

TRUST IN INSTITUTIONS AND TAX COMPLIANCE. A MULTILEVEL ANALYSIS OF THE REGIONS OF SPAIN

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Abstract

The purpose of the article/hypothesis: The aim of this work is to delve into the significance of trust in the phenomenon of tax compliance. Specifically, the relationship between taxpayers' trust in the Government, administrations and institutions and their reported disposition towards tax compliance is explored based on the case of Spain and at regional level (NUTS2). **Methodology:** Using 2017 data collected by the European Values Study (EVS) and the Quality of Government Institute at the University of Gothenburg (QoG), a multilevel linear model is proposed where we assess the impact of citizen support for the Government and institutions on the disposition towards tax compliance. This model allows to simultaneously capture the relationships at taxpayer level and the effects of regional factors in the same equation. **Results of the research:** The results of the multilevel estimation allow the authors to reject the null hypothesis and accept, at least provisionally, the existence of a direct effect of trust in the institutions on tax compliance at regional level. Additionally, the low significance observed in the regional level variables suggests that citizens have non-decentralized perception of tax obligations. Furthermore, given that the effects are measured in terms of the quality of the institutions and government, the implications for regional policy and the actions of regional governments are of significant interest for the study of tax behavior and compliance.

Keywords: tax compliance, trust, tax behavior, slippery slope framework, multilevel analysis.

JEL Class: H26, H30, C12.

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INTRODUCTION

Taxes, in contrast to other rules and regulations, are unique in their simultaneous impact on practically all the issues and events that surround us, and on our day-to-day lives (Long and Swingen, 1991).

From an economic and budgetary perspective, taxes are categorized as a collection of coercive pecuniary transfers to the public sector (Prest, 1983). However, from the broader perspective of economic policy, given these resources are essential to sustain the welfare state and to enable all other public policies, taxation is a fundamental cornerstone of modern societies (Gaisbauer, Schweiger and Sedmak, 2015).

It is therefore unsurprising that the political mandate assigned to tax authorities is always subject to the constraints established under the corresponding legislation, ensuring the level of tax compliance needed to fund public programs and expenditure (OECD, 2010). Consequently, as payment of taxes is obligatory in nature, and compulsory by the Law, in practice, the strategies enacted to maximize tax collection have traditionally and extensively consisted of asserting the principle of authority to enforce tax compliance and of implementing mechanisms and instruments to detect, control and sanction tax evasion practices (Frey, 2003).

Tax authorities continue to resort to, and rely on, the use of deterrent measures, justified under the classic vision of taxpayer compliance being essentially determined by calculating, given the risks involved, the utility and profitability of tax fraud. Nonetheless, in recent decades, the majority of OECD countries have begun to reshape their tax compliance actions and programs, based on more sophisticated notions of taxpayer behavior (OECD, 2014a).

These novel tax compliance approaches and strategies are thus designed with new aims, such as increasing the efficiency and effectiveness of the resources used in policies of deterrence or establishing measures focused on reducing and limiting the possibilities of fraud and evasion, particularly as regards large corporations and multinational firms (OECD, 2008).

Following the concept of the “compliance pyramid” defined by the OECD, the primary premise of national strategies to fight against tax fraud is to correctly identify and classify taxpayers according to their “risk as taxpayers”, i.e., their actual intention and willingness not to comply (OECD, 2004). The aim is none other than to more efficiently manage the resources available to fight against fraud, and, above all, to channel them towards activities and taxpayers with a definite high risk of non-compliance, so applying the proposal and recommendations laid out in the OECD report on “Compliance Risk Management” (OECD, 2004). In addition, the resources thus released and the savings that might be made as a result of applying more efficient anti-fraud

policies should be devoted to implementing “soft” deterrent measures and educational and informative projects, aimed at increasing compliance across all taxpayers that, despite having failed to comply on certain occasions or under certain circumstances, have the intention and willingness to effectively comply with their tax obligations.

In 2010, the OECD recommended tax authorities to persevere in developing and perfecting the new strategies already undertaken and to advance in adapting and directing traditional measures and instruments of deterrence, taking as their lynchpin a broader-based and multidimensional notion of taxpayer behavior. This new approach takes a form of a tax compliance model identifying five primary components that explain and condition the phenomenon: economic factors, norms, deterrence, opportunity, and fairness (OECD, 2010). This served to consolidate the trend towards using more innovative tools to improve tax compliance, built upon a better understanding and identification of the motives underlying taxpayer behavior, without neglecting traditional instruments of deterrence, such as audits and sanctions.

Following the proposals of the OECD, and as a result of the development and application of previous works, measures and recommendations, since 2013, more than twenty countries have incorporated new “Co-operative Compliance” programs into their policies and measures on improving tax compliance. Initially aimed at tax relationships with large corporations, these programs are built upon the premises of mutual trust and collaboration between parties, fluid exchange of information and fairer, more transparent, and symmetrical nexus between large taxpayers and tax authorities (OECD, 2013).

The aim of “Co-operative Compliance” is for both tax administrations and taxpayers to simultaneously obtain benefits. On the one hand, firms are expected to adopt a transparent and collaborative attitude towards the tax authorities, thus enhancing tax risk management. On the other one, the tax authorities undertake to maintain a more fluid exchange of information, thus enabling a reduction in uncertainty, greater certainty in transactions and, in short, greater legal certainty, as has long been demanded by taxpayers (IEF, 2021).

As recognized by the OECD (2013), recent findings from disciplines such as behavioral economics and psychology have evidenced that the environment and the context are significant determinants of the behavior of the actors involved. Thus, when designing and undertaking new programs and mechanisms seeking to tackle fraud and improve tax compliance, it is necessary to have a more systemic vision of tax behavior and to take into account the contributions of research into the phenomenon (OECD, 2014b).

Eberhartinger and Zieser (2021) find parallels between the concept and groundings of “Co-operative Compliance” and various theoretical models and developments, such as those described by Ford and Condon (2011) or Widt

(2017), focused on the paradigm of “new public governance” and which underline the need to recognize that citizens demand quality from services provided by the public administration, in the same way as they do with market-provided services. The authors also report similarities with the work by Braithwaite (2002) on “responsive regulation”, which posits that deterrent efforts should be adapted to the characteristics and motivations of the taxpayers they target, in order to ensure more effective results. Finally, they highlight the link between some of the underpinnings of collaborative compliance and the general premises of the “slippery-slope framework” (SSF) (Kirchler, Hoelzl and Wahl, 2008), where taxpayers’ trust in (administrations) and the perceived/exercised power of (administrations) form a balanced mix that shapes attitudes and disposition towards tax compliance.

The aim of the present work is to delve deeper into the importance of trust, understood as the acceptance and legitimacy of the authorities and institutions, in the phenomenon of tax compliance. Specifically, we explore, based on the case of Spain and at regional level (NUTS2), the relationship between taxpayers’ trust in the administrations and institutions and their disposition towards tax compliance.

To this end, we use 2017 data from the European Values Study (EVS) (EVS, 2020) and the Quality of Government Institute (QoG) (Charron, Lapuente and Annoni, 2019). We perform a multilevel linear model that allows us to simultaneously capture the relationships under study at a taxpayer level and the effects of regional factors in the same equation.

Lago-Peñas and Lago-Peñas (2008) have exploited data from the European Social Survey in order to study tax morale in European countries. They apply a multilevel statistical model and investigate whether the individual differences in micro-level variables and the cross-national differences in macro-level variables were able to produce systematically different patterns of tax morale. Nevertheless, to our best knowledge, there is no previous multilevel analysis on tax compliance and trust in the administrations and institutions regarding the Spanish Regions.

1. THEORETICAL FRAMEWORK AND STUDY HYPOTHESIS

In the early 1970s, Allingham and Sandmo (1972) and Srinivasan (1973), drawing on the work on the economics of crime by Becker (1968), designed models intended to explain the motivations of tax fraud. The literature considers these works as the first theoretical approaches to tax compliance, and the starting point for the studies conducted to date (Alm, 2019).

The study by Allingham and Sandmo (1972) is the most influential and the most representative example of the current known as “classic” or “economic” in the literature on tax compliance (Alm, 2019) and can be viewed as the main

theoretical backing for deterrence and sanctions as the traditional measures to fight against fraud (OECD, 2010; OECD, 2014c).

Economics-oriented models are based on the premise that taxpayers behave like a *homo economicus*, i.e., a rational individual whose main goal is to maximize utility. Thus, the decision to pay or evade taxes lies in a problem of economic calculus under risk (Alm, Kirchler and Muehlbacher, 2012). The primary conclusion is that such *rational* individuals will only pay taxes when they judge the costs of evasion to be higher than the expected benefits of such behavior. This argument is the theoretical underpinning and justification for the traditional recourse to audits and sanctions as anti-fraud measures, since, by increasing the “cost” of tax evasion, such strategies may be useful tools to deter fraud and enhance tax compliance.

Tax compliance is, however, a complex phenomenon that depends on numerous factors that go beyond the merely economic ones (Frank, 1991; Alm, Sánchez and Juan, 1995). Hence, the concept should be analyzed from a broader and more cross-disciplinary perspective, which incorporates the explicit study of behavior and decision-making into the traditional economic analysis (Schmölders, 2006). Consequently, disciplines as varied as economics, law, psychology, sociology, politics, and even medical science (neurology, for example, is a field that has recently shown interest in the question) have provided numerous contributions and conducted considerable research, most of which highlight a spirit of multidisciplinary integration, and a firm commitment to improving and broadening the understanding of tax compliance (Randlane, 2016).

Therefore, the research in the field of tax compliance has been perfected while identifying different factors that appear to determine taxpayer behavior, such as the influence of their environment (family, colleagues, friends, etc.), personal, sociodemographic, and cultural characteristics of taxpayers or the trust [in] and legitimacy [of] the institutions and authorities (Brezina, Eberhartinger and Zieser, 2021).

Taxpayers’ perception of the power of [coercive], and their trust in, the tax authorities is the core argument of the “slippery-slope framework” (SFF) (Kirchler, Hoelzl and Wahl, 2008). This model analyzes tax compliance from the perspective of taxpayers’ motivations for complying with their tax obligations, distinguishing between “voluntary” and “enforced” motivation. The SFF thus brings together the majority of the main determinants of tax behavior previously examined and firmly established in the relevant literature, i.e., “economic” and “non-economic” factors, and psychological, social and cultural influences. The “voluntary” motivation to comply with tax obligations is associated with the taxpayer’s set of values and moral conscience, while “enforced” motivation is grounded in the construct of individualistic factors (maximization of utility), but is also related to, and justified by, the level and perceived efficacy of the power of

authority, translated in the implementation and effectiveness of deterrent and coercive measures, such as audits, fines, or sanctions.

Thus, there emerges a dynamic interaction between the taxpayer and authority as a response to the perceived attitude and disposition of the adversary. Under the SSF, taxpayers form a mental framework (perception) of the behavior and attitudes of the tax authorities, which serves for them to assess their trust in these authorities and their legitimacy (which is the result of transparent and fair tax procedures and actions, proper treatment and services provided by the administration, benevolence and understanding shown towards taxpayers, etc.). It also allows them to identify and judge the [perceived] effective power of the authorities (application of coercive measures and the capacity to control and detect fraud, sanctions, etc.) (Prinz, Muehlbacher and Kirchler, 2014).

Consequently, if both perceptions (trust [in] and power [of]) give rise to a balance in favor of “trust”, taxpayers believe it is advisable and justified to “voluntarily” comply with their tax obligations and thus the predominant motives are not strictly economic in nature (taxpayer morality). However, if the perceived power [of the authorities] holds greater weight, compliance is “enforced” and the logic of economic models, based on maximization of utility, come into play (Brezina, Eberhartinger and Zieser, 2021).

This study proposes a general interpretation of the SFF model whereby it suggests that taxpayers with mental constructs and perceptions based on trust in and the legitimacy of the authorities find that “voluntarily” complying with their tax obligations is justified and makes sense. This broad vision leads us to wonder whether the level of “voluntary” compliance is directly linked to a taxpayer’s level of trust in governmental authorities and institutions, their positive assessment of them and their perceived legitimacy.

Hence, the main hypothesis was as follows, H1: Taxpayers that show greater trust in, and more positive assessments of the government, administrations, and institutions, have a greater commitment to tax compliance (greater rejection of non-compliance).

2. DATA, METHODOLOGY AND DEFINITION OF VARIABLES

2.1. Sources and data collection

Two sources were used to test the hypothesis of the study. Firstly, we extracted data from the 2017 European Values Study (EVS, 2020), which is a large-scale, longitudinal, cross-national survey that, since 1981, has collected information on

the opinions of European citizens aged over 18 years on a wide range of demographic, familial, political, economic, and social questions¹.

This database was chosen for a number of reasons. On the one hand, the EVS allows longitudinal studies to be conducted, since it has mostly followed the same methodological structure from its first waves through to the most recent (the waves correspond to 1981, 1990, 1999, 2008 and 2017). On the other hand, it has the advantage of including information from 37 European countries at the NUTS2 level of disaggregation, which coincides with that of the regions of Europe (Autonomous Communities, in the case of Spain). Thus, we were able to conduct our analysis taking this regional dimension into account, which is especially important in the case of Spain, as it is highly decentralized in terms of politics and administration. Finally, the EVS directly questions the respondents on their attitude towards tax compliance.

From the 2017 EVS, the sub-sample of the answers provided by respondent resident in the Spanish Autonomous Communities was used, accounting for a total of 1.209 observations and 466 variables. Of these, those directly asking about attitudes towards paying taxes and about their trust in, and opinion of, a series of public and private institutions were selected.

Specifically, as the *proxy* for tax behavior, just one variable was used, namely, the response to the question of whether “you consider it justified to cheat (evade/avoid) on tax if you have the chance”, which is scored on a 10-point Likert-type scale, where 1 is “never justified” and 10 is “always justified”².

As the *proxy* to measure citizens’ trust in institutions, administrations, and authorities, the responses to 18 questions were used, all following the same format, asking “how much confidence do you have in...”. The respondents rate their confidence on a 4-point scale, where 1 is “none at all” and 4 is “a great deal”³. The institutions about which they are asked to indicate their level of confidence are the following: the church, the armed forces, the education system, the press, trade unions, the police, the Parliament, the civil service, the social security system, the European Union, the United Nations Organization, the health care system, the justice system, major companies, environmental organizations, political parties, Government and, lastly, social media.

The second source of data used in this study is the 2017 European regional dataset (QoG EU Regional) published by the Quality of Government Institute at the University of Gothenburg (QoG) (Charron, Lapuente and Annoni, 2019). This dataset provides a series of aggregate indexes (at European region level, NUTS2) on citizens’ perceptions about the quality of their governments. These indicators

¹ Access to data and documentation: EVS, 2020.

² ZA7500: EVS 2017: Integrated Dataset, variable v150: do you justify: cheating on tax (Q44B).

³ ZA7500: EVS 2017: Integrated Dataset, variables from v115 (Q38A) to v132 (Q38R).

are developed according to the processing of responses collected from surveys and opinion polls on citizens' experience and personal perception of public services and their interactions with local and regional public administrations, including assessments of their perception of honesty and corruption in administrations.

Additionally, the QoG EU Regional compiles and provides data on more than 350 variables related to sociodemographic indicators. All the datasets are available in time-series format for the European regions (NUTS2)⁴, which facilitates conducting comparative, longitudinal studies, and more importantly for our analysis, they are broken down at a regional level.

From this source, we extracted the sub-sample with 2017 items of data for the Spanish NUTS2 regions (the Autonomous Communities), comprising a total of 17 observations and 337 aggregate NUTS2-level variables. We analyzed three indicators of quality of government: *EQI Index Score*⁵, which is an overall index focused on quality of government and includes all the variables from the survey (Charron, Lapuente and Annoni, 2019). The others were *EQI quality pillar*⁶, based only on citizens' experience and opinion of the public services on which they are consulted in the surveys and the *EQI corruption perceptions index*⁷, which measures citizens' perceptions of corruption in government.

2.2. Modeling and definition of variables

2.2.1. SPECIFICATION OF THE TWO-LEVEL MULTILEVEL LINEAR MODEL

In order to verify at regional level the relationship between the opinions of, and trust in, the institutions and the motivation to comply with tax obligations, we used a two-level linear model as our methodological instrument. The reason was twofold: on the one hand, as the data was cross-regional, we were dealing with a hierarchical schema (citizens within regions). In this sense, the observations in each region would not be independent (within-groups variability), while the total variability of the sample would be partly due to regional effects (between-groups variability), i.e., due to the nesting of the data into independent sets (Raudenbush and Bryk, 2002). That means that the subjects that belong to the same subgroup are not, very likely, independent of each other, which constitutes a severe breach of a basic assumption of the general linear model: the independence between observations. However, linear mixed models (including multilevel models) make

⁴ Access to data and documentation: www1.

⁵ Variable (*sqi_score*) at: www2.

⁶ Variable (*eqi_zquality*) at: www2.

⁷ Variable (*eqi_zcorruptper*) at: www2.

it possible to deal with this type of hierarchical structure, paying attention to the existing covariance in the data.

Hierarchic models (Raudenbush et al., 2000), multilevel modelling (Goldstein, 2003; Hox, 2002; Luke, 2004) or random coefficients models (Longford, 1993) have been proposed to analyze data when cases are grouped into larger information units. Measures are taken at the lowest level (the cases) and the highest levels (the groups) and allows us to simultaneously identify and capture in the relationship explained the fixed effects – those common to all the individuals – and the random effects, due to the dependence between levels. In a two-level model, the coefficients (means and slopes) from Level 1 are interpreted as results of the coefficients and variables from Level 2.

In our analysis, Level 1 corresponds to the observations for each respondent, and Level 2 corresponds to the NUTS2 regions (the Spanish Autonomous Communities). The general specification of the two-level model is:

$$[Level\ 1] Y_{ij} = \beta_{j0} + \sum_{i=1}^k \beta_k X_{kij} + r_{ij} \quad (1)$$

where:

Y_{ij} – Observations of the dependent variable for individual i in level j ,

X_{ij} – Observations of the explanatory variables for individual i in level j ,

β_k – Coefficients (fixed),

β_{j0} – Random effects, due to level j , which, in a more detailed manner, are specified as:

$$[Level\ 2] \beta_{j0} = \gamma_{00} + \sum_{h=1}^p \gamma_{0h} W_h + \mu_{0j} \quad (2)$$

where:

W_h – are the specific explanatory variables of level j ,

γ_{00} and γ_{0h} are the intercept and the slope for each level j .

2.2.2. DEFINITION OF VARIABLES

In Level 1 (respondents), we defined the explanatory variable *Trust* (total trust), constructed by means of the unweighted aggregation of the individual scores obtained for the responses to the questions on evaluating confidence in different institutions. The result was normalized using the z-standardization procedure and, finally, was weighted by the raising factor for the NUTS2 facilitated by the EVS.

In Level 2 (regions), the variables used were the indexes taken directly from the QoG EU Regional database for 2017. On the one hand, we have the *QIndex*

variable, which reflects the so-called *EQI Index Score* (overall index of quality of government), while, on the other, is the *CorruptionIndex*, which corresponds to the values from the *EQI corruption perceptions* index (which measures the perceived corruption, also at regional level). All these variables are z-standardized and were not submitted to any additional transformation.

Finally, the variable Region refers to the Spanish NUTS2 regions (Autonomous Communities) from the EVS sample, while *CheatTax* is the dependent variable in the model, the proxy for tax compliance, which we developed directly from the individual scores on the question related to the justification of cheating on taxes (variable v150 in the EVS notations), which we also weighted by the regional raising factor of the EVS sample.

3. RESULTS AND DISCUSION

Following Pardo, Ruiz and San Martín (2007), multiple specifications of the two-level multilevel model are estimated. Model 1 analyzes variance using a one-random-effects factor specification (unconditional or null model). Everything related to the Level 1 (X_{ij}) and Level 2 (W_h) independent variables has been eliminated in this model⁸.

Second, to reduce the differences between the means of each Level 2 grouping (regions), Model 2 fits a multilevel specification with a Level 2 covariate (W_h).

Model 3 incorporates a Level 1 covariate (X_{ij})⁹, and then we perform a covariance analysis using a random-effects factor specification to explain differences between subjects within the same Region (Level 1 variability).

Model 4 (random coefficient specification) derives a regression equation for each Region and analyzes how the intercepts and slopes of those equations vary. Therefore, it allows both coefficients (the intercept and the slope) to vary randomly between the Regions. Finally, Model 5 fits the complete specification of a multilevel model. Therefore, the coefficients (means and slopes) of Level 1 are interpreted as results of the coefficients and variables of Level 2.

Tables from 1 to 4 show the results of the analysis. Table 1 offers descriptive information: the average tax compliance observed is not the same in all regions (in Region of Murcia, the lowest average is obtained (1,44); in Aragon the highest is obtained (7,15); therefore, the level of tax compliance may seem to be related to regional factors; the last two columns contain the standard deviation and the coefficient of variation (quotient between the standard deviation and the mean, expressed as a percentage).

⁸ The estimations were performed with IBM SPSS Statistics© statistical software (Version: 28.0.0.0 (190)), using the *MIXER* multilevel analysis function.

⁹ All independent variables are mean-centred before perform estimations.

Table 1. Descriptive statistics of the dependent variable CheatTax in each Region (SD= standard deviation; CV= coefficient of variation)¹⁰

Region (Autonomous Communities)	NUTS2	n	Mean	SD	VC
GALICIA	ES11	70	3,77	3,9	103,3%
PRINCIPALITY OF ASTURIAS	ES12	29	2,18	3,5	158,8%
CANTABRIA	ES13	17	4,35	4,5	102,8%
BASQUE COMMUNITY	ES21	57	2,66	1,9	72,6%
NAVARRRE	ES22	17	2,28	1,1	46,3%
LA RIOJA	ES23	5	7,09	4,4	61,4%
ARAGON	ES24	34	7,15	2,6	35,8%
MADRID	ES30	169	2,82	2,7	96,4%
CASTILE-LEON	ES41	63	3,08	2,4	77,8%
CASTILE-LA MANCHA	ES42	54	4,77	3,5	73,1%
EXTREMADURA	ES43	28	1,78	1,5	82,0%
CATALONIA	ES51	191	2,63	2,5	95,7%
VALENCIAN COMMUNITY	ES52	127	1,91	2,2	115,0%
BALEARIC ISLANDS	ES53	29	2,52	2,2	89,3%
ANDALUSIA	ES61	191	2,23	2,0	90,1%
REGION OF MURCIA	ES62	41	1,44	1,1	76,5%
CANARY ISLANDS	ES70	53	2,91	3,6	124,7%
Total	.	1175	2,81	2,8	100,2%

Source: own study.

Table 2 offers various global fit statistics that indicate to what extent the proposed model can represent the variability observed in the data. The first of these statistics is deviance ($-2LL$). The second statistic (AIC) is the Akaike information criterion; the third (AICC) is the corrected Akaike Information Criterion; the fourth (CAIC) is the consistent Akaike information criterion, and the fifth (BIC) is the Bayesian information criterion. The fit of the model to the data is better the lower the value of these statistics.

Table 3 collects the estimated value of the constant or intersection (population mean of the 17 Regions in the dependent variable) and the fixed effects parameters for the different specifications.

In addition, standard error; degrees of freedom; t value (which is obtained by dividing the estimate by its standard error); and the critical level are obtained by testing the hypothesis that the parameter is equal to or different from zero (Sig. < 0,05) are shown.

¹⁰ Autonomous Cities Ceuta (ES63) and Melilla (ES64) were excluded.

Table 2. Global fit statistics (better fit the lower the value)

Statistics	Model 1	Model 2	Model 3	Model 4	Model 5
Deviance (-2LL)	5648,76	5646,44	5623,92	5625,53	5627,30
(AIC)	5652,76	5650,44	5627,92	5633,53	5635,30
(AICC)	5652,77	5650,45	5627,93	5633,56	5635,34
(CAIC)	5664,89	5662,57	5640,05	5657,80	5659,56
(BIC)	5662,89	5660,57	5638,05	5653,80	5655,56

Source: own study.

Table 3. Fixed effect parameter estimates (dependent variable: CheatTax)

Model	Parameter	Estimates	Standar error	gl	t	Sig.
Model 1	Intersección	3,18	0,37	13,88	8,52	<,001
Model 2	Intersección	3,02	0,41	12,38	7,34	<,001
	CorruptionIndex	0,77	0,81	13,18	0,95	0,36
Model 3	Intersección	3,01	0,41	12,69	7,32	<,001
	CorruptionIndex	0,78	0,81	13,48	0,97	0,35
	Trust	-0,03	0,01	1161,53	-5,63	<,001
Model 4	Intersección	3,16	0,37	14,20	8,45	<,001
	Trust	-0,03	0,01	3,70	-4,03	0,02
Model 5	Intersección	2,99	0,42	11,99	7,05	<,001
	Trust	-0,03	0,01	5,93	-3,21	0,02
	QIndex	-0,49	2,81	12,40	-0,18	0,86
	CorruptionIndex	1,20	2,47	12,29	0,49	0,64
	Trust * QIndex	-0,09	0,07	5,72	-1,32	0,24
	Trust * CorruptionIndex	0,06	0,06	5,75	1,07	0,33

Source: own study.

Finally, Table 4 offers the estimates of the covariance parameters, i.e., the estimates of the parameters associated with the random effects of the models.

Table 4. Covariance parameter estimates (dependent variable: CheatTax)

Model	Parameter		Estimates	Standar error	Wald Z	Sig.
Model 1	Residue		6,89	0,29	24,04	<,001
	Region	Variance	2,16	0,89	2,42	0,015
Model 2	Residue		6,89	0,29	24,04	<,001
	Interpetion [unit = Region]	Variance	2,19	0,93	2,35	0,019
Model 3	Residue		6,71	0,28	24,04	<,001
	Iterception [unit = Region]	Variance	2,19	0,92	2,38	0,017
Model 4	Residue		6,66	0,28	23,65	<,001
	Interception + Trust [unit = Region]	UN (1,1)	2,18	0,89	2,46	0,014
		UN (2,1)	0,00	0,02	-0,12	0,908
		UN (2,2)	0,00	0,00	0,62	0,537
Model 5	Residue		6,64	0,28	23,85	<,001
	Interception + Trust [unit = Region]	UN (1,1)	2,33	1,00	2,33	0,02
		UN (2,1)	-0,01	0,02	-0,45	0,653
		UN (2,2)	0,00	0,00	1,12	0,262

Source: own study.

Prior to estimating the complete models (2, 3, 4 y 5), we estimated the null model (model 1) to verify whether the data follow a pattern (dependence with Level 2) and, thus, whether it was necessary to specify a multilevel structure. The coefficient of the null model, which coincided with the estimation of the intercept for each region (j -level), was significant at 1% level (99% confidence interval), and thus the multilevel specification was justified.

Additionally, we calculated the intra-class correlation coefficient (ICC), i.e., the fraction of total variability observed in the sample that is not explained by the explanatory variables observed for Levels 1 and 2. The ICC measures the homogeneity of the observations within each region and the differences

between the observations for each different region. This was calculated as the ratio of explained variance at regional level (j-level) divided by the total variance of the model. In our analysis, the ICC was 0,024, which means that approximately 24% of the total variance was due to regional factors that were not directly observed.

The ICC value also represents the degree of relationship or resemblance between patients in the same Region. In addition, the population variance of the regional factor is zero, the Wald Z statistic is offered, and it has an associated critical level (Sig.) less than 0,05. Thus, we can reject the null hypothesis and state that the variance of the factor is different from zero. Therefore, it can be concluded that tax compliance is not the same in all regions. This argument further corroborates the nested structure of the data and the suitability of multilevel modelling.

The next step in the analysis should be to find out if there is any variable capable of accounting for confirmed differences between the means of the regions. The *QoG CorruptionIndex* variable measures the average regional perception of corruption (a level 2 variable). It is known that the perception of corruption is related to lower tax compliance (Feld and Frey, 2002). Consequently, since the perception of corruption is not the same in all regions, the differences observed in tax compliance in different regions could be explained, at least in part, by the differences in the average perception of corruption. However, the variable is not significant. In addition, there is hardly any decrease in the intercept variance concerning the null model (average variability of the set of regions). Therefore, the regional perception of corruption does not contribute to explaining the differences observed between regions.

From Model 3 results obtained fitting a covariance analysis using a random-effects factor specification, it is particularly worth noting that the parameters estimated are significant for all the variables included except *CorruptionIndex*. We found a highly significant effect of the variable *Trust* (proxy for the overall trust of individuals on the institutions).

As expected, greater legitimacy and trust in the institutions is related to a greater willingness to pay taxes (*CheatTax*, proxy for tax compliance). Furthermore, albeit with a lower significance, the variable *CorruptionIndex*, which captures the rate of perceived overall regional governmental corruption, suggests that citizens think that corruption is an important element in justifying cheating on taxes. In addition, the inclusion of the *Trust* variable reduces the residual variability, which is due to differences in tax compliance within each region.

Finally, although models 4 and 5 show an improvement in explaining intra-regional variability after assuming the existence of different equations for each Region, the null hypothesis of the existence of different slopes cannot be rejected.

Moreover, the covariance between the slopes and the regional averages cannot be accepted either.

Therefore, the *Trust* variable reflects fundamental explanatory relevance while *QIndex* (general quality of regional government perception) does not add more significance to the model.

CONCLUSIONS

Consequently, overall, the results of the estimation lead us to reject the null hypothesis and accept, with some reservations, the general hypothesis proposed in this work.

However, the low significance found in the Level 2 regional variables (*CorruptionIndex* and *QIndex*) suggests that citizens have a non-decentralized perception of tax obligations. Given that these effects are measured in terms of the quality of the institutions and government, the implications for regional policies and the actions of regional governments are of great importance.

Nonetheless, the intention of our analysis was to make a first approach to the relationship between trust in government and institutions as well as the disposition towards tax compliance. Hence, we recognize the need to delve deeper into this issue, and, above all, avoid, for the time being, drawing categorical conclusions.

In this sense, it would be advisable to use a more precise *proxy* indicator of tax compliance than that used in our model. Moreover, as regional effects have been detected in the estimation, it is also necessary to look further into this aspect, including a set of regional variables that encompass measures of economic and social wellbeing by region.

This might enable us to make recommendations and suggest specific measures of regional policy designed to improve tax compliance.

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