

Trust to Pay?

Tax Morale and Trust in Africa

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Abstract

Although low tax morale hits developing countries hardest, little is known about its determinants in those countries. This paper examines the impact of trust in public institutions and the neighborhood on individual tax morale in four African countries: Algeria, Ghana, Morocco, and Nigeria. First, the paper provides theoretical foundations of such a relationship. Further, the paper uses the World Value Survey to estimate the effects of trust in public institutions and the neighborhood on individual tax morale. The

identification strategy employs the instrumental variables method and relies on historical data on the slave trade and the literature on the cultural heritage of trust. The paper finds that trust in public institutions and the neighborhood are largely associated with tax morale in the African countries under consideration. The findings are robust to an alternative identification strategy, additional controls, and a falsification test.

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1 Introduction

Domestic revenues in several African countries are scant and below the minimum level of 20 percent allowing them to achieve development goals (UNDP, 2010). In those countries, low domestic revenue limits the ability of governments to invest in development programs, improve economic efficiency, and reduce poverty (Baunsgaard and Keen, 2010; Agénor et al., 2008). Although developing countries are the hardest hit by taxpayer non-compliance (Fuest and Riedel, 2009), little is known about the determinants of tax compliance and tax morale in those countries, especially in Africa (D'Arcy, 2011; Fjeldstad and Semboja, 2001).

Tax morale is strongly associated with tax compliance, as highlighted by Luttmer and Singhal (2014). The authors define tax morale as "... an umbrella term capturing nonpecuniary motivations for tax compliance as well as factors that fall outside the standard expected utility framework". In addition to capturing citizens' intrinsic motivation to pay their taxes, tax morale also reflects, the feeling of being guilty or shame for failure to comply with tax obligations. This paper examines the role of trust in public institutions and the neighborhood on tax morale in four African countries: Algeria, Ghana, Morocco, and Nigeria. First, I discuss the theoretical foundations of the relationship between both dimensions of trust and tax morale based on the standard model of tax evasion from Allingham and Sandmo (1972). Further, to isolate the effects of trust in public institutions and the neighborhood on tax morale, I use individual-level data from the sixth wave of the World Value Survey (WVS) covering the 2010-14 period. Lastly, I employ an empirical methodology that accounts for potential endogeneity. The identification strategy relies on the instrumental variables (IV) method and takes advantage of the historical data on slavery at the tribe level and the literature on the cultural heritage of trust.

The slavery data are from Nunn (2008a) and Nunn and Wantchecon (2011) who document the number of slaves exported by the ethnic groups during both the transatlantic and the Indian Ocean slave trade. I first match these historical data with the ethnic group of each respondent in the WVS. Then, following Nunn and Wantchecon (2011) I build a variable cap-

turing the intensity of the slave trade. The latter is measured as the ratio of the number of slaves exported and the original land area of the tribe. The slave trade was characterized by a general environment of insecurity where individuals turned against each other, and slaves were captured through state-organized raids and warfare (Piot, 1996). Such an environment caused a culture of mistrust, which may persist to this day (Nunn and Wantchecon, 2011). The effects of the slave trade have therefore altered the cultural norms of the ethnic group exposed to it, affecting, thus, their level of trust. I hypothesize that the culture of mistrust may persist to this day and alter taxpayers' trust in public institutions and the neighborhood. As both trusts in public institutions and the neighborhood are potentially endogenous, I use two additional instruments for identification purposes relying on the literature on the cultural heritage of trust. This literature suggests trust is a part of the cultural heritage which is transmitted from one generation to the next and linked to the country or ethnic group of origin (Dinesen, 2011; Guiso et al., 2008; Uslaner, 2008; Rice and Feldman, 1997). Hence, cultural heritage is a key component of individual-level behaviors such as trust (Woolcock and Narayan, 2000), as is the prevailing institutional environment (Dinesen, 2011). Accounting for both factors, the additional instruments are measured as the average trust in public institutions and the neighborhood in the same ethnic group and community cluster.

The results show that both trust in public institutions and the neighborhood are largely associated with tax morale in Algeria, Ghana, Morocco, and Nigeria. A one-unit increase in trust in public institutions raises individual tax morale between 1.007 and 1.121 units, on a ten-point scale. Similarly, a one-unit increase in trust in the neighborhood increases tax morale between 1.029 and 1.043 units, on a ten-point scale. The magnitude of the effects is large and statistically significant in all specifications. The findings suggest that the relationship between the taxpayer and the state can be assimilated to an implicit contract based on trust. The level of trust reflects satisfaction about such contract, thereby taxpayers willing to pay their taxes. Also, by reinforcing the social capital, trust in the neighborhood might ease taxpayers' willingness to contribute to collective actions such as the provision of public goods and services. As Scholz and Lubell (1998) argue, without trust the potential

benefits of collective actions will depend solely on altruism and enforcement mechanisms that ensure that the benefits of opportunistic behavior are lower than the costs associated with deviation. By playing an important role in maintaining the credibility, improving the social capital, and reducing costly surveillance and sanctions (Coleman, 1994; Ostrom, 1990), trust in public institutions and the neighborhood stimulates the willingness of taxpayers to pay their taxes. The IV regressions produce statistics suggesting that the model is well-identified, and both pertinence and orthogonality conditions are met. Moreover, sensitivity analyses show that the findings are robust to alternative estimation methodology, a falsification test, and additional control variables at the individual and country level. Finally, the analysis of potential bias arising from the selection on unobservables exploiting the insight from Altonji et al. (2005) allows concluding that it is less likely that unobservable characteristics entirely drive the estimated effects.

The literature on tax morale can be summarized in two main categories highlighting the role of social and cultural factors and the effects of the interactions between public authorities and taxpayers, respectively. First, a large part of the literature identifies norms, values, religiosity, culture, and temporary shocks as factors that could explain the taxpayer's willingness to pay his taxes. Besley et al. (2015), Bénabou and Tirole (2011) and Myles and Naylor (1996) show for instance that social norms about tax compliance drive taxpayers' intrinsic motivation to pay their taxes. Alm and Torgler (2006) find that cultural differences between the United States and Europe explain the difference in tax morale. Similarly, tax culture in the country of origin is a significant determinant of individual tax morale in the destination country (Kountouris and Remoundou, 2013). Moreover, the literature highlights that temporary shocks such as tax reforms affect individual tax morale (Besley et al., 2015), as does religiosity (Torgler, 2006), and the contributions of the fellow-citizens (Fortin et al., 2007; Frey and Torgler, 2007). On the other side, tax morale might be interlaced with the political and institutional environment that shape the social contract between the state and the citizens (Mascagni, 2018). This is in line with the fiscal exchange and political legitimacy theories suggesting that attitude toward taxes is affected by the expected benefits from the

government and the extent to which taxpayers trust their government.¹ [Ali et al. \(2014\)](#) find that tax attitude is positively associated with the provision of public good in Kenya, Tanzania, Uganda, and South Africa. This corroborates evidence from [Smith and Stalans \(1991\)](#). The latter highlight that positive actions of states tend to improve the attitudes and commitments of the taxpayer against the tax system. Also, actors such as a progressive tax system are likely to increase tax morale ([Doerrenberg and Peichl, 2013](#)), as is trust in the government ([Slemrod, 2002](#)), and trust in the tax authorities ([Wahl et al., 2010](#); [Kirchler et al., 2008](#)).

This paper brings at least two contributions to the literature on the determinants of tax morale. First, it considers trust in public institutions and the neighborhood and examines their impact on tax morale. Although examining the role of trust in the neighborhood is a novelty, the impact of trust in public authorities on tax morale has been explored in studies such as [Kirchler et al. \(2008\)](#), [Slemrod \(2002\)](#), [Scholz and Lubell \(1998\)](#). However, compared to previous studies that focus mainly on the trust in the government and tax authorities, this paper considers five additional dimensions of trust in public authorities that are the trust in the parliament, legal system, civil service, education system, and police. Second, to the best of my knowledge, the paper is the first to employ the instrumental variable method to explore the determinants of tax morale across countries. Moreover, the paper adds to the limited literature on the determinants of attitude towards taxes in Africa using a cross-country analysis ([Ali et al., 2014](#); [Sacks, 2012](#); [D'Arcy, 2011](#); [Levi et al., 2009](#)).

The next section presents the theoretical foundations. Section 3 presents empirical supporting evidence of the impact of trust in public institutions on tax morale consistent with testable predictions of the model. Section 4 checks the sensitivity of the findings. Section 5 provides some concluding remarks.

¹See for instance [Ali et al. \(2014\)](#), [Kirchler et al. \(2008\)](#), and [Moore \(2004\)](#) for extensive discussion.

2 Theoretical Foundations

The standard model of tax evasion is based on the paper of [Allingham and Sandmo \(1972\)](#). In this model, the taxpayer i has at each period an exogenous income Y_i , that is not known by tax administration. The taxpayer declares to the tax administration an income D on which a tax τ is levied. I assume in this paper that the taxpayer chooses a share ϑ of his income Y_i that he escapes i.e., $D_i = (1 - \vartheta_i)Y_i$.

Let f be the fine paid by the taxpayer if his tax evasion activities are discovered. In this case, the taxpayer's expected income can be written as follows:

$$Y_{ai} = Y_i - \tau(1 - \vartheta_i)Y_i - f\tau\vartheta_iY_i$$

However, the taxpayer's income if he is not discovered will be:

$$Y_{ni} = Y_i - \tau(1 - \vartheta_i)Y_i$$

At each period, the taxpayer chooses the level of tax evasion ϑ that maximizes his expected utility:

$$\max_{\vartheta_i} Eu_i(Y_i) = pu_i(Y_{ai}) + (1 - p)u_i(Y_{ni}) \quad (1)$$

where, p is the detection probability.

$$\max_{\vartheta_i} Eu_i(Y_i) = pu_i[Y_i - \tau(1 - \vartheta_i)Y_i - f\tau\vartheta_iY_i] + (1 - p)u_i[Y_i - \tau(1 - \vartheta_i)Y_i] \quad (2)$$

The taxpayer is assumed to be risk averse, implying that his private utility $u_i()$ is an increasing and concave function of the level of consumption. The first order will be

$$\frac{\partial Eu_i(Y_i)}{\partial \vartheta_i} = 0 \Rightarrow p(1 - f)\tau Y_i u'_i(Y_{ai}) + (1 - p)Y_i \tau u'_i(Y_{ni}) = 0$$

The optimal level of tax evasion can be obtained from Kuhn-Tucker conditions and be written as:

$$\vartheta_i^* = \vartheta_i^*(\tau, f, p, Y_i) \quad (3)$$

Thus, according to [Allingham and Sandmo \(1972\)](#)'s model the proportion of evaded income depends on the extent of deterrence policies like detection probabilities and fines. This means that an increase in detection probabilities p or on the fine f reduces tax evasion.

However, considering the weakness of actual detection policies (low detection probabilities and weak fine), one should observe a higher tax evasion than there really is ([Alm et al., 1992](#)). The standard model takes into account neither taxpayers perception about public services i.e. transparency and fairness ([Cummings et al., 2009](#)), nor the way in which public expenditures are determined ([Alm et al., 1993](#)),² nor the way in which application rules are determined ([Alm et al., 1999](#)), nor the social norms ([Besley et al., 2015](#); [Bénabou and Tirole, 2011](#); [Myles and Naylor, 1996](#)) and the collective actions ([Naylor, 1989](#)).

Based on [Brock and Durlauf \(2001\)](#) and [Fortin et al. \(2007\)](#),³ I extend the standard model by including an individual institutional utility function in the taxpayer private utility function. More specifically, the extended model presents a general framework in which there are both social interaction function $S_i(\vartheta_i, Z_i)$ and institutional interaction function $A_i(\vartheta_i, X_i)$. The latter depends on the share of income evaded ϑ_i and respectively on a set of variables Z_i and X_i . I hypothesize that individual social and institutional interactions functions are linear in ϑ_i .⁴ This assumption entails that the marginal social and institutional functions depend only on variables X_i and Z_i .

²[Alm et al. \(1993\)](#) find for example that tax morale is higher when public goods are voted rather than when they are imposed.

³[Brock and Durlauf \(2001\)](#) is the first paper to include an individual social utility function in the private utility function. [Fortin et al. \(2007\)](#) apply [Brock and Durlauf \(2001\)](#)'s framework to the standard model of tax evasion by adding a social interactions function.

⁴[Fortin et al. \(2007\)](#) make the same assumption.

Taxpayers' expected utility will be :

$$EV_i(Y_i) = Eu_i(Y_i) + S_i(\vartheta_i, Z_i) + A_i(\vartheta_i, X_i)$$

The first component is the expected utility in the standard model of tax evasion. The second and the third components are respectively social and institutional utility associated to tax evasion.

$$S_i(\vartheta_i, Z_i) = s_i(Z_i)(1 - \vartheta_i)Y_i$$

$$A_i(\vartheta_i, X_i) = a_i(X_i)(1 - \vartheta_i)Y_i$$

$s_i(Z_i)$ and $a_i(X_i)$ are respectively social and institutional marginal utility associated to tax evasion. The expected utility function can be written as

$$EV_i(Y_i) = pu_i[Y_i - \tau(1 - \vartheta_i)Y_i - f\tau\vartheta_iY_i] + (1 - p)u_i[Y_i - \tau(1 - \vartheta_i)Y_i] + [s_i(Z_i) + a_i(X_i)](1 - \vartheta_i)Y_i \quad (4)$$

where,

$$a_i(X_i) = a(VT_i, \epsilon_i) \quad (5)$$

$$s_i(Z_i) = s_i(HT_i, K_i, \epsilon_i)$$

I assume that the marginal institutional utility depends on trust in public institutions VT_i and a random term ϵ_i that captures unobservable individual characteristics and attributes that are common to all individuals in the same community. This suggests that the relationship between the taxpayer and the state can be assimilated in terms of a psychological or implicit contract. This contract involves a rewards system, punishments, loyalty and mutual expectation. Thus, if the taxpayer is satisfied with this relationship, his confidence in public institutions increases. In this case, the taxpayer's intrinsic motivation to pay his taxes will be high. Trust in public institutions therefore has a positive effect on tax morale i.e. the marginal institutional utility of tax evasion is expected to be positive. Following [Spicer and Lundstedt \(1976\)](#) and [Alm et al. \(1992\)](#), I assume that public goods funded through taxes are fully taken into account in individual utility. The slackness of this assumption is justified by the inclusion of confidence in public institutions in the tax evasion model. Indeed, the

implicit contract between the taxpayer and the state requires the provision of a desirable level of public good (quality and quantity). Thus, dissatisfaction with public services and expenditures causes deterioration of taxpayers' trust in public institutions. Also, the signals sent by the public institutions (failure, wastage, inefficiency, corruption, abuse of power) affect the taxpayers' confidence in public institutions. Regarding the marginal social utility of tax evasion, I assume that it depends on trust in the neighborhood and a number of individual characteristics. Trust in the neighborhood is perceived here as an integral part of the social capital⁵ as it eases the involvement of taxpayers in collective actions such contributing to the provision of public goods and services. Hence, a high level of trust in the neighborhood reinforces the social capital and stimulates the taxpayers' willingness to pay their taxes. Assuming that preferences satisfy Von Neumann-Morgenstern axioms, the taxpayer problem can be written as:

$$\begin{aligned}
\max_{\vartheta} \quad & EV_i(Y_i) = pu_i[Y_i - \tau(1 - \vartheta_i)Y_i - f\tau\vartheta_iY_i] + (1 - p)u_i[Y_i - \tau(1 - \vartheta_i)Y_i] + [s(Z_i) + a(X_i)](1 - \vartheta_i)Y_i \\
& s/c \\
& 0 \leq \vartheta_i \leq 1 \\
& a_i(X_i) = a_i(VT_i, \epsilon_i) \\
& s_i(Z_i) = s_i(HT_i, K_i, \epsilon_i)
\end{aligned} \tag{6}$$

First-order conditions are:

$$p(1 - f)\tau Y_i u'_i[Y_i - \tau(1 - \vartheta_i)Y_i - f\tau\vartheta_iY_i] + (1 - p)Y_i \tau u'_i[Y_i - \tau(1 - \vartheta_i)Y_i] - [a_i(VT_i, \epsilon_i) + s(HT_i, K_i, \epsilon_i)]Y_i = 0$$

Using the Kuhn-Tucker conditions, the optimal level of tax evasion will be:

$$\vartheta_i^* = \vartheta_i^*(\tau_c, f_c, p_c, VT_i, HT_i, K_i, \epsilon_i)$$

where, i and c are respectively individual and country indexes.

⁵See the seminal work of [Putnam et al. \(1994\)](#) for extensive discussion of social capital and its effects on collective actions.

The optimal level of tax evasion can be written as,

$$\vartheta_i^* = \vartheta_i^*(\tau_c, f_c, p_c, VT_i, HT_i, K_i, \epsilon_i) \quad (7)$$

By taking the total derivatives of tax evasion relative to trust in public institutions, mean of tax evasion, fine, detection probability, we have:

$$\frac{d\vartheta_i}{dVT_i} = \frac{\frac{\partial a_i(VT_i, \epsilon_i)}{\partial VT_i}}{(\tau Y)^2 [p(1-f)^2 u_i''(Y_{ai}) + (1-p)u_i''(Y_{ni})]} \quad (8)$$

$$\frac{d\vartheta_i}{dHT_i} = \frac{\frac{\partial s_i(HT_i, K_i, \epsilon_i)}{\partial HT_i}}{(\tau Y)^2 [p(1-f)^2 u_i''(Y_{ai}) + (1-p)u_i''(Y_{ni})]} \quad (9)$$

$$\frac{d\vartheta_i}{df_c} = \frac{p(1-f)\tau Y u''(Y_a)}{(\tau Y)^2 [p(1-f)^2 u''(Y_a) + (1-p)u''(Y_n)]} \quad (10)$$

$$\frac{d\vartheta_i}{dp_c} = \frac{(f-1)\tau u'(Y_a) + \tau Y u'(Y_n)}{(\tau Y)^2 [p(1-f)^2 u_i''(Y_{ai}) + (1-p)u_i''(Y_{ni})]} \quad (11)$$

From this model and expression above, I can draw four predictions regarding tax evasion:

1. $\frac{d\vartheta_i}{dVT_i} \leq 0$
2. $\frac{d\vartheta_i}{dHT_i} \leq 0$
3. $\frac{d\vartheta}{dp} \leq 0$
4. $\frac{d\vartheta}{df} \leq 0$

Predictions 1 and 2 indicates that an increase of trust in public institutions and the neighborhood would reduce tax evasion. This means that the more taxpayers' trust in public institutions and the neighborhood are high, the higher their intrinsic motivation to pay taxes will be. This suggests that confidence in public institutions and the neighborhood reflect taxpayer's satisfaction about the implicit contract between him, the state, and co-citizens.

Predictions 3 and 4 state respectively that an increase in both detection probability and

finer reduces tax evasion. The last two predictions are exactly the same as in [Allingham and Sandmo \(1972\)](#) model.

3 Empirical Approach

This section estimates the impact of trust on tax morale using equation (7). From the theoretical model to the empirical approach, I assimilate tax evasion to tax morale due to data constraints. Unlike tax evasion data that are scant at the individual level, information on tax morale are relatively available, extensively used as a proxy of attitude toward taxes⁶ and cover a couple of African countries. Moreover, experimental evidence and results from cross-country surveys suggest that tax morale is an important predictor of tax evasion ([Cummings et al., 2009](#)). The authors highlight, for instance, that individuals that perceive tax avoidance to be moral are more likely actually to evade their taxes. The next sections present the empirical specification, the data, and the econometric issues before discussing the findings.

3.1 Empirical specification

The econometric specification is based on the linearized form of the latent tax morale from equation (7):

$$\vartheta_{ilc} = \alpha VT_{ilc} + \beta HT_{ilc} + \gamma K_{ilc} + \eta_c + \epsilon_{ilc} \quad (12)$$

where, i , l and c are respectively individual, location (city) and country indexes. ϑ_{ilc} denotes tax morale, VT_{ilc} trust in public institutions, HT_{ilc} trust in the neighbourhood. K_{ilc} refers to individual taxpayer characteristics and η_c the country fixed effects which allow controlling for important omitted variables at the country such as the deterrence probability, the culture, norms about tax morale, and formal institutions. In the WVS,⁷ respondents are asked to

⁶See for instance [Ali et al. \(2014\)](#), [Frey and Torgler \(2007\)](#), [Torgler \(2006\)](#) and [Torgler \(2005\)](#).

⁷The Afrobarometer data contain similar questions on tax morale and trust in public institutions. However, to the best of my knowledge the survey does not collect information on trust in the neighborhood and confidence in civil service.

state if cheating on tax can always be justified, never justified or something in between.⁸ Responses are on a 10-point scale and relabeled so that 1 corresponds to "always justified" and 10 to "never justified". The analysis uses this variable to capture tax morale, where higher scores refer to higher tax morale. As discussed above, I employ both vertical and horizontal dimensions of trust.

The vertical dimension refers to trust in public institutions and measured as a combination of confidence in government, parliament, the legal system, civil service, police, and education system. The variable captures all the dimensions of trust between taxpayers and the state in the data. For each component, taxpayers are asked to tell how much confidence they have in the organization. Responses are on a 4 point scale, where 1 corresponds to "a great deal of confidence" and 4 to "none at all". The vertical dimension of trust is an aggregate average of six dimensions public institutions mentioned above. The horizontal dimension of trust refers to trust in the neighborhood, which is captured by a categorical variable on a 4 point scale, measuring how much confidence the respondent has in his neighborhood. The value 1 corresponds to "trust completely" and 4 to "do not trust at all". I reverse the scale of both variables to simplify the interpretation so that higher scores denote a higher level of trust.

The model includes several individual characteristics motivated by previous studies on the determinants of tax morale. In particular, I control for age, education, religion, employment status and type of employment, marital status, gender, economic class, financial satisfaction, and other individual characteristics. The variable *age* is included to reflect the fact that individual tax morale may depend on age. According to the literature, I expect a positive or a non-significant effect of age on tax morale. [Tittle \(1980\)](#) and [Friedman et al. \(2000\)](#) show the evidence of positive effect of age on tax morale, while other papers like [Spicer and Becker \(1980\)](#) and [Mason and Calvin \(1984\)](#) find a non-significant effect of age on tax morale.

The variable *religious* controls for the taxpayers' beliefs. Like [Torgler \(2006\)](#), I expect that being religious increases tax morale. According to [Spicer and Becker \(1980\)](#), [Tittle \(1980\)](#)

⁸The question is: "Please, tell me whether you think that cheating on tax, if you have the chance, can always be justified, never be justified, or something in between."

and the social psychological literature, women are more compliant than men. Hence, to take into account the impact of gender on tax morale, I include a gender variable, *gender*, which is equal to 1 if the taxpayer is a man and 0 otherwise. I control for the employment status by including dummy variables capturing whether the taxpayer is a full-time employee, part-time employee, self-employed, retired, housewife not otherwise employed, student or unemployed (reference group: other). Also, working in the public sector or the private sector may affect individual tax morale. Thus, I include two dummy variables *public employee* and *private employee* that indicate if the taxpayer works in the public or private sector.

I control also for marital status by including dummy variables (*single, living together, married, divorced, separated*) that indicate if the taxpayer is single, married, divorced, separated or living together (reference group: widow). [Tittle \(1980\)](#) shows that the tax morale of married persons is higher than that of single persons. The author argues that married persons are more constrained by their social network than single persons. Based on the theory of aspiration,⁹ I include variables accounting for economic and financial satisfaction of the respondent. One might expect that the taxpayers who are least satisfied financially are more likely to engage in tax evasion because they aspire for a better financial situation. The variable measures how to satisfy are the respondent with the financial situation of his household. Similarly, the taxpayer's economic class can affect his motivation to pay taxes. I include a set of dummy variables, *upper class, uppermiddle class lower class* and *working class* (reference group: lower-middle class) to capture the impact of economic class on tax morale. Each dummy variable captures the economic group to which the respondent reports belonging.

I control for the highest level of education attained by the taxpayer (*education*). The more the taxpayer is educated, the better he might know the tax system (strengths and weaknesses) and the uses of collected resources through taxes. Thus, on the one hand, the taxpayer can use his knowledge to detect flaws and make tax evasion and, on the other hand, the latter can have a higher motivation to pay his taxes as he might better evaluate the benefits of collective action. As [Lewis \(1982\)](#) and [Torgler \(2006\)](#), I do not expect education to have a

⁹See [Simon \(1955\)](#) and [Kahneman and Tversky \(1979\)](#).

specific effect on tax morale, it can increase or decrease a taxpayer's tax morale. The variable is ranged from 1 indicating "no education" to 9 indicating "university-level education, with the degree".

I control for additional individual characteristics described as follows. The political position is a ten-point scale ranking information capturing whether the taxpayer is from "the left" or the "right" on the political scale. The higher the value, the more the respondent is on "the right" politically. To account for taxpayer's attitude towards redistribution and freedom of speech, I include two variables assessing (i) if the taxpayer sees taxing the rich and subsidize the poor as an essential characteristic of a democracy, and (ii) the importance of freedom of speech. The latter is a dummy variable that takes 1 if freedom of speech is important and 0 otherwise. Attitude towards taxes is ranking information on a ten-point scale where 10 corresponds to "essential characteristic of democracy" and 1 "not an essential characteristic of democracy". The analysis controls for the taxpayer's perception that the human rights are respected, and includes a dummy variable that takes 1 if the respondent is the chief wage earner of the household and 0 otherwise. Finally, I control for the ethnolinguistic and religious fragmentation measured as the average of the proportion of taxpayers from the same ethnic group and the share of taxpayers from the same religious group at the community level. The additional individual characteristics are included to isolate the effects of trust in public institutions and the neighborhood on tax morale. All questions associated with these individual characteristics are presented in [Table 1](#) below.

Table 1: Description of variables

Variables	Questions	Min	Max
Tax morale	Please tell me for each of the following actions whether you think it can always be justified, never be justified, or something in between: "Cheating on taxes if you have a chance"	1	10
Trust in public institutions	I am going to name a number of organizations. For each one, could you tell me how much confidence you have in them: is it a great deal of confidence, quite a lot of confidence, not very much confidence or none at all? (Police, Courts, Government in your nation's capital, Parliament, Civil service, Universities)	1	4
Trust in the neighborhood	I'd like to ask you how much you trust people from various groups. Could you tell me for each whether you trust people from this group completely, somewhat, not very much or not at all?	1	4
Religiosity	Independently of whether you attend religious services or not, would you say you are "A religious person", "Not a religious person", "An atheist"	0	1
Age	Can you tell me your year of birth, please?	18	98
Gender	Male/Female ? (Male=1, Female=0)	0	1
Employment status	Are you employed now or not? If yes, about how many hours a week? If more than one job: only for the main job (Full time employee, Part time employee, Self employed, Retired/pensioned, Housewife, Student, Unemployed, Other)	0	1
Economic class	People sometimes describe themselves as belonging to the working class, the middle class, or the upper or lower class. Would you describe yourself as belonging to the Upper class, Upper middle class, Lower middle class, Working class, Lower class?	0	1
Education	What is the highest educational level that you have attained? (No formal education, Incomplete primary school, Complete primary school, Incomplete secondary school: technical/vocational type, Complete secondary school: technical/vocational type, Incomplete secondary: university preparatory type, Complete secondary: university preparatory type, Some university level education, without degree, University-level education, with degree)	1	9
Marital Status	Are you currently: Married, Living together as married, Divorced, Separated, Widowed, Single	0	1
Financial satisfaction	How satisfied are you with the financial situation of your household? Please use this card again to help with your answer (1=completely dissatisfied, 10=completely satisfied)	1	10
Wage earner	Are you the chief wage earner in your household?	0	1
Political position	In political matters, people talk of "the left" and "the right." How would you place your views on this scale, generally speaking?	1	10
Redistribution	Many things are desirable, but not all of them are essential characteristics of democracy. Please tell me for each of the following things how essential you think it is as a characteristic of democracy. Use this scale where 1 means "not at all an essential characteristic of democracy" and 10 means it definitely is "an essential characteristic of democracy"	1	10
Fragmentation	Average of the proportion of taxpayers from the same ethnic group and the share of taxpayers from the same religious group at the community level	0	1
Human rights	How much respect is there for individual human rights nowadays in this country? Do you feel there is "A great deal of respect for individual human rights", "Fairly much respect", "Not much respect", "No respect at all"	1	4

3.2 Data

The empirical approach uses the data from the sixth wave of the World Value Survey (WVS) on four African countries: Algeria, Ghana, Morocco, and Nigeria.¹⁰ In the survey, respondents are interviewed on their attitudes concerning economic and social contemporary issues, family, religion, and work. The WVS is widely used in political economics, sociology and economy in many papers, including [Knack and Keefer \(1997\)](#), [Zak and Knack \(2001\)](#), and [Nunn and Wantchecon \(2011\)](#). Moreover, using the experimental data of the *Reader's Digest*,¹¹ [Knack and Keefer \(1997\)](#) provide empirical proof of the validity of these data. Indeed, they show the existence of a strong correlation between the measure of trust in the WVS and the number of wallets lost and returned with their content intact in many countries.

Figure 1 depicts the distribution of tax morale by country. As the figure shows, the majority of respondents declare high levels of tax morale, while a minority state lower tax morale. In Ghana and Morocco, the share of respondents stating that cheating on taxes is never justified is close to 80 percent, while the same proportion is about 60 and 40 percent in Algeria and Nigeria respectively. This highlights heterogeneity in attitudes toward taxes both between and within countries. Figure 2 shows the relationship between tax morale and trust in the data graphically. It plots the average trust in public institutions and the neighborhood against tax morale. As expected, both trust in public institutions and the neighborhood are positively correlated with tax morale, with a more pronounced relationship for trust in public institutions.

In Table 2, I present some individual-level descriptive statistics. The standard errors are presented in parenthesis. The first columns show the summary statistics for each country while the last column gives the statistics for the full sample. Respondents in Algeria report a lower level of tax morale (7.12) compared to respondents in Morocco (9.49), Ghana (9.35), and

¹⁰The sixth wave of the WVS covers three additional African countries, which are the Arab Republic of Egypt, Rwanda, and Zimbabwe. Those countries are not considered in this study as ethnic origins of the respondents are not well documented, making it impossible to employ the identification strategy.

¹¹This experimental study was conducted in several European countries and the United States. The experiment took place in several cities and consisted of losing the wallets containing \$50 each, with the owner's address and phone number. See *The Economist of 22 June 1996*.

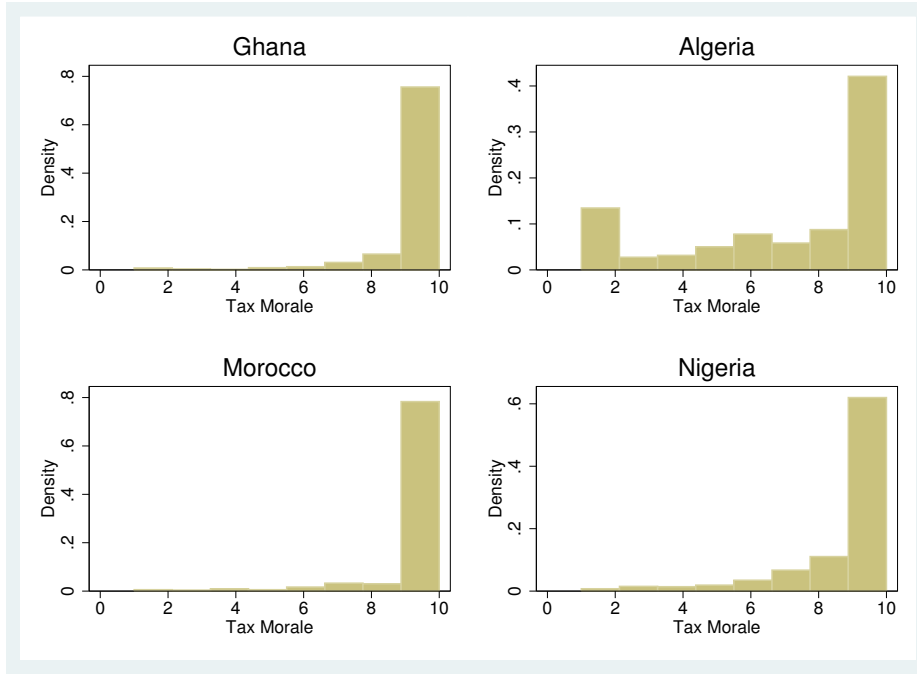
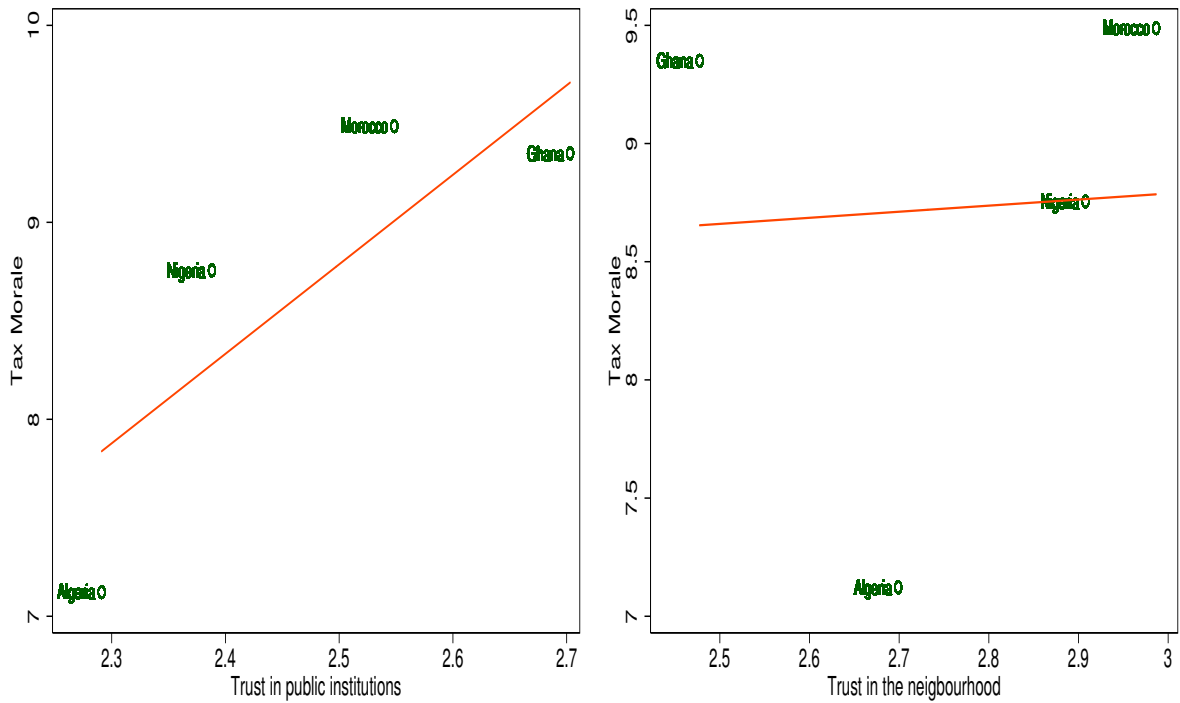


Figure 1: Tax morale by country



(a) trust in public institutions

(b) Trust in the neighbourhood

Figure 2: Tax morale and trust

Nigeria (8.76). They also appear to have less confidence in public institutions, less religious, and less involved in self-employment activities than the respondents in other countries. On average respondents in Ghana report a lower level of trust in the neighborhood compared to those in Algeria, Morocco, and Nigeria. The mean age of the full sample is about 34 years, with Ghana (30) and Nigeria (31) having the lowest average age compared to their North African counterparts. The average respondent of the sample is slightly satisfied with their financial situation (5.50) and believes that taxing the rich and subsidize the poor is an essential characteristic of democracy (5.67). On a scale of 4, Morocco has the lowest perception of respect for the human right (2.32) compared to Nigeria (2.63), Algeria (2.70), and Ghana (3.16). The sample is balanced in terms of gender as men constitute 50 percent of the sample. Finally, approximately 47 percent of the respondents are married.

Table 2: Descriptive statistics - individual level variables

	Algeria	Ghana	Morocco	Nigeria	Full sample
Tax morale	7.12 (3.19)	9.35 (1.35)	9.49 (1.37)	8.76 (1.74)	8.74 (2.15)
Trust in the neighbourhood	2.70 (1.00)	2.48 (0.83)	2.99 (0.84)	2.91 (0.84)	2.76 (0.90)
Trust in public institutions	2.29 (0.84)	2.70 (0.67)	2.55 (0.86)	2.39 (0.66)	2.50 (0.76)
Age	38 (15.10)	30 (12.70)	37 (13.57)	31 (11.69)	34 (13.51)
Male	0.51 (0.50)	0.50 (0.50)	0.50 (0.50)	0.50 (0.50)	0.50 (0.50)
A religious person	0.84 (0.36)	0.97 (0.16)	0.89 (0.31)	0.96 (0.20)	0.93 (0.26)
Self employed	0.09 (0.29)	0.34 (0.47)	0.37 (0.48)	0.41 (0.49)	0.31 (0.46)
Education	4.60 (2.74)	4.33 (2.20)	2.67 (2.46)	5.19 (2.18)	4.30 (2.54)
Married	0.47 (0.50)	0.42 (0.50)	0.54 (0.50)	0.48 (0.50)	0.47 (0.50)
Financial satisfaction	5.99 (2.46)	4.91 (2.55)	5.57 (2.40)	5.64 (2.35)	5.50 (2.47)
Redistribution	5.57 (3.27)	4.86 (2.99)	7.96 (2.49)	5.18 (3.04)	5.67 (3.18)
Human right	2.70 (0.90)	3.16 (0.81)	2.32 (0.88)	2.63 (0.97)	2.73 (0.94)
Political position	6.03 (2.12)	5.54 (2.72)	5.51 (2.35)	5.59 (2.44)	5.62 (2.51)
Observations	1200	1552	1200	1759	5711

Notes. Standard deviations in parenthesis.

3.3 Econometric issues

As emphasized above, both dimensions of trust are expected to be positively correlated with tax morale. Although this is consistent with the predictions of the theoretical model, it is evident that tax morale and trust are entangled, making it challenging to identify the causal effects of trust on tax morale. Potential endogeneity issues might arise from reverse causality and error measurement issues. Respondents might be reluctant to reveal their attitude toward taxes truthfully as it might appear socially undesirable or as a form of social opposition toward state policies (Tripp, 1997; Kinsey, 1991). To identify the causal effect of

trust on tax morale, potential endogeneity issues must be addressed.

I tackle potential endogeneity issues using an instrumental variable approach. An appropriate instrument for trust is one that is correlated with trust but uncorrelated with tax morale. I employ a set of three variables that meet these requirements based on previous research on the slave trade and social capital. The first instrument relies on the pioneering work of [Murdock \(1959\)](#) on slavery at the tribe level. [Murdock \(1959\)](#) mapped the spatial distribution of ethnic groups and the number of slaves exported during the transatlantic and the Indian Ocean slave trade. The identification strategy consists first in matching the number of slaves exported and the initial land area to the corresponding ethnic group information collected in the WVS. I then generate a variable capturing the intensity of the slave trade at the tribe level as the ratio of the number of slaves exported during the transatlantic and the Indian Ocean slave trade over the initial land area of the ethnic group. I argue that this variable is a suitable instrument for several reasons. The trade of slaves caused a culture of mistrust, which may have persisted to this day and alter taxpayers' trust both in public institutions and in the neighborhood. The literature supports the argument on the long-term legacy of slavery in Africa and the receiving countries.¹² The trust shocks caused by slavery, an event lasting for more than 400 years, may remain persistent and affect the actual level of trust ([Nunn and Wantchecon, 2011](#)). The slaves were captured through state-organized raids and warfare, and a ubiquitous environment of insecurity caused individuals to turn on each other ([Piot, 1996](#)). The slave trade results, therefore, in a general environment of mistrust in the ethnic groups affected ([Nunn and Wantchecon, 2011](#)). The historic nature of the data on slavery provides a solid basis of the exogeneity of the instrument as there is no apparent reason for which the slavery origin of the ethnic group could affect the actual tax morale directly, except through the trust channel.

As both vertical and horizontal trust are potentially endogenous, I use two additional instruments for the identification of the equation. The latter relies on the literature on the

¹²See for instance [Nunn and Wantchecon \(2011\)](#), [Engerman and Sokoloff \(2008\)](#), [Nunn \(2008a\)](#), and [Nunn \(2008b\)](#), and [Mitchener and McLean \(2003\)](#).

cultural heritage of trust. Previous studies such as [Guiso et al. \(2008\)](#), [Uslaner \(2008\)](#), and [Rice and Feldman \(1997\)](#) provide strong evidence that trust is a part of the cultural heritage transmitted from one generation to the next and affected by the country or ethnic group of origin. As an individual having the same linguistic or religious origins, tend to behave similarly because they share similar cultural roots ([Falck et al., 2012](#); [Guiso et al., 2009](#)), it is not unreasonable to expect that the average trust of taxpayers having the same ethnic origin affects individual trust. However, ([Dinesen, 2011](#)) provides evidence that the prevailing institutional environment shapes the cultural heritage of trust. Hence, the additional instruments are measured as the average trust in public institutions and the neighborhood in each ethnic group - community cluster. The instruments account for both the cultural heritage of trust and the potential impact of the local institutional environment. Identification issues are minimized because individual-level trust in public institutions and the neighborhood appear as the natural channels through which the cultural heritage of trust could affect tax morale. Further, given three instruments, and two endogenous variables, the equation is over-identified, which allows testing for both instrumental variable conditions (pertinence and validity).

3.4 Estimation results

To examine the impact of both trusts in public institutions and in the neighborhood on tax morale, I estimate equation (12) of tax morale controlling for individuals level variables and country fixed effects. Following the literature,¹³ I employ three different methodologies, which are the ordered probit model, the ordinary least squares (OLS), and the two-stage least squares (2SLS) for the identification strategy. The ordered probit model allows accounting for the structure of the dependent variable, which is ranking information between 1 and 10. Regarding the OLS estimation, it allows assessing the consistency of the findings using a linear model. Table 3 presents the findings with all estimates using the weights. The standard errors are reported in parentheses. The first column of Table 3 reports estimates

¹³See for instance [Kountouris and Remoundou \(2013\)](#), [Frey and Torgler \(2007\)](#).

of the impacts of trust on tax morale using the ordered probit model, column (2) presents estimates from the OLS regression. Finally, columns (3) and (4) present estimates from the 2SLS regressions. Column (3) includes country fixed effects while column (4) accounts for both country and location fixed effects. As shown in column (1), trust in the neighborhood is positively correlated with tax morale while trust in public institutions is not statistically significant in the ordered probit model. Similarly, I do not find a significant effect of both trusts in public institutions and the neighborhood in the OLS model. However, addressing potential endogeneity in columns (3) and (4), I find that trust in public institutions increases taxpayers positive attitudes towards taxes. The regression coefficients are statistically significant at 10 and 5 percent significance levels, respectively. The magnitude of the effect is large as a one-point increase in trust in public institutions is associated with a rise in tax morale by 1.121 or 1.007 points, on a 10-point scale for columns (3) and (4), respectively. Similarly, columns (3) and (4) shows that trust in the neighborhood is also primarily associated with taxpayers willing to pay their taxes. A one-point increase in trust the neighborhood raises tax morale by 1.043 and 1.029 points on a 10-point scale, for columns (3) and (4) respectively. The coefficients are statistically significant at the 1 percent level.

First stage regressions for the IV analyses are reported in Panels B and C. Panel B gives the least squares first stage estimates for trust in the neighborhood while Panel C shows estimates from the least squares first stage regression on trust in public institutions. As Panel B shows, the intensity of the slave trade is negatively correlated with trust in the neighborhood. The coefficient is statistically significant at the 1 and 5 percent level. On the opposite, the first stage regression shows that the average trust in the neighborhood is positively correlated with taxpayers' trust in the neighborhood. A 1-percent increase in the social norms of trust in the neighborhood increases taxpayers' trust in the neighborhood by between 0.51 and 0.55 point, on a four-point scale. Regarding Panel C, the instruments chosen are positively correlated with trust in public institutions at the 1 and 5 percent level.

Additional instrument validity statistics can be found at the bottom of Table 3. The null hypothesis of weak identification is rejected, with an F-statistic ranging from 20.15 to 22.34

depending on the specification. These results show that the first instrumental variable condition of pertinence, i.e., the correlation between the instruments and the endogenous variables, is fulfilled. Employing three separate instruments for two endogenous variables allows testing for the second instrumental variable condition of orthogonality. The over-identification test produces a Hansen J statistic between 0.014 and 0.021 with a p-value of 0.906 and 0.886, respectively. The over-identification test fails to reject the null hypothesis of orthogonality at the 1 percent level for all specifications. These results from weak identification and over-identification tests indicate that the effect of trust on tax morale is well-identified as the chosen instruments meet both conditions for valid instrumental variables.

The estimates on the control variables are in line with those from previous studies on the determinants of tax morale. Relative to the reference group, the employment status included in the model is negatively correlated with attitudes toward taxes. Similarly, belonging to the upper class or the upper-middle class and financial satisfaction are negatively correlated with taxpayers' willingness to pay their taxes. These findings show that financial satisfaction and high economic class decrease positive attitudes toward taxes in Africa, suggesting that concerned taxpayers remain below their reference points. The perception of respect for human rights is negatively correlated with tax morale. On the other hand, age, ethnolinguistic and religious fragmentation, and the level of education are positively correlated with tax morale. The findings suggest that the level of education increases the taxpayers' attitudes toward taxes as it might help the taxpayer to better evaluate the benefits of collective action. Although the findings on the ethnolinguistic and religious fragmentation might appear puzzling, it might be attributable to the context of Africa characterized by high ethnolinguistic and religious fragmentation. The findings suggest that the latter is not negatively associated with tax morale. Finally, I do not find evidence that marital status, gender, and religiosity are associated with tax morale in the IV analyses.

The findings suggest that the relationship between the taxpayer and the state can be assimilated to an implicit contract based on trust. The level of trust reflects satisfaction about such contract, thereby taxpayers willing to pay their taxes. Also, by reinforcing the

social capital, trust in the neighborhood might ease taxpayers' willingness to contribute to collective actions such as the provision of public goods and services. As [Scholz and Lubell \(1998\)](#) argue, without trust the potential benefits of collective actions will depend solely on altruism and enforcement mechanisms that ensure that the benefits of opportunistic behavior are lower than the costs associated with deviation. Moreover, trust plays an important role in maintaining credibility and improving social capital by reducing oversight and costly penalties ([Coleman, 1994](#); [Ostrom, 1990](#)). Hence, the findings highlight that trust in public institutions and the neighborhood might be crucial for attitude toward taxes in Africa.

Table 3: Trust and tax morale

Dependent variable: Tax morale	(1)	(2)	(3)	(4)
	Ordered probit	OLS	IV	IV
Panel A: 2nd stage for tax morale				
Trust in public institutions	0.0595 (0.0517)	0.0900 (0.0570)	1.121* (0.632)	1.007** (0.501)
Trust in the neighbourhood	0.0741*** (0.0199)	0.0615 (0.0263)	1.043*** (0.240)	1.029*** (0.286)
<i>Employment status</i>				
Full-time employee	-1.135*** (0.412)	-0.498*** (0.0750)	-0.860*** (0.290)	-0.890*** (0.331)
Part-time employee	-0.988** (0.389)	-0.247** (0.0712)	-0.479* (0.274)	-0.503* (0.303)
Self employed	-1.074** (0.417)	-0.447*** (0.0655)	-0.761*** (0.256)	-0.769*** (0.277)
Unemployed	-1.209*** (0.446)	-0.607* (0.238)	-0.768*** (0.260)	-0.779*** (0.247)
Retired	-1.241*** (0.404)	-0.578** (0.178)	-0.704** (0.279)	-0.726** (0.311)
Student	-1.120*** (0.394)	-0.434 (0.199)	-0.693*** (0.198)	-0.736*** (0.176)
Housewife	-1.080** (0.453)	-0.341* (0.142)	-0.538* (0.294)	-0.560* (0.317)
<i>Demographic factors</i>				
Log (age)	0.201*** (0.0696)	0.150 (0.0951)	0.202** (0.0823)	0.114 (0.0836)
Religiosity	0.00277 (0.215)	0.162 (0.324)	0.270 (0.387)	0.275 (0.383)
Gender	0.0860 (0.0955)	0.128 (0.139)	0.103 (0.144)	0.116 (0.138)
Education	0.0147 (0.0199)	0.0166 (0.0227)	0.0269* (0.0143)	0.0221 (0.0202)
<i>Marital status</i>				
Single	-0.223** (0.108)	-0.311* (0.124)	0.0440 (0.267)	0.00910 (0.244)
Living together	-0.193 (0.339)	-0.217 (0.361)	0.293 (0.387)	0.320 (0.330)
Married	-0.155 (0.102)	-0.154 (0.0982)	0.119 (0.187)	0.133 (0.151)
Divorced	-0.294*** (0.0646)	-0.270** (0.0576)	-0.246 (0.436)	-0.238 (0.389)
Separated	-0.751** (0.309)	-0.991 (0.693)	-0.719 (0.662)	-0.719 (0.620)
<i>Economic situations</i>				
Upper class	-0.226 (0.237)	-0.448 (0.371)	-0.593 (0.447)	-0.731* (0.436)
Lower class	0.220** (0.0860)	0.272* (0.113)	-0.0261 (0.0984)	-0.00720 (0.0953)
Working class	0.133 (0.132)	0.102 (0.118)	0.000530 (0.0761)	-0.00450 (0.0759)
Upper-middle class	-0.181*** (0.0537)	-0.388* (0.147)	-0.400* (0.236)	-0.470* (0.249)
Financial satisfaction	0.00918** (0.00364)	0.00856* (0.00280)	-0.0323 (0.0221)	-0.0330* (0.0185)
<i>Other individual characteristics</i>				
Ethnolinguistic and religious fragmentation	0.307 (0.242)	0.501 (0.362)	1.033** (0.477)	0.960*** (0.357)
Perception of respect the human rights	-0.0505*** (0.0134)	-0.0464 (0.0249)	-0.230*** (0.0775)	-0.213*** (0.0779)
Importance of freedom of speech	-0.0968 (0.110)	-0.123 (0.142)	0.0729 (0.102)	0.0622 (0.0958)
Chief wage earner of the household	-0.0873 (0.0623)	-0.0848 (0.123)	-0.166 (0.174)	-0.134 (0.157)
Attitude towards redistribution	0.0126 (0.00976)	0.00848 (0.00865)	0.00851 (0.0152)	0.00647 (0.0148)
Political position	-0.0188* (0.0110)	-0.0106 (0.00502)	-0.0363 (0.0283)	-0.0370 (0.0235)
Panel B: 1st stage for Trust in the neighbourhood				
$Ln.[1 + (slave\ exports)/land\ area]$			-0.042** (0.009)	-0.038*** (0.006)
Average trust in the neighbourhood			0.544*** (0.080)	0.51*** (0.077)
Average trust in institutions			-0.105 (0.066)	-0.099 (0.046)
Panel C: 1st stage for trust in public institutions				
$Ln.[1 + (slave\ exports)/land\ area]$			0.025 (0.015)	0.025 (0.011)
Average trust in the neighbourhood			0.087** (0.022)	0.080** (0.024)
Average trust in institutions			0.33*** (0.038)	0.32*** (0.038)
F-stat of excl. IVs			22.34	20.15
Hansen J statistics			0.014	0.021
Hansen J p-value			(0.906)	(0.886)
Country fixed effects	Yes	Yes	Yes	Yes
Location fixed effects	Yes	Yes	No	Yes
Observations	3,837	3,837	3,511	3,511

Notes. All estimates use the weights. Robust standard errors clustered at the country level in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

4 Sensitivity Analysis

In this section, I examine whether the findings are sensitive to an assessment of potential bias from the selection on unobservables, alternative methodology, a falsification test, an additional set of control variables both at the individual and country levels.

4.1 Selection on observables to assess the bias from unobservables

A critical concern of examining the impacts of trust is the issue of unobservable factors. So far, the estimations included several observable characteristics to minimize biased arising from unobservable characteristics. However, the estimated impacts might be biased if unobservable characteristics are correlated with the selection into the slave trade, the cultural heritage of trust and subsequently the current level of trust in both public institutions and the neighborhood. To rule out concern about the selection on unobservables, this section assesses the likelihood that estimates are biased because of unobservable characteristics.

The strategy consists in using the methodology developed by [Altonji et al. \(2005\)](#), which allows using the selection on observables to assess the potential bias from unobservables. The approach consists in assessing how much stronger selection on unobservables relative to selection on observables, must be to explain the entire estimated effects. The test is performed considering two regressions: (i) one with a restrictive set of controls from which the estimated coefficient from the variable of interest is $\hat{\beta}^r$; (ii) one with a full set of controls, with an estimated coefficient from the variable of interest $\hat{\beta}^f$. The ratio assessing the importance of selection on unobservables relative to selection on observables is obtained as follows:

$$ratio = \frac{\hat{\beta}^f}{\hat{\beta}^r - \hat{\beta}^f}$$

As [Nunn and Wantchecon \(2011\)](#) write "the smaller is the difference between $\hat{\beta}^r$ and $\hat{\beta}^f$, the less the estimate is affected by selection on observables, and the stronger selection on unobservables needs to be (relative to observables) to explain away the entire effect". Regarding

the numerator $\hat{\beta}^f$, the larger is the latter, the greater is the effect that needs to be explained away by selection on unobservables, therefore the higher is the ratio.

I consider the regression of trust in public institutions and the neighborhood on tax morale. The strategy is described as follows. I consider two restricted equations. The first one does not include any individual control variables while the second includes a sparse set of individual controls which are gender status, age and a variable capturing whether the respondent is the chief wage earner of the household. Both restricted equations are estimated in parallel with a full equation including a full set of control variables described above. Given two restricted and one unrestricted set of covariates, there two combinations of ratios that can be obtained for trust in public institutions and trust in the neighborhood. The ratios are reported in Panel A of Table 4. As it can be seen, all ratios are above one in absolute value,¹⁴ ranged from 2.57 to 10.03, with a median value of 2.80. The findings suggest that to attribute the entire OLS estimate to selection effects, the selection on unobservables would have to be about on average 2.80 times greater than selection on observables. The findings allow concluding that it is less likely that the estimated effects of trust in public institutions and the neighborhood are fully driven by unobservable characteristics.

As an additional robustness check, I consider the first step equations described above. In the initial approach, I replicate the restricted and unrestricted equations replacing now the dependent variables with the endogenous ones and adding the instruments simultaneously. Then, I consider two additional approaches similar to the ones above at the exception that here the instruments are included individually in both the restricted and full regressions. The restricted regression is identical to the ones described above. To summarize, there are now four combinations of restricted and unrestricted equations that can be used to calculate the ratios. The ratios are reported for each instrument. The combination gives us 24 ratios reported in Panel B of Table 4. Once again, all ratios are above one in absolute value with a median ratio of 3.5. This implies that to attribute the entire OLS estimate to selection

¹⁴Negative ratios imply that the coefficient in the unrestricted model is larger than the one from the restricted model.

effects, the selection on unobservables would have to be about on average 3.5 times greater than selection on observables.

Assessing the likelihood that estimates are biased because of unobservable characteristics allow us to conclude that it is less likely that unobservable characteristics fully drive the estimated effects.

Table 4: Robustness - Selection on observables vs. unobservables

Controls in the restricted model	Control in the unrestricted model	Trust in public institutions	Trust in the neighbourhood				
Panel A - OLS for the main equation							
No individual level control variables	Full set of controls from equation (12)	-10.03	-2.73				
Age, Sex, Wage earner	Full set of controls from equation (12)	-2.88	-2.57				
Panel B - OLS for the first step equation							
		(1)	(2)	(3)	(4)	(5)	(6)
No individual level control variables	Full set of controls from equation (12)	-1.86	-3.28	8.14	3.54	-96.47	2.89
Age, Sex, Wage earner	Full set of controls from equation (12)	1.93	-3.64	8.42	4.61	-271	3.41
No individual level control variables	Full set of controls from equation (12) and instruments included individually	-1.11	9.66	25.82	7.73	1.68	24.90
Age, Sex, Wage earner	Full set of controls from equation (12) and instruments included individually	-1.12	9.66	22.69	9.10	1.92	29.23

Notes. The table reports the ratios $\frac{\hat{\beta}^f}{\hat{\beta}^r - \hat{\beta}^f}$ of the coefficients for trust in public institutions and the neighborhood. Panel A presents of ratios for the equation of interest while Panel B reports the ratios for the first step equations as additional sensitivity checks on selection on unobservables vs. observables. The coefficient $\hat{\beta}^r$ is from the restricted model, which include a limited set of control variables; $\hat{\beta}^f$ is obtained from the unrestricted model, which includes a full set of control variables.

4.2 Alternative estimation method

Although the main findings employ linear estimation model following the literature on tax morale, such a model might not be appropriate as the dependent variable is ranking information between 1 and 10. In this section, I conduct a sensitivity analysis employing a non-linear model which might be more relevant because the ten-category dependent variable is neither continuous nor normally distributed. Hence, the first set of robustness checks consists in using the two stages conditional maximum likelihood (2SCML) procedure, which has the advantage of testing and controlling for potential endogeneity issues.

The procedure involving a two-step estimation was initially developed by [Alvarez \(1994\)](#) and [Rivers and Vuong \(1988\)](#). The first step implies using the ordinary least squares to estimate the reduced form equation of the endogenous variables and predicts the residuals. Further, the 2SCML methodology consists in including the residuals from the first step estimation in the ordered probit regression as additional control variables. The underlying intuition of the

2SCML is similar to a 2SLS estimation in the sense that the reduced forms equations contain variables that are excluded from the structural equation of interest. These exclusions are required for identification purposes, and the reduced form equations separate the component of errors terms that are correlated with one another. Hence, the residuals included in the final steps of the procedure are estimates of the portion of the variance of the endogenous variables accounted for within the system of equations (Scholz and Lubell, 1998). Recent studies such as Wooldridge (2015, 2014) provide strong support to the 2SCML methodology also known in the literature as "control function methods" or "two-stage residual inclusion" approach. Moreover, according to Alvarez (1994), the 2SCML procedure is more efficient than the standard 2-stage probit procedure.

The results, reported in columns (1) and (2) of Table 5, are similar to the main findings. Both trusts in public institutions and the neighborhood are statistically significant at the 1 percent level. In particular, the probability of stating that cheating on taxes is never justifiable increases by 0.532 to 0.664 point, and 0.677 to 0.718 point for a one-point increase in trust in public institutions and the neighborhood, respectively. The magnitude of the effects is close to those obtained in the main findings. The residuals from trust in public institutions and the neighborhood equations are both statistically significant in the structural model reported in column (1) and (2). These findings imply that both variables need to be treated as endogenous and including the estimated residuals generates more robust estimates of the impact of trust on tax morale. All estimates include the individual characteristics described above, country fixed effects and alternate location fixed effects.

4.3 Falsification test

For the main results, I use the intensity of slavery as the main instrument in the identification strategy. The argument is that the slave trade has altered trust in public institutions and the neighborhood, and thereby taxpayers' attitude towards taxes. If this assumption is correct, then the relationship between trust and tax morale should not exist in part of the world

Table 5: Robustness - Alternative methodology and falsification test

Dependent variable: Tax morale	2SCML		Falsification test	
	(1)	(2)	(3)	(4)
Trust in public institutions	0.664*** (0.220)	0.532*** (0.231)	0.128 (0.325)	0.131 (0.340)
Trust in the neighbourhood	0.677*** (0.122)	0.718*** (0.143)	0.033 (0.277)	0.022 (0.272)
Residual - Trust public institutions	-0.590*** (0.222)	-0.489*** (0.233)		
Residual - Trust in the neighbourhood	-0.633*** (0.122)	-0.663*** (0.149)		
F-stat of excl. IVs			252.34	230.11
Individual characteristics	yes	yes	yes	yes
Country fixed effects	yes	yes	yes	yes
Location fixed effects	no	yes	no	yes
Observations	3 506	3 506	32 490	32 490

Notes. The table reports estimates from the two-step conditional maximum likelihood and a falsification test in columns (1) to (2) and (3) to (4) respectively. All estimates include all individual characteristics described before and country fixed effects. All estimates use the weights. Robust standard errors clustered at the country level in parenthesis. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

that did not experience the slave trade. To assess the validity of the identification strategy, I present in this section a falsification test. The latter consist of estimating the impact of trust on tax morale using a sample of countries that did not experience the slave trade. The sample comes from the same wave of the WVS 2010-14 excluding African countries. The sample has the advantage of having the identical questions for all countries and includes 43 them in four continents.¹⁵ As both trust in public institutions and the neighborhood are endogenous, I employ the same identification strategy as previously, except the intensity of the slave trade that is not used here as an instrumental variable. The two last columns of Table 5 report the reduced form estimates of the relationship between trust and tax morale. As it can be seen, there is no evidence that both trust in public institutions and the neighborhood and affect attitude toward taxes. The regression coefficients are highly insignificant. The F-statistic of the excluded instruments from the first stage regression is largely above the usual threshold.

¹⁵Azerbaijan, Australia, Armenia, Belarus, Chile, China, Taiwan, China, Colombia, Cyprus, Ecuador, Estonia, West Bank and Gaza, Germany, Iraq, Japan, Kazakhstan, Jordan, Republic of Korea, Kuwait, Kyrgyzstan, Lebanon, Malaysia, Mexico, Netherlands, New Zealand, Pakistan, Peru, Philippines, Poland, Qatar, Romania, Russian Federation, Singapore, Slovenia, Spain, Sweden, Trinidad, Turkey, Ukraine, United States, Uruguay, Uzbekistan, and Republic of Yemen

So, the null hypothesis of weak identification is rejected. Employing two instruments for two endogenous variables, we are unable to test for orthogonality in the falsification test. However, based on the literature on social conformity I believe that taxpayers' trust in public institutions and the neighborhood is the only channel through which the community level trust in public institutions and the neighborhood affect the taxpayer's morale.

4.4 Set of controls

Individual-level controls.

Assessing the determinants of tax morale, I should keep in mind the drawbacks of using self-reported information which might be subject to potential biases ([Bertrand and Mullainathan, 2001](#)). One can imagine that respondents will tend to overstate their attitude towards taxes to avoid the social stigma associated with illegal activities ([Kountouris and Remoundou, 2013](#)). Moreover, attitudes towards taxes and trust might be affected by important omitted variables and potential unobservable individual characteristics. Although the identification strategy presented above minimizes issues related to omitted variables, error measurement, and reverse causality biases, the findings may still be biased due to unobservables' characteristics correlated with trust and tax morale. In this section, I include three additional variables, which might help to minimize such biases.

The WVS contains three critical variables that can be used to minimize issues from unobservable characteristics and assess the sensitivity of the findings. The first relevant question asks: "how justifiable is avoiding a fare on public transport?" Responses are on a 10-point scale and relabeled as before so that 1 corresponds to "always justified" and 10 to "never justified". Controlling for this variable to minimize biases arising from important omitted variables and unobservable heterogeneity. As one might expect, the variable is highly correlated with tax morale and might capture some of the intrinsic characteristics of the taxpayer in term trust and tax morale. The pairwise correlation coefficient is 0.557 and statistically significant at the 1 percent level. The additional variable is included in the

model that is estimated with the 2SLS model as before. The results, reported in columns (1) and (2) of Table 6 corroborate those obtained in the main findings. Both trusts in public institutions and the neighborhood increase tax morale. A one-unit increase in trust public institutions raises individual tax morale between 1.534 and 1.586 units, on a ten-point scale. The magnitude of the effect is larger than the one obtained in the main findings. On the opposite, a one-unit increase in trust in the neighborhood increases individual tax morale between 0.689 and 0.703 unit, which is lower than the effects obtained in the primary results. Statistics from weak and over-identification tests are also reported in columns (1) and (2) of Table 6. These statistics indicate that the effect of trust on tax morale is once again well-identified, suggesting that the chosen instruments meet pertinence and orthogonality conditions. The null hypothesis of weak identification is rejected, with an F-statistic between 20.39 and 22.78 above the usual threshold. The over-identification test fails to reject the null hypothesis of orthogonality at the 1 percent level as before.

The second and third interesting questions ask (i) "how justifiable is it to claim government benefits to which you are not entitled?" and (ii) "how justifiable is stealing property?" As before, the responses are on a 10-point scale and reversed so that 1 corresponds to "always justified" and 10 to "never justified". Once again, these additional variables allow capturing some of the taxpayers' intrinsic characteristics associated with trust and illegal activities such as cheating on taxes. Introducing those variables help to minimize potential biases, especially those arising from intrinsic characteristics affecting both trust and tax morale. The pairwise correlation coefficient between tax morale and both additional variables are 0.523 and 0.508, respectively. The coefficients are statistically significant at the 1 percent level. As before, the results reported in columns (3) to (6) show that both trusts in public institutions and the neighborhood are significant determinants of tax morale in Africa. The magnitude of the effects is on average lower than those obtained previously. A one-unit increase in trust in public institutions raises tax morale between 0.810 and 1.64 units, on a ten-point scale. Similarly, a one-unit increase in trust the neighborhood increases individual tax morale between 0.397 and 0.566 unit, on a ten-point scale. The null hypothesis of weak identification is rejected in

all specification, and the over-identification test fails to reject the null hypothesis of orthogonality. So, the effect of trust on tax morale is once again well-identified, suggesting that the chosen instruments meet pertinence and orthogonality conditions. Finally, Table 6 shows that avoiding transport fare, claiming government benefits illegally, and stealing a property are all positively associated with tax morale. The coefficients are statistically significant at the 5 and 10 percent level.

Colonial origin

So far, all regressions include the country fixed effects to control for the difference in institutions mainly across countries and important country-level characteristics. This, however, may not account for institutional differences from colonial origins which might affect both trust and tax morale. A large body of the literature on institutions highlights how colonial origins have shaped the type of institutions implemented¹⁶ and specific culture associated with the origins. This is even more relevant as it is well established that norms and culture are important determinants of tax morale (Besley et al., 2015; Alm and Torgler, 2006). To account for the colonial origin and better isolate the effect of trust on tax morale, I include a dummy variable that takes one if the country has a French legal origin and 0 otherwise. In the sample, Algeria and Morocco have similar French legal origin while Ghana and Nigeria both have British legal origin. The results, reported in columns (7) and (8) of Table 6 indicate that the impact of trust on tax morale remains highly significant and quantitatively similar to those obtained in the main results. Statistics from weak and over-identification tests also reported in columns (7) and (8) of Table 6 suggest that model is well-identified as both pertinence and orthogonality conditions are met. The dummy variable for French legal origin is negatively associated with tax morale and statistically significant at the 1 percent level in all specifications. This suggests that on average having a French colonial origin reduces individual tax morale by about 0.56 unit, on a ten-point scale. These findings corroborate the one from Alm and Torgler (2006) demonstrating that countries having a Roman culture (which

¹⁶See for instance Acemoglu et al. (2001) for extensive discussion on colonial origins of institutions.

include French colonial origin) have higher tax non-compliance in emerging and developing countries.

Table 6: Robustness - Additional control variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent variable: Tax morale								
Trust in public institutions	1.586*** (0.442)	1.534*** (0.362)	1.641*** (0.451)	1.611*** (0.420)	0.835** (0.370)	0.810** (0.387)	1.121* (0.632)	1.007** (0.501)
Trust in the neighbourhood	0.703*** (0.137)	0.689*** (0.170)	0.566*** (0.119)	0.538*** (0.110)	0.433*** (0.0988)	0.397*** (0.0982)	1.043*** (0.240)	1.029*** (0.286)
Avoiding transport fare	0.321*** (0.0544)	0.313*** (0.0449)	0.215*** (0.0146)	0.210*** (0.0156)	0.122*** (0.0246)	0.120*** (0.0264)		
Claiming government			0.247** (0.120)	0.246** (0.117)	0.155** (0.0688)	0.156** (0.0674)		
Stealing property					0.414*** (0.0241)	0.408*** (0.0233)		
Legal origin							-0.565*** (0.149)	-0.564*** (0.0896)
F-stat of excl. IVs	22.78	20.39	22.42	20.06	21.99	19.69	22.34	20.15
Hansen J statistic	0.001	0.001	0.090	0.027	0.192	0.058	0.014	0.021
Hansen J p-value	0.976	0.969	0.764	0.871	0.661	0.810	0.906	0.886
Individual characteristics	yes	yes	yes	yes	yes	yes	yes	yes
Country fixed effects	yes	yes	yes	yes	yes	yes	yes	yes
Location fixed effects	no	yes	no	yes	no	yes	no	yes
Observations	3,503	3,503	3,497	3,497	3,496	3,496	3,506	3,506

Notes. All estimates use the weights and include individual characteristics described above and country fixed effects. Robust standard errors clustered at the country level in parenthesis. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

5 Conclusion

Deciding to adhere to their tax obligations is a complex decision for taxpayers, and several factors motivate it. A large body of the literature has sought to understand the determinants of tax morale with limited evidence on the role of trust.

As a novelty, this paper considers simultaneously the role of vertical and horizontal relationships, captured by trust in public institutions and the neighborhood, on attitude towards taxes. First, the paper proposes a theoretical framework, where both trust in public institutions and the neighborhood are included in the standard model of tax evasion. Further exploiting the outcomes of the model, the paper examines the effects of both types of trust on tax morale in Algeria, Ghana, Morocco, and Nigeria using the WVS. As the relationship between trust and tax morale is potentially endogenous, the paper devotes efforts to address such issues employing the instrumental variable method. The identification strategy takes advantage of historical data on slave shipments by ethnic group and community-level social norms about trust in public institutions and in the neighborhood. The underlying hypothesis of using historical data on slavery is that the slave trade caused a culture of mistrust in Africa, which may persist to this day and alter taxpayers trust in public institutions and the neighborhood. It is well documented that the slave trade generated a general environment of insecurity as slaves were captured through state-organized raids and warfare, and caused individuals to turn against each other. So, I rely on the intensity of the slave trade measured as the ratio the number of slaves exported and the initial land area of the ethnic group. I use two additional instruments, which are the average trust in public institutions and the neighborhood at the community level. Both instruments rely on the literature on the cultural heritage of trust according to which cultural heritage about trust is a critical component of individual-level trust.

The estimation results indicate that both trust in public institutions and the neighborhood are significant determinants of individual tax morale in Algeria, Ghana, Morocco, and Nigeria. The magnitude of the effects is large and statistically significant at the usual signif-

icance level. A one-unit increase in trust in public institutions raises individual tax morale between 1.007 and 1.121 units, on a ten-point scale. Similarly, a one-unit increase in trust in the neighborhood increases tax morale between 1.029 and 1.043 units, on a ten-point scale. Given three instruments for two endogenous variables, the equation is over-identified, allowing, therefore, to test for both instrumental variables conditions, i.e., pertinence and orthogonality conditions. Hence, statistics from weak and over-identification tests suggest that both pertinence and orthogonality conditions are met. The findings are robust to alternative estimation methodology, a falsification test, and additional control variables at the individual and country level.

This paper adds to the literature on the determinants of tax morale, especially in Africa, where studies on tax compliance are scant. The results suggest that taxpayers' trust might explain the low level of domestic resource mobilization in Africa in public institutions and the neighborhood. These results give support to the arguments that tax compliance is interlaced with the environment that shapes the social contract between the state and the citizens. Trust in public institutions might be one of the critical factors that shape such a social contract. Also, trust in the neighborhood might reinforce such social contract through its effect on social capital. The analysis suggests that attempts to improve attitudes toward taxes in Africa might pay attention to strengthening the general environment of trust. Improving the quality and provision of public goods, along with reducing the sentiment of insecurity of the taxpayers could help to boost positive attitudes towards taxes in Africa.

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