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Is Ethnic Diversity a Poverty Trap? A Complex  
Relationship between Ethnicity, Trust, and Tax Morale

Andrej Tuscisny



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**Abstract**

Much research indicates that ethnic diversity leads to suboptimal public goods provision and hinders economic development. However, similar levels of ethnic diversity are often associated with very different outcomes. This paper specifies under what conditions ethnic differences undermine tax compliance in multiethnic societies. Based on multilevel modeling of survey data from 70 countries, the paper shows that people belonging to small ethnic minorities in countries with a high level of ethnolinguistic fractionalization are also those the most willing to accept tax evasion. However, generalized trust and trust in the government moderate the relationship between ethnic fractionalization and tax morale among small ethnic groups. The analysis suggests that ethnic diversity is not a poverty trap because its effect can be largely offset by measures increasing interpersonal trust across ethnic lines and trust in political institutions. The paper uses a new dataset that identifies World Values Survey respondents' membership in politically relevant ethnic groups.

**Keywords**

Ethnic diversity, economic development, public goods, trust, world values survey.

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## **Puzzling Relationship between Ethnic Diversity and Public Goods Provision**

Applying multilevel models on cross-national survey data, this paper demonstrates that the relationship between ethnic diversity and tax morale is conditional on social and political trust. In less trustful societies, members of ethnic minorities react to the greater ethnic heterogeneity of their country more strongly than members of ethnic majorities. Generalized interpersonal trust and trust in government undermine the negative association between ethnic diversity and tax morale among this particularly vulnerable group. Public trust in government also increases tax morale globally.

In the 1990s, development economists pinpointed ethnic fragmentation as a cause of low schooling and inadequate investment in infrastructure in Africa, the most underdeveloped region of the world (Easterly and Levine 1997). For example, Miguel and Gugerty (2005) found that Kenyan communities with an average ethnic diversity raised 20 percent less contributions for their schools than ethnically homogenous communities. Five thousand miles away, households in mixed communities in Indonesia were less likely to contribute money and labor to local health centers, rice cooperatives, and neighborhood irrigation associations (Okten and Osili 2004). Using cross-national survey data, Lago-Peñas and Lago-Peñas (2010) showed that ethno-linguistic fractionalization is also associated with a lower tax morale. It should not come as a surprise then that local government's investment in public goods, from education to roads to trash pickup, is inversely related to racial diversity in U.S. cities (Alesina et al. 1999). For a larger sample of countries, Alesina et al. (2001) found a similar negative association between ethnic fractionalization and the government's social spending. Due to all this empirical evidence, "the notion that social divisions undermine economic progress" has become "one of the most powerful hypotheses in political economy" (Banerjee et al. 2005, 639). Since it is rarely easy – or desirable – to change the ethnic makeup of a country, ethnic heterogeneity can, according to this view, lock in low levels of economic development for many generations.

Despite an impressive number of studies observing a negative association between ethnic diversity and public goods, many interesting cases deviate from this pattern. To use a particularly illustrative example, Miguel (2004) compared two nearby and similar districts, separated only by the Kenyan-Tanzanian border. Kenyan communities at an average level of ethnic diversity raised 25 percent less funding for their schools than homogenous communities. Across the border, in Tanzania, heterogeneous communities were equally successful as their homogenous counterparts. More broadly, Alesina and La Ferrara (2005, 794) concluded in their comprehensive survey of the relevant literature:

Rich democratic societies work well with diversity, in the case of the United States very well in terms of growth and productivity. Even within the developing world, similar levels of ethnic diversity are associated with very different degrees of conflict and interethnic cooperation.

This observation leads us to the question under what conditions ethnic diversity reduces people's willingness to contribute to public goods provision. An answer to this question can also suggest how we can prevent or offset this negative effect. Only few studies have endeavored in this direction. Comparing Kenya and Tanzania, Miguel (2004) argued that Tanzanian political leaders managed to bridge ethnic divisions in their country chiefly by promoting Swahili as the common language. Similarly, Glennerster et al. (2010) highlighted the role of a common lingua franca in Liberia, where, as they found, ethnic heterogeneity did not influence local public goods provision. This paper contributes to the literature by adding another moderator – trust.

## **Role of Trust**

The paper highlights reciprocal cooperation as a moderator of the relationship between ethnic diversity and people's willingness to provide public goods in general – and their willingness to pay taxes in particular. As early as 1906, social scientists hailed reciprocity as "the vital principle of the society" (Hobhouse 1906, 12). Almost a century of research later, a *Science* article reiterated this view: "Reciprocation is the basis of human cooperation" (Nowak and Sigmund 2000, 819). Reciprocal

cooperation has become one of the universal social norms, present in most if not all moral codes (Gouldner 1960). Experimental research indicates that most people are indeed conditional cooperators; they are willing to cooperate if they trust others to cooperate as well (Chaudhuri 2011). Cooperation with strangers in a laboratory is usually associated with higher generalized trust and expectations of fair behavior (Gächter et al. 2004).

If a conditional cooperator faces the decision whether to contribute to a collective effort, she estimates the likelihood that her partners will reciprocate cooperation. While giving to a charity, for instance, individuals increase their contributions if the money is matched by their peers (Meier 2006). It should be easy to estimate other people's average contributions in a small village, where most interactions occur face-to-face and repeatedly over many years. However, individual reputation is not very helpful if a collective endeavor requires a large number of strangers to coordinate their behavior.

We face a collective action problem of this type every year on tax day. Holding everything else equal, a conditional cooperator should be more willing to pay taxes if she expects other citizens to do the same. She should reduce her contributions if she expects other citizens to cheat. Survey data provide empirical evidence of reciprocal cooperation in tax compliance. For example, Frey and Torgler (2007) observed a strong correlation between European survey respondents' beliefs about how high the tax evasion in their country is and their own tax morale. Frey and Torgler assumed that beliefs about average tax evasion vary across countries. The paper extends their line of argument by letting beliefs about average tax evasion vary also across ethnic groups within the same country.

It is a normal cognitive function to classify people into social categories based on visible characteristics, such as race or gender, and to view thusly formed groups as homogenous in terms of personality traits (Fiske 2000; Yzerbyt and Demoulin 2010). For example, Blacks in American society are often seen as "lazy" and "criminal" (Devine and Elliot 1995). As many other behavioral characteristics have become subject to group stereotypes, there is no reason to believe that expectations of tax compliance are immune to this natural tendency. In fact, as a popular American image of a black "welfare queen" illustrates, beliefs about net social contributions can become powerful ethnic stereotypes.

Social psychology has collected so much empirical evidence showing that most people trust ingroup members more than outgroup members that Brewer (1999) redefined "ingroup" as a bounded community of mutual yet depersonalized trust, extending to all members of the group, but not to outsiders. Limiting trust to a smaller group is an exercise in risk management. Experimental data from Uganda suggest that it is easier to find and punish someone who exploited one's trust if the person belongs to one's own ethnic group (Habyarimana et al. 2009). Bad reputation of an untrustworthy person can also spread through her social network. Since social ties are usually denser within than across ethnic groups, it should be easier to obtain information about the past of a coethnic (Fearon and Laitin 1996).

If a conditional cooperator only trusts her own ethnic group, her willingness to pay taxes should decrease as the proportion of outsiders among her potential partners increases. If people do not extend trust beyond the borders of their own ethnic group, the logic of reciprocal cooperation should lead to the result described in much of the literature – a negative association between ethnic diversity and people's willingness to contribute to public goods.

Although people tend to trust ingroup members more than outsiders on average, there is some degree of variation. For example, Italian respondents of a Eurobarometer survey conducted in 1996 trusted the Swiss, Swedes, and Americans more than their own countrymen. Even more often, people extend their trust to humanity in general. This generalized trust can be defined as horizontal trust among people and it encompasses strangers and unknown groups as well. Freitag and Bühlmann (2009, 1540) considered generalized trust to be an indicator of the "environment of general reciprocity" that "makes cooperation possible, and minimizes the risks involved in the act of trust." Unlike "particularized trust" in a specific ethnic group or in one's immediate social circle, "generalized trust reflects a bond that people share across a society and across economic and ethnic groups, religions, and races" (Rothstein and Uslaner 2005, 45). Particularized and generalized trust are distinct from each other both analytically



and empirically (Uslaner 2002).

I expect generalized trust to break the negative association between ethnic diversity and tax morale. The argument makes several assumptions that, unfortunately, cannot be tested using available data. If the assumed relationships are weak, the estimates reported in the empirical section will be more noisy and potentially biased down. The first assumption is that people who trust their coethnics more than outsiders are also more likely to trust their coethnics to pay taxes. As a result, conditional cooperators should display higher individual-level tax morale as the share of the person's ethnic group in the country's population increases. Second, the paper assumes that generalized trust can be used as a proxy for trust in strangers' tax compliance. In other words, trustful people should expect tax compliance to be similar across ethnic groups. Therefore, their expectations of overall tax compliance in the country should be independent from ethnic heterogeneity. If they are also conditional cooperators, trustful people should be equally willing to contribute to public goods regardless of how ethnically fragmented their society is. To sum up the observable implications, we should observe a significant interaction between ethnic heterogeneity and generalized trust.

A different type of trust can still produce the same result even if the person in fact does not believe that all groups in her society are equally benevolent. Apart from horizontal generalized trust in fellow citizens, there also exists vertical trust between citizens and the state. Scholz and Lubell (1998) argued that vertical (political) trust creates focal points for cooperative solutions and horizontal (social) trust reduces the costs of enforcement of collective solutions. They also found that political trust, in the form of confidence in government institutions, is empirically associated with higher tax compliance. This finding was successfully replicated by Letki (2006), Marien and Hooghe (2010), and other studies. I argue that trust in political institutions should not only reduce tax evasion, but also reduce the negative effect of ethnic heterogeneity on tax morale. If a person believes that the state is effective and fair in punishing cheaters, she expects more cooperation from other rational citizens due to deterrence and subsequent conditional cooperation. The paper tests the hypothesized interactions between ethnic diversity and the two types of trust on worldwide survey data from 70 countries.

## **Research Design**

The main goal of the paper is to model the individual tax morale as a function of ethnic diversity and trust. The unit of analysis is the individual respondent, and the data come from the World Values Survey. The World Values Survey (WVS) is a large-scale cross-national survey. This study pools the data from all the survey waves between 1990 and 2008. Table A.1 in the appendix lists the surveyed countries and years. Table A.2 describes the distribution of the variables used in the paper.

*Tax Evasion.* The WVS does not ask directly whether the respondent evades taxes. A direct question would probably elicit a large number of socially desirable – yet untrue – responses. Due to the prevailing social norms, respondents would be unlikely to disclose free-riding behavior. Instead of a more direct question producing more biased answers, the WVS asks about people's acceptance of tax evasion in general: "Please tell me for each of the following statements whether you think it can always be justified, never be justified, or something in between, using this card. Cheating on taxes if you have a chance." Many researchers use this survey question as an inverse measure of tax morale, that is intrinsic motivation to pay taxes (Alm and Torgler 2006; Frey and Torgler 2007). As the risk of being caught is too low to deter rational tax cheaters, they argue that the observed high tax compliance levels are driven primarily by tax morale – we pay taxes because we believe it is the right thing to do (Frey and Torgler 2007). In fact, some people pay taxes even if the probability of detection of cheating is zero (Alm et al. 1992).

*Generalized Trust.* Similarly to other large-scale surveys, the WVS measures generalized trust by the question: "Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?" Answers are coded 1 ("Most people can be trusted") or 0 ("Can't be too careful"). Although Glaeser et al. (2000) found that the question was associated with greater trustworthiness – not trustfulness – among the subjects playing a laboratory trust game, Cox et al. (2009)

observed a positive correlation between trust measured by the survey question and trustful behavior in lab. Knack and Keefer (1997) found that the average generalized trust measured by the survey question was associated with return rates in wallet-drop experiments conducted in the same area.

This standard proxy for generalized trust has been used extensively by survey researchers since the 1950s. Despite its popularity, it is plagued by a number of problems. First, it only roughly approximates the concept of generalized trust, as outlined in the previous section. A Hungarian respondent trusting other Hungarians would be able to agree that “most people can be trusted” without extending any trust to the Roma minority. Furthermore, different respondents may interpret the wording of the question in different ways. Does the question ask about most people they know, most strangers on the main street of their hometown, most inhabitants of their country, or most humans currently alive? Ambiguity is reinforced by the fact that the question does not refer to any specific trustworthy behavior. Trusting that one would get a correct change from a bartender versus trusting that a stranger would return a lost wallet with \$1,000 in it are clearly different beliefs and we cannot know which one the respondent had in mind while answering the WVS question. Finally, as Miller and Mitamura (2003) pointed out, the WVS measure of generalized trust is double-barreled, conflating trust (“most people can be trusted”) with caution (“can’t be too careful”). Sadly, there is no other comprehensive cross-national source of information about generalized trust. As I could not find a better proxy, I had to use the same imperfect survey measure as most previously published studies on trust.

*Trust in Government.* The paper measures trust in government using the following survey question: “I am going to name a number of organisations. 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? The government.” The same question has been previously used by Letki (2006), Marien and Hooghe (2010), and other researchers. The correlation between political and social trust is typically weak because trust in government institutions varies to a great degree with partisanship: people who support the ideology of the ruling party are also more likely to express confidence in the government (Rothstein and Stolle 2008).

*Ethnic Fractionalization.* Following other cross-national studies of ethnic diversity and public goods, I measure ethnic diversity at the country level. Of course, people are likely to consider ethnic diversity at different levels. If a person is deciding whether to pay for a ticket on a public bus, she might be more concerned with ethnic composition of the city or even with the ethnic identity of fellow bus passengers. However, most taxes are paid to the central government, which may redistribute the money throughout the whole country. Therefore, the country level seems to be appropriate for studying this behavior. Furthermore, country-level measures of ethnic fractionalization are already available and widely used in the political science and economics literature. Although there are several competing measures of ethnic heterogeneity, most of them are based on the Herfindahl concentration formula:

$$ELF_j = 1 - \sum_{i=1}^N s_{ij}^2$$

where  $ELF_j$  is ethnolinguistic fractionalization of country  $j$ ,  $s_{ij}$  is the share of group  $i$  in country  $j$ , and  $N$  is the number of groups.<sup>1</sup> This formula essentially measures the probability that two randomly selected individuals from the population will be from different groups.

Easterly and Levine (1997) used the index of ethnolinguistic fractionalization (ELF), based on the data from *Atlas Narodov Mira*, a Soviet ethnographic atlas published in 1964. The Soviet source was

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<sup>1</sup> Notable exceptions include indices measuring ethnic polarization developed by Montalvo and Reynal-Querol (2005) and Cederman and Girardin (2007). Montalvo and Reynal-Querol (2005) argued that polarization is a better predictor of ethnic conflict. However, this paper focuses on a different topic – tax morale.

originally popularized by Taylor et al. (1972). Since then, ELF has become a standard measure of ethnic heterogeneity in quantitative cross-national studies. Fearon (2003) built an alternative – and more up-to-date – ethnic fractionalization score from a variety of different secondary sources. Finally, Alesina et al. (2003, 159) created an ethnic fractionalization index combining “racial and linguistic characteristics” in order to identify the most meaningful ethnic categories in each country. The primary source was *Encyclopedia Britannica*, complemented with the *CIA World Factbook*, national census data, and other sources. Due to an overlap of their sources, Alesina et al. (2003) and Fearon (2003) produced very similar indices. Alesina’s index is probably the most widely-used measure of ethnic fractionalization in the fields of economics and political economy. Because of its comprehensive coverage of countries and wide use in the literature, I decided to adopt Alesina’s ethnic fractionalization index as a proxy for ethnic diversity. Just as virtually all ethnic fractionalization indices, the variable does not vary in time. Although Laitin and Posner (2001) criticized ethnic fractionalization indices as disregarding the fact that ethnic identities can change over time, the lack of temporal variation should not be a big problem for the short time window 1990-2008 explored in this study.

*Relative Group Size.* Although ELF is a measure of choice in studies of ethnic diversity and public goods, it may not be the best measure. If a white tax-payer in the United States decides to minimize her tax burden because she believes that most minority members pay no income tax anyway, is she really concerned with the number and relative size of all ethnic groups living in the country – as studies using fractionalization indexes assume – or rather with the relative proportion of her own group of Whites? I argue that if a person is driven by higher trust of her own ethnic group, her tax morale should be based on the relative proportion of her own group in the total population.

For each World Values Survey respondent, I tried to identify her membership in one of the politically relevant ethnic groups listed in the Ethnic Power Relations dataset (EPR), which is maintained by the ETH Zurich and the University of California Los Angeles. In few cases explained in the codebook (available at <http://www.tusicisny.com/research-publications/>), I also used Alesina et al. (2003) and Fearon (2003). Based on three survey questions on ethnicity, language, and religion, I was able to identify the relevant EPR group for more than 100,000 respondents. Then I assigned the relative size of the corresponding EPR group to all respondents belonging to this group. The relative size of ethnic groups in the resulting dataset ranges from 0.0003 (Jews in Poland) to 0.999 (Koreans in South Korea). People whose group membership could not be unambiguously identified were excluded from the analysis. For example, due to the lack of useful information in the WVS data, I could not differentiate between English, Scottish, and Welsh people living in the United Kingdom, though I could identify British Asians and Afro-Caribbeans. Fortunately, this extreme case was quite exceptional.

In order to control for potential confounders, the analysis includes a number of individual-level control variables from the WVS:

*Acceptance of Bribe.* Trustful people may refrain from free riding not because they expect strangers to reciprocate cooperation, but because of some innate personal attribute, such as altruism or natural law abidance. In fact, Uslaner (1999) used my dependent variable as part of his indicator of “moral behavior”; Guiso et al. (2003) as a proxy for people’s attitudes to legal norms; and Letki (2006) as an indicator of “civic morality”. To control for this confounding effect, I included another variable on the right side of the regression equation: acceptance of bribe.<sup>2</sup> Controlling for this variable should isolate the public goods element of the dependent variable from general law compliance measured by the bribe question.

*Church Attendance.* Listhaug and Miller (1985) and Guiso et al. (2003) found religious people to be less likely to approve of cheating on taxes. Based on a comprehensive review of more recent studies, Lago-Peñas and Lago-Peñas (2010) consider this result to be one of the most robust findings in

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<sup>2</sup> The exact wording of the WVS question is: “Please tell me for each of the following statements whether you think it can always be justified, never be justified, or something in between, using this card. (Read out statements. Code one answer for each statement). Someone accepting a bribe in the course of their duties.”

the tax compliance literature. At the same time, religion also influences generalized trust (Guiso et al. 2006), creating a possible confounding problem. When Torgler (2006) concluded that religiosity raises tax morale, he analyzed a variety of related WVS questions. Among them, I chose church attendance because it appears very frequently in WVS national questionnaires. The question asked: “Apart from weddings, funerals and christenings, about how often do you attend religious services these days?”

I also added some individual-level demographic variables that influence the dependent variable and may correlate with trust: *Sex*, *Age*, *Marital Status*, *Education*, and *Income*.<sup>3</sup> A great number of studies have found that tax compliance tends to be higher among older people, women, and married people (Uslaner 1999; Guiso et al. 2003; Torgler 2006). Age, gender, and marital status seem to be the most consistent demographic predictors of tax morale in the literature (Lago-Peñas and Lago-Peñas 2010). Listhaug and Miller (1985) and Guiso et al. (2003) also found people with a higher income to be more likely to cheat on taxes. The effect of education is much less consistent (Uslaner 1999; Torgler 2006; Lago-Peñas and Lago-Peñas 2010).

The following macro-level control variables are measured for each country-year in which the survey data were collected:

*Tax Revenue*. As Rose (1984, 122) put it succinctly: “Within any given country, the level of tax resistance is likely to be greater when taxes are high rather than low.” At the same time, tax rates seem to correlate with generalized trust due to relatively heavy taxation in the exceptionally trustful Nordic countries. Moreover, the way ethnic politics influences people’s tax compliance may be different in the countries that actually rely on taxation than in the countries extracting rent from natural resources. The control variables thus include the overall tax revenue as a share of the country’s GDP (in percent). Given the high measurement error and the fact that the World Bank does not report this variable for all years, I computed country averages for each survey wave. So, for example, the missing tax revenue of Georgia in 1996 was imputed with Georgia’s average tax revenue during the whole survey wave (1994-1999).

*Democracy*. Political regime may be another country-level confounder. La Porta et al. (1999) found that ethnic diversity is associated simultaneously with bad governance, low public goods provision, low tax compliance, and less political freedom. Rothstein and Stolle (2008, 453) showed that “countries with high levels of generalized trust also have the most effective and impartial institutions and the longest experiences with democracy.” Tabellini (2010) sought an explanation in history: regions of Europe with less legal constraints on the executive in the past tend to be characterized by lower generalized trust in the present. As my variables of interest (ethnic diversity, generalized trust, public goods) are all correlated with political institutions, I included the Polity IV score of the country at the time of the survey as a control variable.

*GDP per capita*. Both political regime and tax revenue correlate with economic development. In fact, Alesina and La Ferrara (2005) argued that rich societies cope with the negative effect of ethnic diversity on economic growth better than poor societies. I used a natural logarithm of the World Bank estimates of GDP per capita, PPP, in constant 2005 dollars. All the variables used in the multilevel models presented here were rescaled to a continuous scale running from 0 to 1. This transformation to the same scale facilitated convergence of the complex mixed models that involve a three-way cross-level interaction along with random intercepts and random slopes. As the regression analysis includes both individual-level and group-level predictors, I used the following mixed model:

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<sup>3</sup> Sex is coded 1 for male and 0 for female respondents. Age is coded in the number of years. Marital status differentiates between married (1) and unmarried (0) people. The highest educational level attained has eight categories, as provided by the WVS. The scale of income uses ten categories specific for each country. Therefore, this variable measures within-country, but not between-country variation.

$$\begin{aligned}
 \text{tax evasion}_{ij} = & \beta_0 + \beta_1 \text{relative group size}_{ij} + \beta_2 \text{generalized trust}_{ij} \\
 & + \beta_3 \text{trust in government}_{ij} + \beta_4 \text{acceptance of bribe}_{ij} \\
 & + \beta_5 \text{church attendance}_{ij} + \beta_6 \text{male}_{ij} + \beta_7 \text{age}_{ij} + \beta_8 \text{education}_{ij} \\
 & + \beta_9 \text{income}_{ij} + \beta_{10} \text{married}_{ij} + \alpha_1 \text{ethnic fractionalization}_j \\
 & + \alpha_2 \text{tax revenue}_j + \alpha_3 \text{polity score}_j + \alpha_4 \log \text{GDP/capita}_j \\
 & + \beta_{11} \text{relative group size}_{ij} \times \text{generalized trust}_{ij} \\
 & + \gamma_1 \text{ethnic fractionalization}_j \times \text{generalized trust}_{ij} \\
 & + \gamma_2 \text{ethnic fractionalization}_j \times \text{relative group size}_{ij} \\
 & + \gamma_3 \text{ethnic fractionalization}_j \times \text{relative group size}_{ij} \\
 & \times \text{generalized trust}_{ij} + \mu_{0j} + \mu_{1j} \text{relative group size}_{ij} \\
 & + \mu_{2j} \text{generalized trust}_{ij} + \varepsilon_{ij}
 \end{aligned}$$

Tax evasion of an individual  $i$  in the country-year  $j$  is explained by the individual-level and country-level variables described above. Coefficients  $\beta$  and  $\alpha$  denote fixed effects of these variables. Coefficients  $\gamma$  represent cross-level interactions of two or more variables measured at different levels.<sup>4</sup> Effects of unmeasured country-level confounding variables are absorbed in the random intercepts ( $\mu_{0j}$ ), varying across 76 different surveys conducted by WVS national teams in different years and countries. Random slopes ( $\mu_{1j}$  and  $\mu_{2j}$ ) of relative group size and trust are necessary to estimate cross-level interactions.

I used the design weights provided by the national WVS teams to make the samples more representative of the population of each country. Since I was interested in variation across countries, I did not use weights proportional to the total population of the country in the pooled data. Weighting by population of the country would practically discard variation in ethnic fractionalization among small countries and the overall results would be driven by the few biggest countries, such as China and the United States. A replication of the analysis without weights did not change any of the substantive findings.

A price for using a large trove of observational data such as the World Values Survey is the threat of endogeneity. In principle, a historical accident may have caused both a cultural norm of paying one's taxes and a higher rate of assimilation into the dominant ethnic group in a subset of countries. Or, higher tax compliance in the past could lead to higher trust in the present through satisfaction with a better functioning government. Despite the author's attempt to include relevant confounders in the

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<sup>4</sup> The number of individual surveys used for this analysis (76) is much higher than the number of countries (up to 30) for which Stegmueller (2013) warned about a risk of bias resulting from cross-level interactions.

regression model, the omitted variable bias cannot be fully ruled out. The reverse causality problem could be alleviated by an instrumental variable regression if only one could find an instrument for trust. Unfortunately, none of the instruments proposed in the literature (including literacy levels in the 19<sup>th</sup> century, constraints on the executives in the past, constitutional monarchy, post-Communism, the grammatical rule allowing pronoun-drop, average temperature in the coldest month, and geographic latitude) seems to satisfy the exclusion restriction. Like many other cross-national studies, this paper sacrifices unambiguous causal identification in order to maximize external validity. Hopefully, its argument will be soon tested by experimental and quasi-experimental studies at the micro-level.

## Results

Quantitative analysis of the cross-national survey data presented in this paper identified complex interactions between ethnic fractionalization, relative group size, and trust. Table 1 compares fixed effects in two models, one focusing on generalized trust and one focusing on trust in government. The centerpiece of the models are cross-level interactions between ethnic fractionalization, relative group size, and trust. A statistically significant three-way interaction term in both models indicates that the relationship between these variables is quite complex. Due to the presence of interactions, coefficients and standard errors should be interpreted conditionally. For example, the main effect of ethnic fractionalization with a coefficient of 0.061 and a standard error of 0.056 would only describe an effect on distrustful members of infinitely small ethnic groups. For everyone else, main effects should be taken into account jointly with interaction effects. As complex interactions are easier to grasp in a graphic form, I will focus the discussion of the findings on Figure 1 and Figure 3, which are based on Model 1 and Model 2 respectively.

Figure 1 shows the predicted values of the respondent's approval of tax evasion as a function of ethnic fractionalization, relative group size, and generalized trust, while holding all other fixed effects constant at their median values. Random effects are set to zero in order to produce population-level predictions. Let us start with the first graph, predicting attitudes towards tax evasion among people with no generalized trust.

Distrustful people are more approving of tax evasion as ethnic heterogeneity of the country increases. This result mirrors earlier findings by Alesina et al. (2001), Lago-Peñas and Lago-Peñas (2010), and other studies. The relationship is stronger as the relative size of the respondent's ethnic group decreases and smaller minorities are willing to justify tax evasion more readily than larger groups. The interaction between ethnic heterogeneity and relative group size leads to an interesting result: the highest support of tax evasion is among the small ethnic groups in highly heterogeneous countries. This subpopulation may be largely responsible for the negative association between ethnic diversity and contributions to public goods detected in previous studies.

The plane representing the predicted values of tax evasion is somewhat flatter among trustful people. Although ethnic diversity still matters, its effect on the crucial subpopulation of the small ethnic groups in ethnically fragmented countries is much less detrimental. Trustful members of small minorities in extremely heterogeneous countries are no more likely to cheat on taxes than trustful members of small minorities in more homogenous countries. Among trustful people, greater ethnic diversity seems to be associated with higher tax evasion in large ethnic groups in the most heterogeneous countries. In practice, this is not a problem because the area with the predicted higher evasion rate is actually an almost empty set – by definition, there are not many very large groups in very heterogeneous countries. This potentially problematic area corresponds to the upper right corner of Figure 2, which plots the number of respondents by relative size of their group and ethnic fractionalization of their country. Respondents belonging to small groups in ethnically fragmented countries are much more numerous (lower right corner of Figure 2).

Political trust interacts with ethnic diversity and relative group size in a similar way as social trust does. Figure 3 replicates Figure 1 for Model 2, which replaces generalized trust in the interaction terms with trust in government. The graph on the left shows predicted values of tax evasion among the

respondents who, when asked how much confidence in the government they had, said they had “none at all”. Again, the highest approval rate of tax evasion is among the respondents belonging to the small ethnic groups in ethnically highly fragmented countries. This subgroup would also benefit the most from having more trust. The respondents with a “great deal of confidence” in their government are much less willing to justify tax evasion across the board (see the graph on the right). However, the difference is the strongest for two different subgroups: members of the smallest ethnic minorities in highly heterogeneous countries and members of the dominant ethnic groups in highly homogenous countries. Echoing a similar finding for generalized trust, a higher support for tax cheaters among people trusting the government is predicted for the mostly hypothetical group of large ethnic groups in very heterogeneous societies.

The relationship between ethnic diversity and tax compliance is moderated by trust in political institutions and trust has a potential to improve tax compliance especially in the societies composed of many small groups – the very same societies predicted by the standard theory to be in the worst situation. How much does trust change attitudes towards tax compliance in these countries? For an average Nigerian for instance, the gains from trust depend on whether she is part of a large or small group. For a group of the size of the Yoruba or Hausa-Fulani (25%), trust does not change the predicted average tax evasion approval rate (0.06) at all. However, if one’s group is ten times smaller (the size of the Tiv), higher political trust almost halves the tax evasion approval rate, from 0.07 to 0.04.

Although both types of trust moderate the relationship between ethnic diversity and tax evasion, they do not erase it completely. On the one hand, both political and social trust weaken the connection between ethnic diversity and tax evasion among small ethnic groups. On the other hand, large ethnic groups seem to remain negatively affected by ethnic diversity even if they trust strangers and governments. Trust in government is a stronger predictor of tax morale than generalized trust, though this result may be partially attributed to a bad measure of the latter in the World Values Survey data.

The regression analysis presented in Table 1 mostly confirms the findings of previous studies regarding individual-level factors. Tax compliance is higher among older, married, and religious people. Women tend to approve of cheating less often than men. Education is another negative predictor of tax evasion. Richer people tend to be more open to tax cheating. Country-level fixed effects of tax revenue, democracy, and GDP per capita failed to reach the threshold of statistical significance, though tax morale appears to be slightly lower in the countries with a more democratic regime and those extracting higher taxes from their populations.

## **Conclusion**

The negative effect of ethnic diversity on public goods provision has become an accepted wisdom in the economics literature. However, not all ethnically mixed societies fare badly. Consequently, the question of which communities can escape the supposed poverty trap of ethnic fragmentation has become of crucial importance. Applying a new approach to an old problem, the paper offers a solution.

Justification of tax evasion is more prevalent among distrustful ethnic minorities and, in this segment, it increases as ethnic fractionalization gets higher. Both generalized trust and trust in political institutions increase tax morale among the small ethnic groups in ethnically fragmented countries. Greater political trust is associated with an additional increase of tax morale among other groups as well. As trust has the most beneficial effect on those with the lowest tax morale – the small ethnic groups in ethnically highly diverse countries – increasing both vertical and horizontal trust can provide ethnically diverse countries with an escape route from their supposed poverty trap.

The paper adds a new item to the short list of variables that moderate the relationship between ethnic diversity and public goods provision. Whereas other known moderators – common language (Miguel 2004), democratic regime (Collier 2000), and economic development (Alesina and La Ferrara 2005) – are macro-scale and difficult to manipulate, trust can be increased more easily at the individual level. This unique feature has profound implications for future experimental research as well as policymaking. For example, governments may communicate more effectively the fact that a vast

majority of tax payers actually pay their taxes. If a better dissemination of information improves people's beliefs about tax compliance in other ethnic groups, governments of multiethnic countries can increase their tax revenue simply by relying on the human natural tendency to reciprocate cooperation. A fair and effective justice system can increase people's morale through two different channels: by increasing their trust in political institutions and by increasing trust in their fellow citizens regardless of ethnic differences.

The paper's main methodological contribution consists of adding information about the relative size of politically relevant ethnic groups to the largest source of cross-national survey data – the World Values Survey. Analytically, relative group size fits better the standard theoretical explanations of why ethnic diversity should correlate with lower contributions to public goods. Empirically, relative group size turned out to be a strong predictor of tax morale in the WVS data. The new dataset, available at <http://www.tusicisny.com/research-publications/>, can be used by other researchers whenever they believe that attitudes measured in the WVS may differ depending on whether the respondent belongs to an ethnic minority or a majority.



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Table 1: Multilevel Model Predicting Approval of Tax Evasion

	Model 1		Model 2	
	Coef.	S.E.	Coef.	S.E.
Intercept	0.060	0.045	0.102*	0.049
<i>Individual-Level Variables</i>				
Relative Group Size	0.005	0.023	0.018	0.027
Generalized Trust	0.017	0.016	0.002	0.002
Trust in Government	-0.039***	0.003	-0.057*	0.029
Acceptance of Bribe	0.567***	0.004	0.566***	0.004
Church Attendance	-0.027***	0.002	-0.027***	0.002
Male	0.016***	0.001	0.016***	0.001
Age	-0.071***	0.004	-0.069***	0.004
Education	-0.015***	0.002	-0.014***	0.002
Income	0.034***	0.003	0.034***	0.003
Married	-0.009***	0.002	-0.009***	0.002
<i>Country-Level Variables</i>				
Ethnic Fractionalization	0.061	0.056	0.033	0.065
Tax Revenue	0.093.	0.071	0.063	0.071
Polity Score	0.037	0.026	0.039	0.026
Log GDP per capita	0.003	0.034	-0.027	0.035
<i>Cross-Level Interactions, Generalized Trust</i>				
Size * Trust	-0.022	0.019		
Fractionalization * Trust	-0.054.	0.030		
Fractionalization * Size	-0.042	0.046		
Fractionalization * Size * Trust	0.099*	0.040		
<i>Cross-Level Interactions, Trust in Government</i>				
Size * Trust			-0.041	0.033
Fractionalization * Trust			-0.014	0.053
Fractionalization * Size			-0.102.	0.055
Fractionalization * Size * Trust			0.182**	0.067
N Individuals	83423		83423	
N Surveys	76		76	

. p < 0.1, \* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001.

Figure 1: Predicted Approval of Tax Cheating Among Mistrustful People (Left) and Trustful People (Right)

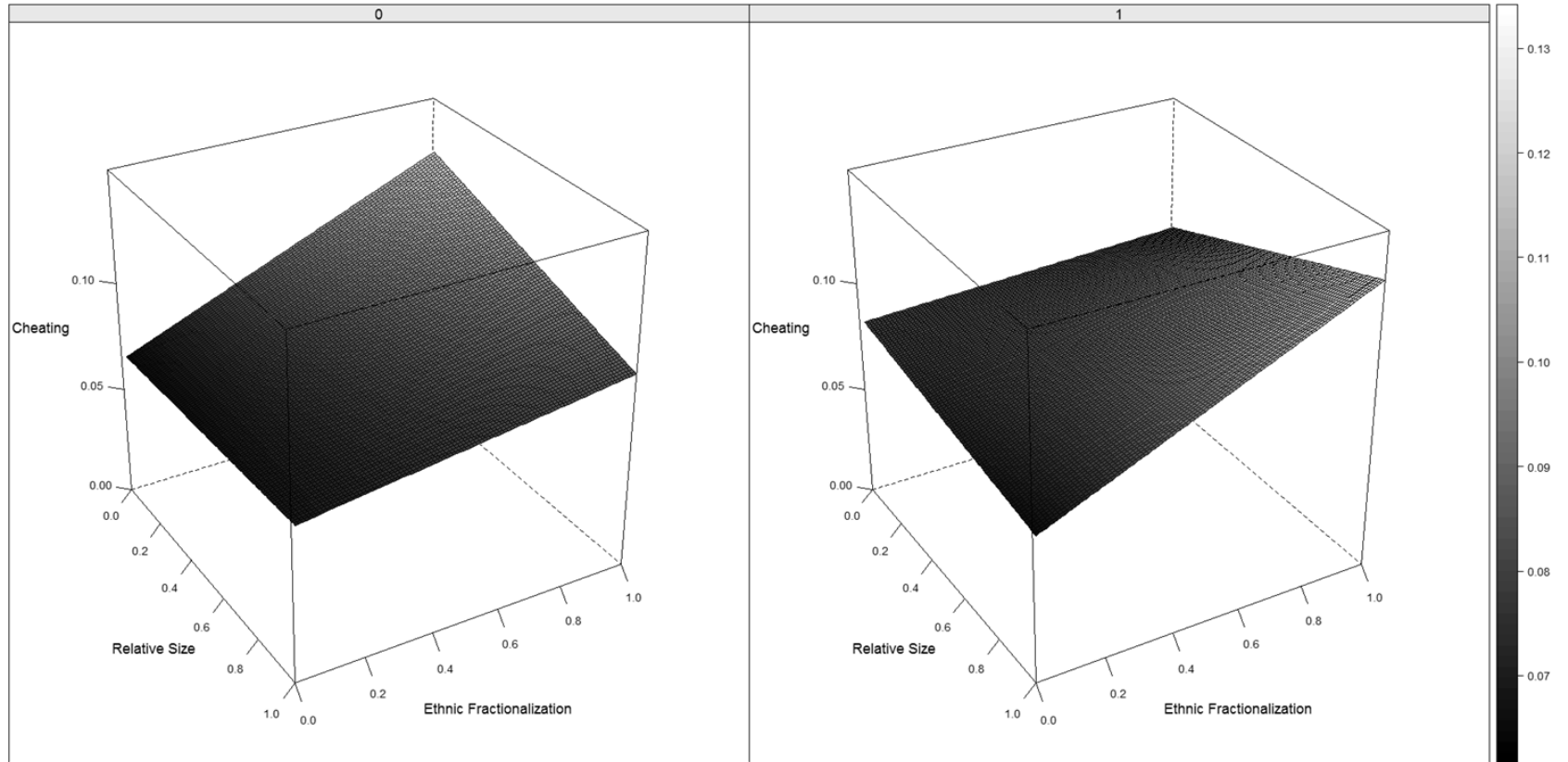


Figure 2: Number of Respondents by Relative Group Size and Ethnic Fractionalization

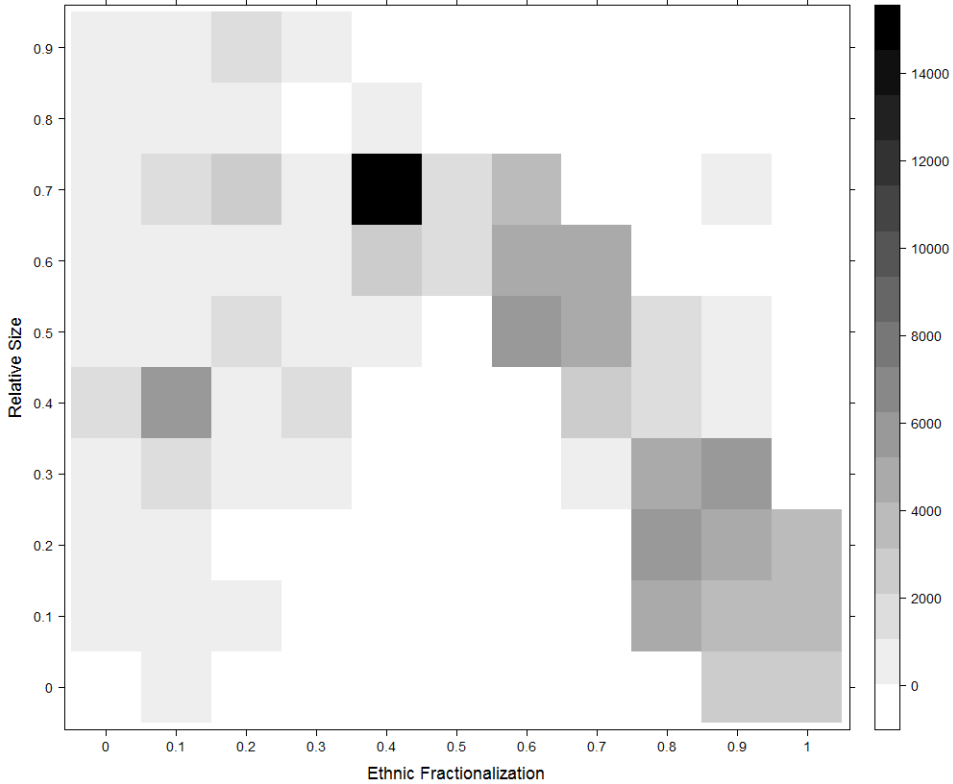
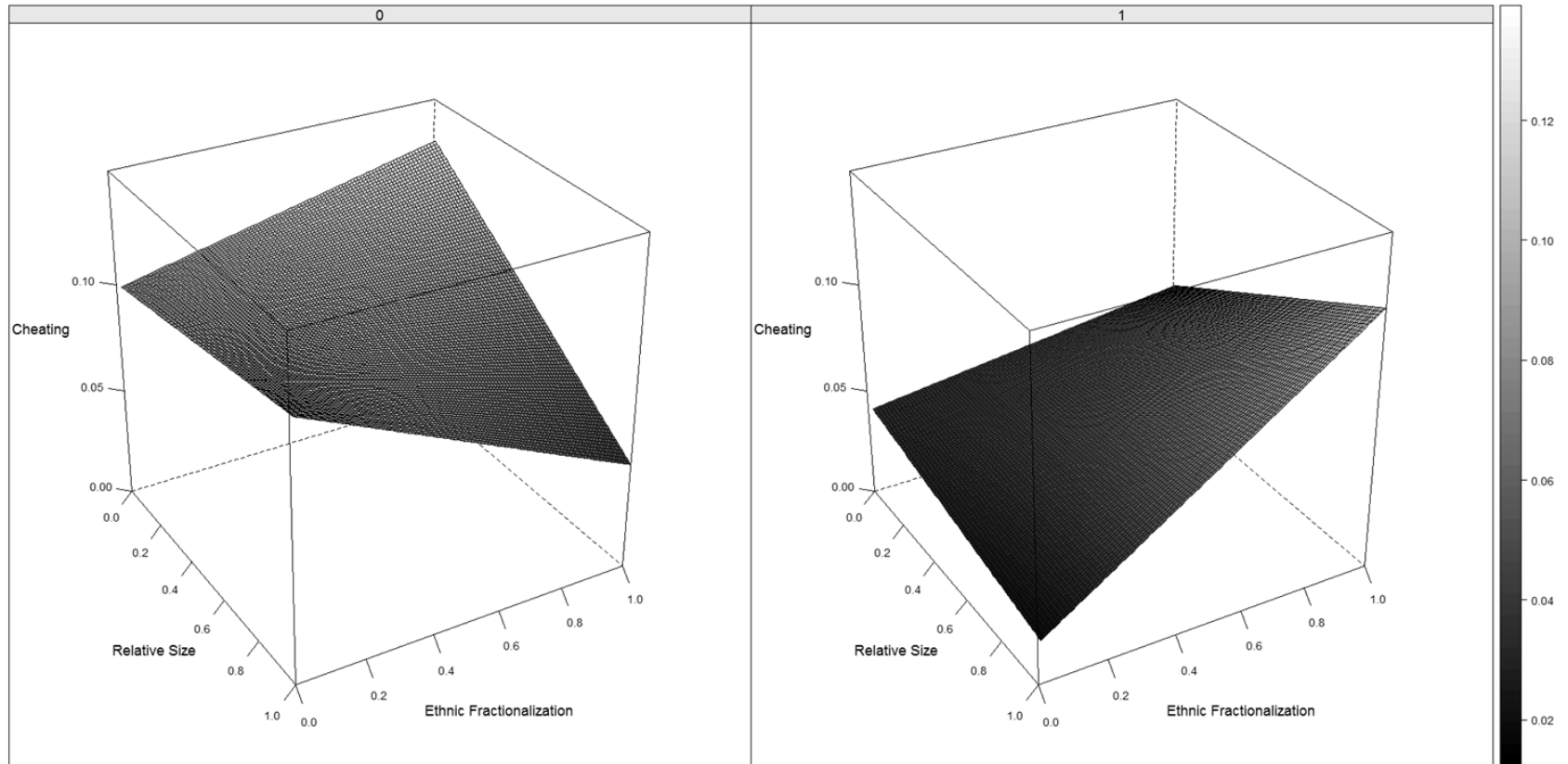


Figure 3: Predicted Approval of Tax Cheating Among People Not Trusting Government (Left) and People Trusting Government (Right)





## Appendix

Table A.1: Number of Respondents Classified into EPR Groups per Survey

Country	1990	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2005	2006	2007	2008
Albania	0	0	0	0	0	775	0	0	0	924	0	0	0	0	0
Algeria	0	0	0	0	0	0	0	0	0	1110	0	0	0	0	0
Andorra	0	0	0	0	0	0	0	0	0	0	0	980	0	0	0
Argentina	0	0	0	0	0	0	1188	0	0	0	0	0	932	0	0
Armenia	0	0	0	0	1800	0	0	0	0	0	0	0	0	0	0
Australia	0	0	1959	0	0	0	0	0	0	0	0	1320	0	0	0
Azerbaijan	0	0	0	0	1438	0	0	0	0	0	0	0	0	0	0
Bangladesh	0	0	0	1357	0	0	0	0	0	1456	0	0	0	0	0
Belarus	0	0	0	1514	0	0	0	0	0	0	0	0	0	0	0
Bosnia and Herzeg.	0	0	0	0	0	1101	0	0	1174	0	0	0	0	0	0
Brazil	0	0	0	0	1038	0	0	0	0	0	0	0	867	0	0
Bulgaria	0	0	0	0	829	0	0	0	0	0	0	0	840	0	0
Burkina Faso	0	0	0	0	0	0	0	0	0	0	0	0	0	867	0
Canada	0	0	0	0	0	0	0	1754	0	0	0	0	1831	0	0
Cyprus	0	0	0	0	0	0	0	0	0	0	0	0	979	0	0
Czech Republic	0	0	0	0	0	1030	0	0	0	0	0	0	0	0	0
Egypt	0	0	0	0	0	0	0	2598	0	0	0	0	0	0	0
Estonia	0	0	0	942	0	0	0	0	0	0	0	0	0	0	0
Ethiopia	0	0	0	0	0	0	0	0	0	0	0	0	0	1163	0
Finland	0	0	0	907	0	0	0	0	0	0	0	984	0	0	0
France	0	0	0	0	0	0	0	0	0	0	0	0	524	0	0
Georgia	0	0	0	1804	0	0	0	0	0	0	0	0	0	0	1314
Germany	0	0	0	0	53	0	0	0	0	0	0	0	1781	0	0
Ghana	0	0	0	0	0	0	0	0	0	0	0	0	0	1300	0
Great Britain	0	0	0	0	0	0	0	0	0	0	0	0	65	0	0

Country	1990	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2005	2006	2007	2008
Guatemala	0	0	0	0	0	0	0	0	0	0	0	989	0	0	0
Hungary	0	0	0	0	0	432	0	0	0	0	0	0	0	0	0
India	250	0	4350	0	0	0	0	0	2014	0	0	0	998	0	0
Indonesia	0	0	0	0	0	0	0	0	329	0	0	0	1249	0	0
Iran	0	0	0	0	0	0	0	4289	0	0	0	0	0	7199	0
Italy	0	0	0	0	0	0	0	0	0	0	0	586	0	0	0
Japan	0	0	0	0	0	0	0	1144	0	0	0	0	0	0	0
Jordan	0	0	0	0	0	0	0	0	1118	0	0	0	0	0	0
Kyrgyzstan	0	0	0	0	0	0	0	0	0	0	991	0	0	0	0
Latvia	0	0	0	1085	0	0	0	0	0	0	0	0	0	0	0
Lithuania	0	0	0	0	836	0	0	0	0	0	0	0	0	0	0
Macedonia	0	0	0	0	0	814	0	0	990	0	0	0	0	0	0
Malaysia	0	0	0	0	0	0	0	0	0	0	0	0	1055	0	0
Mali	0	0	0	0	0	0	0	0	0	0	0	0	0	1040	0
Mexico	75	0	0	12	0	0	0	16	0	0	0	16	0	0	0
Moldova	0	0	0	846	0	0	0	0	0	868	0	0	1010	0	0
Morocco	0	0	0	0	0	0	0	0	1933	0	0	0	0	1107	0
Netherlands	0	0	0	0	0	0	0	0	0	0	0	0	936	0	0
New Zealand	0	0	0	0	0	1025	0	0	0	0	0	0	0	0	0
Nigeria	0	0	1111	0	0	0	0	1360	0	0	0	0	0	0	0
Norway	0	0	0	0	0	0	0	0	0	0	0	0	0	0	972
Pakistan	0	0	0	0	0	0	0	0	979	0	0	0	0	0	0
Peru	0	0	0	1140	0	0	0	0	1564	0	0	0	0	0	0
Philippines	0	0	0	17	0	0	0	0	33	0	0	0	0	0	0
Poland	0	0	0	0	0	0	0	0	0	0	0	859	0	0	0
Romania	0	0	0	0	0	1102	0	0	0	0	0	1522	0	0	0
Russia	0	0	1749	0	0	0	0	0	0	0	0	0	1685	0	0
Serbia and Monten.	0	0	0	1238	0	0	0	0	1922	0	0	0	0	0	0
Slovakia	0	0	0	0	0	979	0	0	0	0	0	0	0	0	0
Slovenia	0	0	929	0	0	0	0	0	0	0	0	930	0	0	0
South Korea	0	0	0	0	0	0	0	0	0	0	0	1178	0	0	0

Country	1990	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2005	2006	2007	2008
Spain	0	0	1039	0	0	0	0	1049	0	0	0	0	0	1061	0
Sweden	0	0	0	904	0	0	0	0	0	0	0	0	901	0	0
Switzerland	0	0	0	1017	0	0	0	0	0	0	0	0	0	0	0
Taiwan	0	64	0	0	0	0	0	0	0	0	0	0	1	0	0
Thailand	0	0	0	0	0	0	0	0	0	0	0	0	0	2814	0
Trinidad and Tob.	0	0	0	0	0	0	0	0	0	0	0	0	834	0	0
Turkey	0	0	0	0	0	0	0	0	0	0	0	0	0	1182	0
Uganda	0	0	0	0	0	0	0	0	798	0	0	0	0	0	0
Ukraine	0	0	0	2162	0	0	0	0	0	0	0	0	658	0	0
Uruguay	0	0	0	923	0	0	0	0	0	0	0	0	817	0	0
Venezuela	0	0	0	533	0	0	0	470	0	0	0	0	0	0	0
Vietnam	0	0	0	0	0	0	0	0	925	0	0	0	0	0	0
Zambia	0	0	0	0	0	0	0	0	0	0	0	0	0	1082	0
Zimbabwe	0	0	0	0	0	0	0	0	11	0	0	0	0	0	0

Table A.2: Descriptive Statistics

Variable	Mean	SD	N
Tax Evasion	0.14	0.25	122614
Ethnic Fractionalization	0.44	0.23	122614
Relative Group Size	0.60	0.29	122614
Generalized Trust	0.27	0.45	122614
Trust in Government	0.47	0.31	122614
Acceptance of Bribe	0.08	0.20	121769
Male	0.50	0.50	122484
Age	0.31	0.19	122407
Education	0.49	0.33	121710
Income	0.40	0.26	110145
Married	0.59	0.49	122373
Church Attendance	0.51	0.36	118830
Tax Revenue	0.30	0.13	99969
Polity Score	0.68	0.35	118370
Log GDP per Capita	0.51	0.25	118398

Variables were rescaled to the scale from 0 to 1.