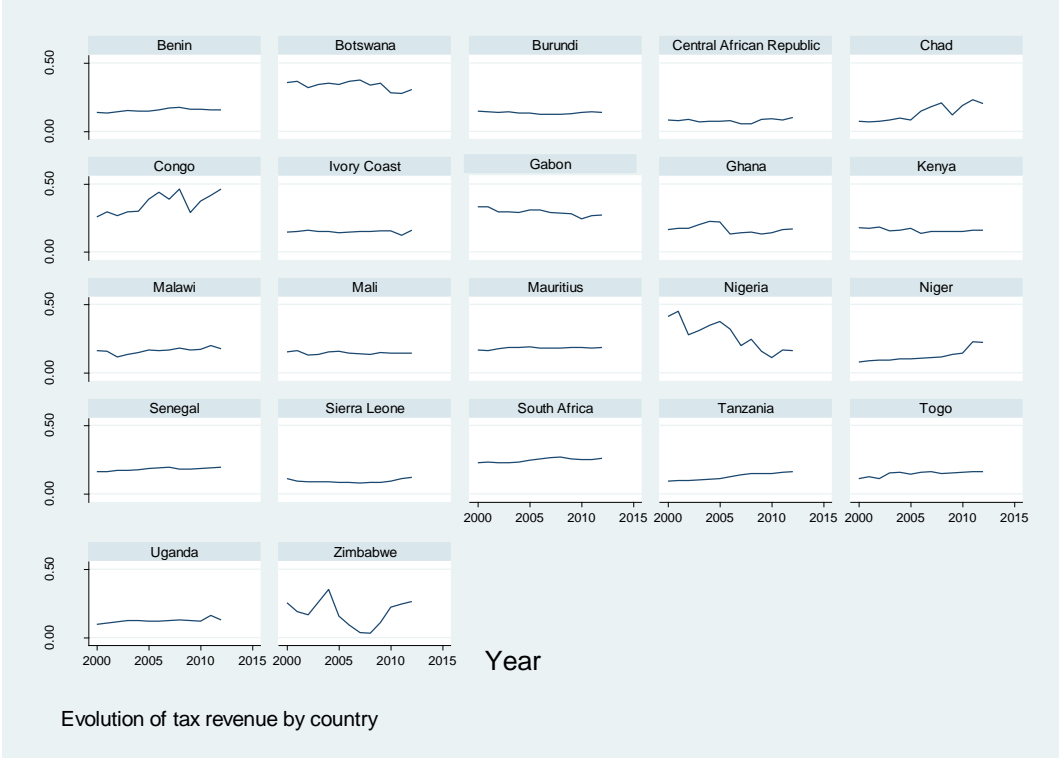
Source: Author, based on data Economic Outlook for Africa and World Bank, 2015.

The evolution of tax compared to the evolution of the quality of institutions may help to understand more the graph 2. Figure 3 shows the evolution of the tax revenue and the Worldwide Governance Indicator (WGI) such as corruption and government effectiveness in 2000-2012. It shows the evolution of tax revenue and governance indicators[4]. Corruption and government effectiveness have the same trend as the tax revenue which may indicate that there is a great correlation between them. Knowing the determinants of tax revenue would lead to a more easy mobilization.

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[4] Government effectiveness reflects perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. Corruption reflects perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests. These indicators are range from weak to strong governance performance. (World Bank, 2013).

Figure 3: Evolution of tax revenue and Worldwide Governance Indicators 2000-2012.
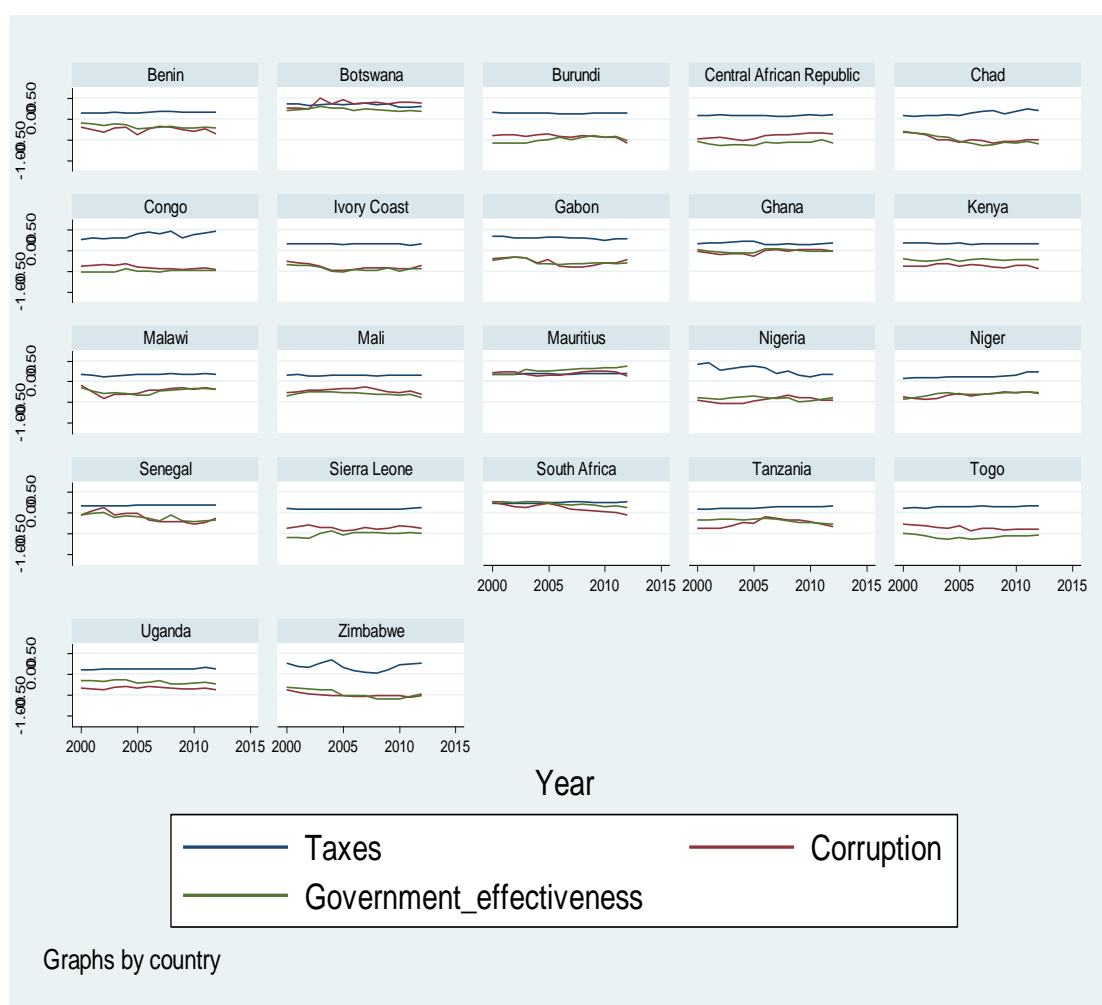
Source: African Economic Outlook and WGI, 2013.

For the microeconomic level, the survey gives some information on individual's perception on tax payment. The table 1 shows the answers of questions related to the dependent variable. It indicates that more than half, that is to say 52.35% individuals, refuse to pay the tax against 47.65% who pay it. 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. Annexe 3 in appendix gives the responses by country.

Table 1: Wrong or not to refuse to pay the tax

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	4,580	11.37
Wrong but understandable	14,386	35.71
Wrong and punishable	19,196	47.65
Do not know	2,121	5.27
Total	**40,283**	**100,00**

Source: Afrobarometer round 5.

To the question of why people refuse to pay the tax, many people think that avoiding paying the tax is due to a lack of resources or the high level of tax. Table 2 summarizes the answer to this question. For an overall of 36,006 individuals 35.01% believe that agents do not pay taxes because of lack of resources while 20.93% believe that this is due to the fact that taxes are high. The quality of public services is the third level with a percentage of 10.94%. Factors related to governance such as the unfairness of the tax system, waste of funds, theft of funds by leaders, ease of cheating and not taking into account the concerns by the government are given with low percentages respectively 8.29%, 5.71%, 4.38%, 2.98% and 1.62%. Factors such as the ignorance of taxpayers about the taxes (2.89%) and selfishness or greed taxpayers (1.09%) were mentioned. Other reasons are not mentioned here but have been given with a very low percentage.

Table 2: Why do some people avoid paying taxes and fees?

What do you think is the main reason that some people avoid paying government the taxes and fees that they owe?		
	Observation	Percentage
People cannot afford to pay	12,607	35.01
The taxes are too high	7,537	20.93
The poor services they receive from government	3,941	10.94
The tax system is unfair	2,985	8.29
People don't avoid paying	2,204	6.12
Government wastes tax money	2,057	5.71
Government officials steal tax money	1,578	4.38
They know they will not be caught	1,073	2.98
Ignorance	1,043	2.89
Government does not listen to them	585	1.62
Selfishness	396	1.09
TOTAL	**36,006**	**100**

Source: Afrobarometer round 5.

3.2   Estimation Method

The estimation method indicates the modelling tools needed to answer the research question. It describes the generalized structural equation modelling (GSEM) method and gives its econometric and graphic formulation and necessary tests.

Presentation of the GSEM

To determine the relationship between individuals' perceptions of the quality of institutions and their behaviour in the payment of taxes, we use GSEM. Indeed, the variable denoting the quality of institutions is a latent variable. 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.

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, or countable responses and multinomial 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.

Structural equation of the latent variable, quality of institutions

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:

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

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. Coefficient γ_i in matrix Γ describes relation between latent variable and exogenous variables. ζ is error term which mean is zero and covariance matrix ψ.

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:

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

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:

$$Y_j = v + \Lambda \eta_j + K x_j + \varepsilon_j \quad (3)$$

Where Y_j is a vector of responses of individuals j, v 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 ($\mu_j = \text{pr}\left(Y_j = 1 | \eta_j\right)$). The following equation shows the measurement model for the logit.

$$Y_j^* = g(u_j) = v + \Lambda \eta_j + K x_j \quad (4)$$

Or

$$logit(\mu_j) = \ln\left(\frac{\text{pr}(\mu_j)}{1 - \text{pr}(\mu_j)}\right) = v_i + \Lambda \eta_j + K x_j \quad (5)$$

With μ_j a vector of conditional mean of responses given η_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 is given by Λ and the indirect effects are given by the cross effect $\Lambda * \Gamma$ (6).

After the model's specification, it is important to discuss its identification in order to estimate and interpret the results.

Identification, estimation technique and test of specification

An unidentified model cannot be estimated. So, it is important to address the problem of identification of the model, to respecify it if necessary before the estimates.

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.

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. For regulatory constraints, GSEM can automatically solves the problem by imposing the coefficient from the

latent variable to be equal to 1. But according to Bollen (1989), a recursive model is always identified. Thus, our model is identified and can be estimated since it is recursive.

Estimation technique

The data we have could encourage using a multilevel model. But as D'Arcy (2011), we will not use it because it is the individual level that interests us in this paper. However, we use the cluster approach since we have people living in different countries. The cluster approach specifies that the standard errors allow for intragroup correlation, relaxing the usual requirement that the observations be independent. That is to say, the observations are independent across clusters (countries) but not necessarily within clusters. This approach affects the standard error and variance-covariance matrix but does not affect the regression coefficients.

There are two methods of estimation for GSEM. It is the method of maximum likelihood (default) and the method of quasi-maximum likelihood. The difference between the two is that the former requires a conditional normality while the second relaxes this assumption while estimating standard errors. We use the quasi-maximum likelihood method to generate cluster standard errors.

Test of specification

After the estimates, we make the specification tests to check whether the model is well specified. So, Wald test is considered in this paper. Wald test tests the model specification by imposing constraints on coefficients which allow us to verify the significance of variables. It performs Fisher or Khi-2 test.

4   Results

This section presents the estimations and the interpretations of the results. We present first, in table 3, Wald test for the fit of the binary and ordinal logit models. Wald test indicates that all the variables used in the regression explain jointly the dependant variable. In other words, the variables included in the regression improve statistically the fit of the models. Then, we can interpret results.

Table 3: Wald's test

	Binary logit	Ordinal logit
Chi^2	3164.62	7871.25
Degree of freedom	23	23
Prob > chi^2	0,0000	0,000

Source : author's computation in Stata

The OLS results presented in the Appendix give an overall indication of the effect of institutional variables on fiscal behaviour. Results show that variables such as cheat, quality of

health, quality of education, quality of electricity, confidence, quality of information, and comparison of attitudes have a significant effect and an expected sign on tax payment. 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. The table 4 reports the odds ratio of the binary and ordinal logit.

Institutional variables

Results show that the odds to pay tax for an individual with a perception of good quality of institutions is 9.767 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 a good quality of institutions are satisfy, government easily mobilizes 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 result 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 with the perception that it is not easy to cheat has .791 times more chance to pay tax against the one having a perception that it is easy to cheat[5]. This result confirms the hypothesis of economic deterrence. Given the existence of penalties for detection, individuals behave in accordance with the quality of controls' institutions. When these institutions are effective in order that it is difficult to cheat without detection, people tend to pay the tax. This result allows to state that effort should be made to help authorities to 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 are identified. This solution point out the role of informal economy on tax mobilization. A policy designed to improve the cadastre ability to register estates may shows more visibility on taxpayers and reduce fraud.

Our results also point out that an individual with the perception of a good quality of education services in the country has .429 times more chances to pay taxes compare to an individual who thinks that the services are poor quality. Similarly, an individual having a perception of a good quality of electricity service has .546 times more odds to pay the tax compare to that the one having a perception of poor quality. This odds is .488 times more for the perception of good quality of healthcare services. These results suggest that when these public services are well funded, people will honour their tax burden. Also, health, education and electricity are major concerns in SSA and people really have an interest in contributing to the enhancement of the quality of these goods. Thus, fiscal exchange's hypothesis is confirmed.

For the assumption of social interactions, results show that individuals with confidence in the tax authorities, even if that confidence is partial, are more likely to pay taxes compare to those having no confidence in the tax authorities. Indeed, for an individual with a high confidence in the tax authority the chance to pay the tax is 1.894 times more. Similarly, for an individual

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[5] Indirect effect= odds of latent variable*odds of the variable: .791= 9.767*0.081

having little or partial confidence that chance is .478 times more. This result shows how trust is an important element in tax policy even when that trust is not complete. It implies that the tax authority should work to obtain the confidence of taxpayers. Likewise, factors such as the quality of information, are also very important in the fiscal behaviour. The results show that an individual with a perceived ease of information on which tax to pay has 1.132 times more likely to pay the tax compare to those who think for a lack of information, confirming the importance of information in tax behaviour, characterized by an asymmetry of information. Moreover, results show that the odds to pay tax of people thinking that other people do not avoid paying the tax is .712 times more than those having the perception that other avoid paying tax. This is easily understandable since people in SSA are very cohesive.

Nevertheless, corruption and transparency are not significant to explain tax behaviour. The result seems surprising especially when we think that less corruption and transparency increase individuals'' confidence and encourage them to pay government's tax. However, this result may be understandable. Individuals may not worried directly about corruption, but rather expect a good quality outcomes such as shown in the fiscal exchange theory. The perception of ethnic discrimination is also no significant.

Control variables

Control variables indicating the characteristics of the individual are also crucial in the decision to pay the tax. These are the variables such as age, gender and the level of education. Indeed, individuals with age between 36 and 50 were .168 times more likely to pay tax than younger, between 18 and 35 years. In addition, individuals which ages more than 51 years have .300 times more odds to pay tax compared to individuals aged 18-35 years. This result shows that more people get older, more they are conscious of their tax liability. It confirms the results of Kirchler et al. (2011). Awareness policies should therefore be directed to more young people. The results also indicate that women have .083 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. Another possible explanation may be the fact that women are more connected to the informal sector than men in SSA. Policies reducing inequality would support tax policy.

As the quality of services in education, the level of education is an important factor in explaining the tax behaviour. Results show significant effect in secondary and post-secondary education's level. More specifically, the odds to pay tax are .244 and .503 times more respectively for the individuals with secondary and post-secondary level compared to a person who has no formal education. The primary education level is not significant to explain tax behaviour. This result points out the role of high level education on tax mobilization. Policies which encourage education contribute to strengthen tax policies. However, control variables such as area and employment status are not significant in explaining tax payment.

Robustness Check

The ordinal logit, for robustness check, confirms results except for the effect of corruption and quality of electricity services. Indeed, corruption become significant in explaining tax behaviour but has an unexpected sign. The odds to pay the tax is 1.474 times less when individuals perceive that tax authority is corrupt than when they perceive that the latter is not corrupt. This result may be explain by the fact that individuals perceive the corruption as an opportunity to pay less taxes. They may prefer a corrupt administration to pay less taxes rather than pay all taxes they owe. This result is confirmed even with the ordinary least square and the simple logit regressions. Then one should think deeply about this effect. A further analysis related to the relation between corruption and fiscal behaviour may be helpful. As for the quality of electricity services, it impact becomes non-significant; which is also supported by Ali et *al*. (2013) findings. These authors indicated that fiscal exchange theory is verified according to the nature of goods.

Table 4: Estimation with latent variable

	binary logit	ordinal logit
	Odds-Ratio	Odds-Ratio
Latent variable (Quality of institution)		
Deterrence		
Cheat	1.081***	1.276***
	(.017)	(.036)
Fiscal exchange		
Quality of health	1.050***	1.084***
	(.019)	(.034)
Quality of education	1.044***	1.125***
	(.010)	(.0365)
Quality of electricity	1.056**	1.095*
	(.029)	(.058)
Social interactions		
Partial confidence	1.049**	1.176***
	(.021)	(.045)
Total confidence	1.194***	1.442****
	(.038)	(.091)
Quality of information	1.116 ***	1.282***
	(.022)	(.049)
Transparency	1.026	1.023
	(.022)	(.038)
Ethnic	1.034	1.024
	(.033)	(.069)
Comparison of attitudes	1.073***	1.194***
	(.023)	(.014)
Corruption	.973	.849***
	(.031)	(.052)
Dependent variable (tax/taxes)		
Quality_institution	10.767***	7.079***

	(.879)	(.764)
Age1	1.168***	1.280***
	(.045)	(.069)
Age2	1.300***	1.468***
	(.052)	(.104)
Semi-urban	1.107	1.147
	(.197)	(.323)
Urban	1.197	1.338
	(.211)	(.393)
Gender	0.917***	.877***
	(.023)	(.033)
Primary education	1.157*	1.296*
	(.100)	(.178)
Secondary education	1.244***	1.552***
	(.097)	(.197)
Post-secondary education	1.503***	2.198***
	(0.138)	(.343)
Employment	.942	.958
	(.063)	(.091)
Country fixed effects	yes	Yes
Regional fixed effects	yes	Yes
Observations	40042	40042
Pseudolikelihood	-26830.698	-39438.909

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

5   Conclusion

Understanding the behaviour of individuals in their decisions to pay the tax is a challenge for the 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 generalized structural equations modelling method and using 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.

Our results show an aggregate impact of the quality of institution. Indeed, results show that the odds to pay tax is higher for an individual with a good perception of the quality of institutions than the odds 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 tax is more 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 hypothesis. When public services are well funded, people honour their tax burden. In fact, the individual perception of a

good quality of education, healthcare and electricity services increase his odds to pay taxes compare to an individual having the perception of poor quality of public services. However the quality of electricity services become non-significant with the robustness check, ordered logit, which is supported by Ali et *al*. (2013) findings who indicated that fiscal exchange theory is verified according to the nature of goods.

Social interactions assumptions are validated except the presence of corruption which was not significant with the binary logit but significant with the ordinal one and has an unexpected effect. A further analysis related to the relation between corruption and fiscal behaviour may be helpful. Factors such as confidence, total or incomplete, comparison of attitudes and quality of information are all significant determinant of fiscal behaviour and have expected sign.

In sum, the study shows that quality of institutions has effects, both direct and indirect, on the decision to pay tax. 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 policies 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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Appendix

Annexe 1: countries sample

Countries	Observations	Percentage
Benin	990	2.45
Botswana	1,064	2.64
Burkina Faso	1,083	2.68
Burundi	1,082	2.68
Cameroon	1,098	2.72
Cape Verde	1,103	2.73
Cote D'Ivoire	1,103	2.73
Ghana	2,204	5.46
Guinea	1,079	2.67
Kenya	2,167	5.37
Lesotho	1,028	2.55
Liberia	1,084	2.69
Madagascar	1,065	2.64
Malawi	2,125	5.27
Mali	1,089	2.70
Mauritius	1,033	2.56
Mozambique	2,066	5.12
Namibia	814	2.02
Niger	1,084	2.69
Nigeria	2,136	5.29
Senegal	1,109	2.75
Sierra Leone	1,066	2.64
South Africa	2,064	5.12
Swaziland	1,087	2.69
Tanzania	2,153	5.34
Togo	1,111	2.75
Uganda	2,117	5.25
Zambia	1,030	2.55
Zimbabwe	2,115	5.24
Total	**40,349**	**100**

Annexe 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.
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 information	Based on your experience, how easy or difficult is it to find out what taxes and fees you are supposed to pay to the government?	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?	2= over 50 ; 1=36-50 ; 0=18-35
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?	2=urban ; 1= semi-urban ; 0= rural
Employment	Do you have a job that pays cash income? If yes, is it a full-time or part-time? If no, are you presently looking for a job?	1=yes, full-time or part-time; 0= no, looking for a job or not looking for a job.
Country fixed effects	Gross domestic product per capita 2012	
Regional fixed effects	Region	Western Africa, East Africa, Southern Africa

Annexe 3 : Wrong or not to refuse to pay the tax (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

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	Cameroun	Côte d'Ivoire	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

Annexe 4: OLS regression

	Dependent variable : Tax (binary)/ taxes(ordinal)	
Deterrence		
Cheat	. 044***	.118***
	(.010)	(.019)
Fiscal exchange		
Quality of health	. 028**	.037**
	(.011)	(.015)
quality of education	.031 ***	. 055***
	(.011)	(.015)
quality of electricity	. 031**	. 041
	(.015)	(.024)
Social interactions		
Partial confidence	. 027***	.082***
	(.011)	(.018)
Total confidence	.101***	. 170***
	(.017)	(.026)
quality of information	. 063***	. 115***
	(.012)	(.017)
Transparency	. 014	.007
	(.012)	(.016)
ethnic	. 019	.008
	(.018)	(.032)
comparison of attitudes	. 039***	.085***
	(.012)	(.017)
Corruption	-.014	-. 083***
	(.017)	(.027)
Control variables		
Age1	. 037***	. 058***
	(.009)	(.012)
Age2	. 062***	. 088***
	(.009)	(.015)
Semi-urban	.024	. 030
	(.042)	(.065)
Urban	.043	. 068
	(.041)	(.068)
Gender	-.020***	-.030***
	(.006)	(.009)
Primary education	.035*	.061**
	(.020)	(.031)
Secondary education	.052***	.107***
	(.018)	(.028)
Post-secondary education	. 097***	.188***
	(.021)	(.033)
Employment	-.013	-.010
	(.016)	(.022)
Constant	. 131*	.704***
	(.078)	(.131)
Country fixed effects	Yes	Yes
Regional fixed effects	yes	yes
Observations	40042	40042

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

Annexe 5: Simple logit estimation

	binary logit	ordinal logit
	Odds-Ratio	Odds-Ratio
Dependent variable : Tax (binary)/ taxes(ordinal)		
Deterrence		
Cheat	1. 205***	1.349**
	(.056)	(.069)
Fiscal exchange		
quality of health	1. 125**	1.111**
	(.054)	(.048)
quality of education	1. 140***	1. 162***
	(.055)	(.048)
quality of electricity	1. 140**	1. 121*
	(.074)	(.075)
Social interactions		
Partial confidence	1. 122**	1.224***
	(.054)	(.060)
Total confidence	1.526***	1. 599***
	(.109)	(.118)
quality of information	1. 300***	1. 356***
	(.066)	(.066)
Transparency	1. 063***	1.038
	(.053)	(.048)
Ethnic	1. 083	1.035
	(.085)	(.089)
comparison of attitudes	1. 182***	1.248***
	(.059)	(.058)
Corruption	.939	. 823***
	(.070)	(.059)
Control variables		
Age1	1. 168***	1. 169***
	(.045)	(.041)
Age2	1. 300***	1. 282***
	(.052)	(.055)
Semi-urban	1.107	1. 086
	(.197)	(.193)
Urban	1.197	1. 198
	(.212)	(.219)
Gender	.917***	.917***
	(.023)	(.022)
Primary education	1.157*	1.185**
	(.100)	(.101)
Secondary education	1.244***	1.325***
	(.097)	(.100)
Post-secondary education	1. 503***	1.638***
	(.138)	(.145)
Employment	. 942	.970
	(.063)	(.059)
Observations	40042	40042

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

Annexe 6: Summary Statistics

Variables	Mean	Std. Dev.	Min	Max
tax	.476	.499	0	1
taxes	1.310	.739	0	2
age1	.270	.444	0	1
age2	.179	.384	0	1
Semi-urban	.614	.486	0	1
Urban	.369	.482	0	1
gender	.493	.499	0	1
Primary education	.321	.467	0	1
Secondary education	.362	.480	0	1
Post-secondary education	.115	.319	0	1
employment	.328	.469	0	1
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 information	.249	.432	0	1
cheat	.140	.347	0	1
quality of electricity	.368	.482	0	1
ethnic	.611	.487	0	1
comparison of attitudes	.715	.451	0	1
corruption	.834	.371	0	1
quality of health	.598	.490	0	1
Number of observation : 40042				

Source: Author's computation with Afrobarometer data round 5