IMT

SCHOOL
FOR ADVANCED
STUDIES
LUCCA

#07
2016

ISSN 2279-6894
IMT LUCCA EIC WORKING
PAPER SERIES 07
December 2016

RA **Economics and institutional change**

Tax Morale, Aversion to Ethnic Diversity, and Decentralization

Alessandro Belmonte
Roberto Dell'Anno
Desiree Teobaldelli

Research Area
Economics and institutional change

Tax Morale, Aversion to Ethnic Diversity, and Decentralization

Alessandro Belmonte
IMT School for Advanced Studies Lucca

Roberto Dell'Anno
University of Salerno

Desiree Teobaldelli
University of Urbino

ISSN 2279-6894
IMT LUCCA EIC WORKING PAPER SERIES #07/2016

Piazza San Ponziano 6, 55100 Lucca

Tax Morale, Aversion to Ethnic Diversity, and Decentralization*

Alessandro Belmonte † **Roberto Dell'Anno** ‡
Desiree Teobaldelli §

Abstract

This paper analyzes the relationship between individuals' aversion to ethnic diversity, the degree of fiscal and political decentralization, and tax morale. Our theory is based on the assumption that individuals are risk averse in contributing to the provision of public goods benefiting other ethnic groups, and threfore display a lower tax morale. We find scope for policy intervention—specifically, our model predicts that the effect of individuals' aversion to ethnic diversity on tax morale is smaller or null in decentralized political and fiscal systems relative to centralized ones. The theory highlights the role of decentralization reforms to cut down inter-ethnic redistribution in conflicting environments. We test our results by using individual data from the World Value Survey, and several decentralization measures from Fan et al. (2009). According to our most preferred estimation, a one-scale change in the attitude toward ethnic diversity reduces tax morale of 0.03 in centralized system. We rather find no impact in decentralized states.

Keywords: Ethnic diversity, Decentralization, Tax morale, Risk-aversion.
JEL Classification: J15, H26, H73

*We are grateful to Davide Ticchi for valuable discussions. We also thank participants at the XXVIII SIEP meeting for comments.

†IMT School for Advanced Studies Lucca, e-mail: alessandro.belmonte@imtlucca.it
‡University of Salerno, e-mail: rdellanno@unisa.it
§University of Urbino, e-mail: desiree.teobaldelli@uniurb.it

1 Introduction

There is a large theoretical and empirical literature showing that investments in state fiscal capacity, namely economic institutions for tax compliance, are a key feature of economic development.[1] At the same time, a widely-accepted literature remarks that tax compliance cannot be fully explained by the level of enforcement or the tax rates and, after a long period in which non-pecuniary motivations have been neglected (Andreoni et al., 1998), tax morale has turned into a key issue among the determinants of tax compliance (Torgler, 2007). Tax morale is usually defined as a moral obligation or an intrinsic motivation to pay taxes, and it can be considered as "an umbrella term capturing non-pecuniary motivations for tax compliance as well as factors that fall outside the standard, expected utility framework" (Luttmer and Singhal, 2014, p. 150).[2]

A variety of aspects then are expected to influence tax morale and the literature has indeed provided evidence on different channels and on substantial cross-country variation. A strand of literature has emphasized the individual's relationship with the state, and, specifically, the perception individuals form about the government or the fairness of the tax schedule (e.g. Feld and Frey, 2002; Hofmann et al. 2008; Besley et al. 2014). Other works have shown how culture affects tax compliance in a given country—thus controlling for the same institutional context and environment (e.g. Halla, 2012; DeBacker et al., 2015; Kountouris and Remoundou, 2013). Similarly, Torgler (2006) and Lago-Peñas and Lago-Peñas (2010) have estimated positive correlations between beliefs, such as national pride or religiosity, and the country's tax morale.

On the other hand, the institutional arrangement in which the government works and the composition of the population have proved to explain part of such "motivations" in complying. The extent of democratic participation, and the degree of decentralization and local autonomy, have been recognized by a growing empirical literature as decisive factors influencing the intrinsic motivation to pay taxes (Torgler, 2005; Güth et al., 2005; Torgler et al., 2010). The degree of ethnic diversity of the country population has been found to be a determinant of individuals' attitudes towards tax compliance and, more generally, of the desire of the citizens to support redistributive policies.[3]

Our work contributes to this literature by focusing on the individuals' attitude toward other ethnic groups and its interaction with institutional arrangements as main drivers of tax compliance. Specifically, we analyze, theoretically and empirically, the impact of

[1] See Besley and Persson (2013) for a review.

[2] See also Alm and Torgler (2006) and Dell'Anno (2009) for similar definitions.

[3] See, for a comprehensive overview, Li (2010).

individuals' aversion to ethnic diversity on intrinsic motivations to comply with taxes, and test whether and to what extent a decentralized political and fiscal system affects this relationship. We find evidence that a negative attitude toward ethnic diversity reduces tax morale in centralized political systems, while it does not have a statistical significant impact in decentralized states. We also obtain that the negative effect of aversion to ethnic diversity on tax morale is lower in ethnically fragmented communities than in homogeneous countries.

Our analysis relies on the idea that individuals averted to ethnic diversity are more reluctant to contribute to the provision of public goods that benefits other ethnic groups and, therefore, display a lower tax morale. In decentralized systems, local autonomy ensures that taxes collected in one jurisdiction are spent primarily for the provision of that jurisdiction's public goods. Our mechanism uses the idea that single jurisdiction are more ethnically homogeneous than the whole country, so that, in result, citizens feel more attached to their community. Their aversion towards other ethnic groups is therefore likely to have a lower impact on the individuals' tax morale.

We propose a simple framework where individuals are asked to pay taxes to provide public goods that benefit the entire community. All agents have the same income as we do not address the extrinsic motivational components of tax morale.[4] We assume that agents incur in a non-pecuniary extra cost when their wealth is used to subsidize the provision of a public good that benefit also members of other ethnic groups. This psychological cost is what we interpret as the *loss aversion to ethnic diversity* and capture the idea that the taxpayers' intrinsic motivation to comply with the law is related to the diversity in the ethnic composition of their community.

We consider the case where local communities are perfectly homogeneous and, therefore, the risk of contributing to an ethnically fragmented community can be insured by implementing a decentralization reform that transfer the powers of taxation and expenditure to local authorities. In a decentralized country, with no within-region ethnic fragmentation, psychological costs are absent and the individuals' utility loss is equal to the tax paid to finance the public goods provision. The perceived risk is then fully covered after paying the cost of establishing a decentralized system—which we interpret as the risk premium—and it tells us how much the individuals are willing to pay for not contributing to the unfelt social community; this is what we define the ethnic diversity aversion component of the tax cheating.

[4]We also neglect other sources capable of increasing reciprocity between tax payers and the tax administrator such as the quality of the public good, the efficiency in managing its provision, or the perceptions about the fairness of the tax system

Our model leads to the conclusion that when taxpayers are loss averted toward ethnic diversity and the ethnic composition follows territorial boundaries, a decentralized fiscal system boiled down the negative impact of risk aversion. On the contrary, when ethnic fragmentation is high, but the between regions variation is negligible, decentralization is an ineffective and costly reform. This cost increases with ethnic fragmentation making tax morale relatively higher.

We test these predictions using microdata from the World Value Survey (WVS) that collects respondents' ethnic diversity aversion and their propensity to cheat on taxes as well as their individual characteristics. We combine this dataset with several measures of fiscal decentralization from Fan et al. (2009) in order to decompose the variation in tax morale at individual-, religions-within-country- and country-level using a linear mixed model. This strategy allows us to estimate the impact of country variant variables, such as decentralization, GDP per capita, and other sources of fragmentation, whilst providing robust within groups estimates within religions-within-country and within-country estimations that cut down eventual sources of omitted variable bias.

Our most preferred estimation reports a decreasing of about -0.03 in tax morale in response of a one-scale increasing in ethnic aversion in centralized countries. Consistently with our theory, we find no significant effect of ethnic aversion on tax morale in decentralized countries—even controlling for several sources of diversity, such as language, religion and ethnic diversity. Finally, we also study the direct impact of ethnic fragmentation on tax morale in different fiscal systems and find that ethnic fractionalization moderates the negative impact of ethnic aversion in a non-linear fashion. According to our benchmark specification a 10 per cent increasing in ethnic fragmentation, when fractionalization is low, generates a small yet negative impact on tax morale in poorly decentralized systems (-0.007) which goes to zero in highly decentralized countries. In these latter systems, high values of ethnic fragmentation are found to positively leverage tax morale (0.005 after a 10 per cent increasing in ethnic fragmentation).

The implication of our theory is that attitudes *towards* ethnic diversity explain a larger fraction of tax morale variation than ethnic diversity *per se*. The former source of conflict—acting on the psychological side of the tax payers—can be dramatically reduced implementing a fiscal and political reform. These are, for example, the reforms implemented over the last three decades of the last century in Belgium which established a unique form of a federal state composed by three regions with segregated political power. Along with the Brussels-Capital Region, in which both the French and the Flemish community have historically lived side by side, the Flemish and the Walloon

Regions have been established around the two main linguistic communities.[5] Similar examples include the Switzerland and the Germany.

The paper is organized as follows. Section 2 discusses the main works related with this paper. Section 3 presents a simple model and discuss its comparative statics. Section 4 describes the empirical methodology, the data employed and the estimation results. Section 5 analyzes the direct impact of ethnic fractionalization on the relationship between tax morale and ethnic aversion. Section 6 concludes with a summary and discussion of the main results.

2 Related Literature

Our work complements the studies analyzing the impact of ethnic diversity on tax morale. As far as this determinant is concerned, a limited, yet rapidly growing, literature concludes that ethnic diversity is negatively correlated to tax compliance. In particular, Li (2010), motivates this result as a consequence of intergroup discrimination, i.e. people favor policies that offer beneficial treatment to their own ethnic communities, and withdraw support for other groups. Conversely, Tusicisny (2014) finds that trust in government moderates the negative correlation between ethnic fractionalization and tax morale, especially among ethnic minorities.[6]

The above-mentioned results are consistent with the findings suggesting the detrimental impact of ethnic fractionalization on public sector performance and economic outcomes (see Alesina and La Ferrara, 2005, for a review). For example, Alesina et al. (1999) provide evidence that the share of spending on productive public goods in U.S. urban areas is inversely related to the ethnic fragmentation of the communities. Luttmer (2001) finds that people increase their support for welfare spending as the share of local recipients from their own racial group rises. Alesina et al. (2001) show an inverse relationship between the size of government redistributive spending and the country's ethnic fragmentation.[7]

[5]For an historical excursus of the recent Belgian events, see Witte et al. (2009).

[6]Alesina et al. (2003) find a negative, but not statistically significant relationship between ethnic fractionalization and tax compliance. Lago-Peñas and Lago-Peñas (2010) corroborates this finding, showing that ethnic-linguistic fractionalization is significantly negatively associated with tax morale in European countries.

[7]Alesina and La Ferrara (2005) refer to Tajfel et al.'s (1971) Social Identity Theory to explain which psychological mechanisms may link ethnic heterogeneity to the economic choices. According to this approach, once people have categorized themselves as part of a group, they then tend to compare their group with other groups. Consequently, individuals may attribute positive utility to the well-being of

With respect to this field of research, our analysis has two key and innovative features. First, we point out that the country's degree of ethnic fractionalization is not necessarily a factor affecting negatively the individuals' tax morale, as we believe that it is not the ethnic diversity *per se* that matters in explaining the individuals' intrinsic motivation to pay taxes; rather, it is the individual's attitude *towards* ethnic diversity. Second, we analyze how this relationship is shaped by the country's institutional features and, in particular, by the degree of fiscal decentralization.

Our contribution is in line with the empirical literature that highlights how decentralized fiscal systems are characterized by a higher tax morale. For instance, Torgler et al. (2010) using Swiss data to provide evidence that there is a strong and positive correlation between local autonomy, direct democracy and tax morale, whereas Torgler and Werner (2005) find evidence that a higher fiscal autonomy leads to a higher tax compliance in Germany. Martinez-Vazquez and Torgler (2009) show that intrinsic motivation to pay taxes rose in Spain as a consequence of the trend towards an enhanced fiscal federalism. Other studies focus instead on interregional aspects of tax morale. Torgler and Schneider (2007) find that tax morale exhibits regional differences in Switzerland and Spain, whereas Lago-Peñas and Lago-Peñas (2010) provide evidence for European countries that tax morale is lower in rich federal regions than rich regions in unitary states, and attribute this result to the higher visibility of interregional transfers in decentralized countries. Güth et al. (2005) contribute to this strand of the literature by providing experimental evidence that tax morale is higher in a decentralized tax system.[8] Our paper contributes to this strand of the literature by emphasizing that fiscal and political decentralization may also have an indirect effect on tax morale; specifically, in the case we analyze, the degree of decentralization affects the relationship between individual's attitude towards ethnic diversity and tax morale.

3 Theoretical framework

In this section we highlight the main mechanisms of our empirical analysis presenting a simple theoretical framework linking tax compliance, decentralization, and ethnic fragmentation where citizens are averted to ethnic diversity.

members of their own group, and negative utility to that of members of other social groups.

[8] All these findings follow the view that more extensive possibilities for direct political participation lead to higher intrinsic motivation to pay taxes, since taxpayers feel more obliged to be honest when they participate in decision-making through a system of direct democracy (see on this point, Pommerehne and Weck-Hannemann, 1996; Torgler, 2005; Schwarz, 2011).

We focus, for simplicity, on two regions, A and B, populating by citizens that have same preferences on wealth. Agents have same income (normalized to 1) and, after observing the degree of ethnic fragmentation in the community ϕ, are asked to pay taxes τ to provide public goods that will benefit the entire community and remunerate the tax administrator. The provision is efficient and the tax administrator not selfish.

The key assumption of the model is that agents incur in a non-pecuniary extra cost when his or her wealth is used to subsidize a good that also benefits a non-member of his or her ethnic group.[9] This cost is equal to a fraction λ of taxes τ. When the subsidy goes toward members of their group no additional costs are perceived.

We split the discussion in two parallel parts. We start considering two regions ethnically homogeneous—that is, populated by agents of same ethnicity. In subsection 3.1, therefore, only between variation is at play. In subsection 3.2 we complicate the scheme allowing for a fraction of within-region ethnic fragmentation.

3.1 Homogeneous regions

Regions A and B are ethnically homogeneous but they differ to each others. More precisely, they have same ethnicity with probability $1-\phi$. The parameter ϕ is then the rate of ethnic fragmentation in the country. In this set-up is natural to assume ϕ being a binary variable, i.e. $\phi = \{0, 1\}$.

Given the ethnic fragmentation in the country, in a centralized system taxpayers perceived a psychological loss equal to $\lambda\tau$ with probability ϕ. The expected utility of the agent $i = \{A, B\}$ after paying taxes is then equal to:

$$\begin{aligned} \mathbb{E}u_i &= \phi(1-\tau-\lambda\tau) + (1-\phi)(1-\tau) \\ &= 1-(1+\phi\lambda)\tau. \end{aligned} \tag{1}$$

When λ is equal to zero taxpayers do not incur in any extra costs, regardless of the fractionalization of the country. When λ is high ethnic diversity counts substantially. λ is then the degree of loss aversion to ethnic diversity.

Alternatively taxpayers can ask the tax administrator to decentralize the fiscal system. This reform however costs π, because of the establishment of two distinct offices, but cuts λ to zero. Once the reform is implemented, region A does not care about region B anymore and region B does not care about A likewise. Therefore the utility of the agent i after paying taxes, in a decentralized country, is then equal to:

$$u_i = 1-\tau-\pi. \tag{2}$$

[9] See on loss aversion Kosgezi and Rabin (2006, 2007).

In a decentralized country, with no within-region ethnic fragmentation, psychological costs are absent and people just pay taxes τ for benefiting the public good. The risk of contributing to a fragmented community is then fully covered after paying the cost of establishing a decentralized system. π is then the risk premium adverse agents pays to insurance their risk—in this case ethnic diversity. It tells us how much people would be willing to pay for not contributing to the unfelt social community and it is what we define the ethnic diversity aversion component of the tax cheating.

One can easily get the optimal amount that in equilibrium tax payers are willing to pay to insure such a risk, equalizing (1) to (2) as follows:

$$\pi^* = \phi\lambda\tau. \tag{3}$$

3.2 Heterogeneous regions

Regions A and B are now also ethnically different within themselves. The total variation can then be disentangled as follows:

- ϕ^w is the rate of fractionalization within each region;
- ϕ^b is the rate of fractionalization between the two regions;
- All the citizens belong to the same ethnic group with probability $1 - \phi^w - \phi^b$.

In this more general set-up it is natural to think of ϕ^w and ϕ^b in terms of rates, i.e. $\phi^w \in [0, 1]$ and $\phi^b \in [0, 1]$. Seizing $\phi^w = 1$ and restring the support of ϕ^b to the only two values of 0 and 1 yields the set-up presented in section 3.1. Everything else is the same as stated above and so is the timing of actions. In a centralized system, the expected utility of each agent i after paying taxes is given by:

$$\begin{aligned} \mathbb{E}u_i &= (\phi^w + \phi^b)(1 - \tau - \lambda\tau) + (1 - \phi^w - \phi^b)(1 - \tau) \\ &= 1 - (1 + (\phi^w + \phi^b)\lambda)\tau. \end{aligned} \tag{4}$$

In a decentralized system, now, aversion to ethnic diversity also matters as long as ethnic fragmentation within each region is positive, i.e. $\phi^w > 0$. Nevertheless, the between variation does not affect tax payers decisions anymore. The implementation of the reform must then take into account the fact that it does not fully insure the risk. Along with the cost π, the implementation of the reform contemplates an additional psychological penalization proportional to the ethnic fragmentation itself. The idea is

that the decision to decentralize the fiscal system has to be less attractive when within variation is expected in the region. The expected utility is then:

$$\begin{aligned}\mathbb{E}u_i &= \phi^w(1-\tau-\lambda\tau)+(1-\phi^w)(1-\tau)-(1+\phi^w)\pi \\ &= 1-(1+\phi^w\lambda)\tau-(1+\phi^w)\pi.\end{aligned} \tag{5}$$

In equilibrium, agents will cover the risk establishing a reform that costs π^*:

$$\pi^* = \frac{\phi^b}{1+\phi^w}\lambda\tau. \tag{6}$$

3.3 Comparative statics

How can this simple framework help us understanding the relationship among tax morale, aversion toward ethnic diversity, ethnic fragmentation, and decentralization? π^* is the psychological cost that tax payers would like to insure implementing a decentralized system. The complement, $p = 1-\pi^*$, gives us a rough measure of the ethnic diversity aversion component of tax morale. We can then discuss the effects of exogenous variations of our parameters of interest, λ, ϕ^w, and ϕ^b, on tax morale. We summarize them in the following proposition.

Proposition 1 *The following comparative statics results hold:*

1. *Aversion to ethnic diversity negatively affects the willingness to comply with the taxation system:*
$$\frac{\partial p(\lambda \mid \phi^w, \phi^b)}{\partial \lambda} < 0. \tag{7}$$
2. *In a decentralized system (where $\phi^b = 0$), loss aversion to ethnic diversity does not affect tax morale:*
$$\frac{\partial p(\lambda \mid \phi^w \geq 0, \phi^b = 0)}{\partial \lambda} = 0. \tag{8}$$
3. *In a highly fragmented country the marginal effect of loss aversion to ethnic diversity on the willingness to comply with the taxation system is ambiguous, depending on the source of fragmentation:*
$$\frac{\partial^2 p(\lambda \mid \phi^w, \phi^b)}{\partial \lambda \partial \phi^b} \leq 0, \quad \frac{\partial^2 p(\lambda \mid \phi^w, \phi^b)}{\partial \lambda \partial \phi^w} \geq 0. \tag{9}$$

The first simplest prediction of the model clearly comes out from the assumption of agents being reluctant in contributing to a system with a high degree of ethnic fragmentation. The loss aversion to ethnic diversity has a big impact on tax morale and it is, consistently with previous researches (e.g., Li, 2010; Tusicisny, 2014), negatively related.

At the same time, our second result is novel in the literature and tells us that such negative impact could be boiled down once implementing a decentralized fiscal reform. If tax payers concerns only regard ethnic fragmentation, as in our framework, eliminating one big source of ethnic diversity could be an effective policy to increase the country's tax morale. Within region fragmentation is still at play, but it could not be insured through a decentralization reform and therefore, by this logic, taxpayers would not be willing to pay a dollar to cover it. So, tax cheating does not vary with the within ethnic diversity when differences between the two regions are cut down through the reform.

Finally, we got ambiguous predictions related to the link tying the marginal effect of loss aversion to ethnic diversity on tax morale and the ethnic diversity itself—depending on the source of fragmentation. A rise in ϕ^b broadens the negative effect of aversion to ethnic diversity since it makes people even more willing to pay for not contributing to the fiscal system of a highly fragmented country. On the contrary, an increase in ϕ^w moderates the impact of taxpayers aversion. There are no previous works showing evidence on the sign and magnitude of these two links. Our cross-country analysis brings support in favor of the second effect.

This framework also suits for studying the potential effects of idiosyncratic versus aggregate shocks to the ethnic composition of the country's population. An incoming migration flow that specifically targets a region (and not the rest of the country) moves up both ϕ^w and ϕ^b, generating an ambiguous effect on tax morale. An aggregate migration shock to the country's population, by contrast, will move up ϕ^w that in turn reduces ϕ^b. Tax morale is therefore expected to increase.

In the remainder of the paper we empirically test these three predictions.

4 Empirical analysis

4.1 Data description

Our research objective is to model individual tax morale as a function of ethnic aversion and decentralization. To this purpose we combine both individual-level and country-level data described below that potentially may influence subjective heterogeneity in tax morale, and correlate with ethnic aversion. Details on data description are reported in Table A0, whereas summary statistics are presented in Table A1. They are both reported in the Appendix.

4.1.1 Individual-level data

We use individual data from the 2005 wave of the World Value Survey—the only providing information upon the individual attitude towards ethnic diversity. Our sample contains more than 30 thousand individuals distributed in 44 countries.

Our dependent variable is tax morale ($TaxMor$). It relies on the question about noncompliance attitudes and assesses the extent to which respondents think cheating on taxes is justifiable, when an opportunity is available. In particular, the index is based on the answer, in a 1 to 10 scale, to the following question: "*Cheating on taxes, if you have a chance, is: 1 = never justifiable, 10 = always justifiable.*" Hence, the lower the score, the higher the tax morale. We rescaled the index, so that higher values of our variable correspond to a higher tax morale of the individual.[10]

We use the individual attitude toward ethnic diversity (AED) as the main explanatory variable of interest. It comes from the answer, on a scale from 1 to 10, to the following question: "*Turning to the question of ethnic diversity, with which of the following views do you agree? Ethnic diversity erodes a country's unity (scale 1); Ethnic diversity enriches my life (scale 10).*" This index has been rescaled so that higher values correspond to individuals with higher aversion to ethnic diversity.[11]

Following the literature on tax morale determinants (e.g., Torgler and Schaltegger, 2005; Torgler and Schneider, 2007; Lago-Peñas and Lago-Peñas, 2010), we additionaly employ a group of indicators which account for individual socio-demographic characteristics: *gender*, *age*, *marital status*, *education*, *social class*, *income*, and *size of town*.

- *Sex* is a dummy variable taking value 0 for male and 1 for female.

- *Age* is a variable taking values from 13 to 108 years.

- *Marital status*: we employ seven dummy variables, each for one of the following categories: married; living together as married; divorced; separated; widowed; single/never married; divorced, separated or widow.

- *Education*: we employ eight dummy variables, each for one of the following categories: inadequately completed elementary education; completed (compulsory) elementary education; incomplete secondary school; complete secondary school; incomplete secondary; complete secondary; some university without degree; university with degree.

[10] The WVS question we use is labeled F116. We simply rescaled it so as $TaxMor = 11 - \text{F116}$.

[11] Even in this case, we simply rescaled the WVS question G032 so as $AED = 11 - \text{G032}$.

- *Social class*: we control for five dummies, one for each social class category (working, lower, lower middle, upper middle, upper class).

- *Income*: we use dummy variables for each of the ten income classes.

- *Size of town*: we employ eight dummy variables, each for category of the size of town.

This literature has shown that tax compliance tends to be higher among older people, women, married people.[12] Moreover, people with a higher income have shown to be more likely to cheat on taxes (Lago-Peñas and Lago-Peñas, 2010). The effect of education is instead ambiguous. While more educated individuals are found to be better aware of the benefits related to the public goods provision, they are also more critical about the state's fiscal policy (Torgler and Schaltegger, 2005; Torgler and Schneider, 2007). Finally, the inclusion of the size of town as control is motivated by the fact that people living in smaller towns develop a greater sense of community and social ethics. This is also in line with the Olson's (1965) thesis that free riding is more likely to emerge in large groups.

4.1.2 Country-level data

Decentralization measures. The measures of decentralization employed follow those proposed in literature (Rodden, 2004; Treisman, 2008). Whereas defining a suitable index to compare the degree of decentralization among countries is a particularly hard task—since decentralization is a multidimensional concept that encompasses political, administrative and fiscal dimensions, as well as cultural and geographical traits—two main approaches have been employed in the literature to measure the degree of country decentralization.

The first kind of measures looks at the political and administrative dimensions of the public decision-making process. In order to account for this aspect, we use two dichotomous variables, $federal$ provided by Treisman (2007) and *autonomy* from Fan et al. (2009). $federal$ is a dummy variable on whether the country is federal or not (where 1 denotes the federal state) in the mid-1990s, according to the classification provided

[12] Orviska and Hudson (2003) using sample survey data from randomly chosen group of people, provide evidence that evasion is more common among the young and men, and is condoned by a large proportion of the population particularly ready to take advantage of someone else's evasion.

by a leading expert of federalism (Elazar, 1995).[13] *autonomy* is a dummy calculated on whether the constitution assigned at least one policy area exclusively to subnational governments or gave subnational governments exclusive authority to legislate on matters not constitutionally assigned to any level.

Although both indexes are close to various classics definitions of federalism,[14] the variable *autonomy* represents a broader category, since assigns the value 1 "*also to countries that devolve decision-making rights to certain selected regions but not to others*" (Fan et al., 2009: 17). The variable $federal$, instead, seems to adopt a stricter criterion: it relies on the primary characteristic of a federal state—a constitutionally guaranteed division of power between central and regional governments (Lijphart, 1984), but defines as federal "*those states whose constitutions endow subnational governments with residual authority to decide on matters not explicitly assigned to the central government*" (Treisman, 2008: 30).

A second set of proxies of decentralization focuses on fiscal decentralization and it usually consists of a ratio between the expenditure (or revenue) of subnational government and the total government expenditure (or revenue) at the national level. We use three indexes drawn from the IMF – Government Finance Statistics and reported in the World Bank's database of Fiscal Decentralization Indicators. For all of them, we calculate their average values over the period 1972-2000. These are subnational expenditures as a percentage of total expenditures ($snete7200$), subnational revenues as a percentage of total revenues ($snrtr7200$), and intergovernmental transfers as a share of sub-national expenditures ($vi7200$). The latest index, defined as vertical imbalance, measures the degree to which subnational governments rely on central government revenues to support their expenditures. Higher values of this variable correspond to lower degree of fiscal decentralization. To get consistent interpretation of our results, we also rescale $vi7200$

[13] According to Elazar's definition (1995), federal political systems are those in which a general government is constituted by a group of two or more constituent governments which have very substantial reserved or protected powers within the common whole. Following the author's suggestion, federalism should be understood as constitutionalized power-sharing through systems that combine self-rule and shared rule.

[14] As reported in Fan et al. (2009: 17), in Riker's definition, a federal constitution has (at least) two levels of government governing the same land and people; each level of government has "*at least one area of action in which it is autonomous*"; and this autonomy must be guaranteed in the constitution (Riker 1964: 11). This is similar to Dahl's definition of federalism as "*a system in which some matters are exclusively within the competence of certain local units-cantons, states, provinces-and are constitutionally beyond the scope of the authority of the national government; and where certain other matters are constitutionally outside the scope of the authority of the smaller units*" (Dahl, 1986; quoted in Stepan, 2001: 318).

so that higher values correspond to higher degree of fiscal decentralization, as this means that a lower share of local expenditure comes from central government transfers.[15] Bordignon (2013) argues that vertical fiscal imbalances—i.e., higher shares of transfers in the local government budgets—is meant to capture the divergence between own revenues and expenditure at the local level. Higher levels of this index are usually shown to be associated with poorer local governments' performance.

A synthetic index of decentralization. We favor the hypothesis that a federal political structure is the proper proxy to use in this context because federalism is viewed as a way to manage conflict in ethnically divided societies, especially in countries where such divisions are more pronounced (Treisman, 2008). Federations often emerged with the role of balancing the competing and conflicting demands for autonomy and unity in such countries, on the basis that political recognition of cultural and ethnic pluralism helps to reduce ethnic tensions and conflicts, thus being an important instrument of nation building.

Moreover, as argued in Teobaldelli (2011) and Dell'Anno and Teobaldelli (2015), federalism—where the constitution guarantees subnational governments the power to autonomously rule and legislate—is meant to be a process of governmental decentralization in which the devolution of resources goes hand in hand with the transfer of political responsibility, thereby strengthening subnational governments in terms of accountability and good governance.

However, there is a key issue concerning the use of this measure. It has been argued that the advantages gained by $federal$ actually stem from fiscal decentralization—namely, the devolution of expenditures and revenue-raising power. Thus, federalism may be an imperfect measure because "*there can be both centralized and decentralized federations and, similarly, centralized and decentralized unitary states*" (Lijphart, 1984: 176). Lijphart also emphasizes that "*federalism and decentralization tend to go together*" (especially considering OECD countries) and the same pattern is found by Fisman and Gatti (2002). Moreover, the measure of fiscal decentralization often used in the literature, i.e., the subnational share of total government expenditures (or revenues), is not immune from criticism, either. Its most serious limitation is a possibly weak correspondence between budgetary items and actual decision making. If the budgets of local governments are actually mandated from above, then greater decentralization need not correspond to

[15] As a result, our measure of vertical imbalance is given by $\max_k(\frac{1}{T}\sum_{t=1972}^{2000} x_{kt}) - \frac{1}{T}\sum_{t=1972}^{2000} x_{kt}$, where t is the year and k is the country. T is the number of years over which the country average is computed. The maximum run over the cross-country distributions.

autonomy in expenditure allocation (Fisman and Gatti, 2002; Panizza, 1999). In order to work, fiscal decentralization requires a sufficient degree of local financial autonomy.

Since the indexes, singularly considered, may suffer of such limitations, we propose a new dichotomous variable (Dec) based on the cited above five indexes. This new index aggregates different dimensions of political and financial autonomy into one decentralization dummy variable taking value of 1 if the majority of the decentralization variables considered indicates that the country is decentralized and 0 otherwise. In particular, the aggregation of the five decentralization indexes is made as follows. Each index is rescaled taking the value 1 if the country is decentralized and -1 if it is centralized; in the case of the three continues indexes (subnational expenditures, subnational revenues and vertical imbalance), the country is considered decentralized (resp. centralized), and therefore the rescaled index takes value 1 (resp. -1), when the original index indicates that the country is more decentralized (resp. centralized) than the median. Then, our new decentralization variable (Dec) is obtained from the sum of the five rescaled indexes; if the score obtained from the sum of such indexes is negative, the country will be classified as centralized and our decentralization index will take value 0, while our new index takes value 1 indicating that the country is decentralized when the sum of the five rescaled indexes is positive.

Let us index each decentralization measure as s and country as k. In symbols, our index is calculated as follows:

$$Dec_k = \begin{cases} 1 & \text{if } \sum_{s=1}^{5} D_k^s > 0 \\ 0 & \text{otherwise} \end{cases} \tag{10}$$

where the rescaled indexes D_k^s from the dummy variables $federal$ and $autonomy$ used to realize our synthetic index are obtained as follows:

$$D_k^s = \begin{cases} 1 & \text{if } S_k = 1 \\ -1 & \text{if } S_k = 0; \end{cases} \tag{11}$$

while the three new indexes drawn from the continuous variables ($snete7200$, $snrtr7200$ and $vi7200$) are as follows:

$$D_k^s = \begin{cases} 1 & \text{if } S_k > median(S) \\ -1 & \text{otherwise.} \end{cases} \tag{12}$$

In constructing this variable, our final goal is to preserve the sample size, accepting the trade off to lose information of continuous variable on fiscal decentralization to gain a

Table 1: Correlations between decentralization measures.

	Dec	*auton.*	*federal*	*subnat. expend.*	*subnat. rev.*	*vertical imb.*
Dec	1.000					
autonomy	0.313***	1.000				
federal	0.627***	0.508***	1.000			
subn. exp.	0.557***	0.143	0.421***	1.000		
subn. rev.	0.581***	0.097	0.408***	0.948***	1.000	
vert. imbalance	0.256**	−0.038	0.050	−0.059	0.161	1.000

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

broader definition of overall decentralization. According to the *Dec* index, among the 43 countries of our sample, we count 13 decentralized states and 30 centralized countries.[16]

Table 1 reports the correlation indexes among the decentralization measures discussed above. Our synthetic index (in column 1), as expected, is significantly correlated with all the other indexes. The measure reported in the last row is not correlated with any other proxies of decentralization used here, and our interpretation for that is that vertical imbalance captures a complementar dimension of fiscal decentralization—that is, the share of local expenditure coming from the central government. *federal* and *autonomy* are highly correlated to each other, though federal is also closer to the two indexes measuring the fraction of subnational economic activity—expenditure and revenues.

Country-level control variables. We also control for some characteristics of the country. The total population and the GDP per capita, to account for the level of economic development, based on purchasing power parity (PPP) in 2011, are taken from the World Development Indicators (WDI). The measures of ethnic fractionalization (ethnic), language fractionalization (language) and religious fractionalization (religion) come from Alesina et al. (2003); all three indexes range from 0 to 1 with higher values denoting a higher degree of fractionalization. On the whole, our countries sample features an average ethnic fractionalization value of 0.36, that however hides a big heterogeneity (SD = 0.24). Similarly, the average language and religion fractionalization values are 0.32 and 0.43, respectively. A large literature on the impact of ethnic fractionalization on

[16]According to our index, the decentralized states are, respectively: Argentina, Australia, Brazil, Switzerland, Spain, Germany, India, Moldova, Mexico, Malaysia, Sweden, United States, South Africa. See Table A2 in Appendix for a complete list of country and decentralization status.

government activities indicates that ethnic and linguistic fractionalization are associated with negative outcomes in terms of both economic output and the quality of governments (see, for instance, Alesina et al., 2003; La Porta et al., 1999). According to these theories that look at the taxpayers preferences (culture) and their extrinsic motivation, public goods provision should be less efficient in divided societies, and this may lower tax morale. While in line with these previous findings, our mechanism is substantially different as it underlines the effect of ethnic fragmentation on tax compliance when agents are loss averted to ethnic diversity.

Finally, we add two indexes taken from the Worldwide Governance Indicators (WGI) to control for the quality of institutions that prove to be positively related to the quality and the extent of fiscal policies, which may affect, in turn, the external motivation associated to tax morale. The first one is the government effectiveness index, capturing the perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. The other one is the control of corruption index capturing the perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests.

4.2 Empirical strategy

The simplest way to study how the effect of aversion towards ethnic diversity on tax morale varies across differently decentralized systems (or in accordance with the degree of ethnic fragmentation) would be estimating a cross-country model. And this was the strategy of much of the works in the field.[17] The advantage of working with a little complex model is however outweighed by the the loss of information about tax compliance at individual level.

Our data strikingly suggest that tax morale is mainly a purely individual behavior. Table 2 in fact reports the estimated variance components of tax morale in a null model at the country, $\sigma^2_{u_k}$, and religion-within-country level, $\sigma^2_{u_{jk}}$, as well as the intraclass correlation ρ at either the two levels.[18] In either cases ρ is smaller than 0.1 indicating that grouping counts for only a small part of the variation in tax morale—at most 10 per cent of the total variation in tax morale.

[17] See for instance Lee (2010) and citations there in.

[18] The null model is specified so as $TaxMor_{ijk} = \alpha + u_{jk} + u_k + \varepsilon_{ijk}$, where u_{jk} is the random component at the religion-within-country level and u_k is that operating at country level.

Table 2: Between-groups variations in tax morale and intraclass correlations estimated in a null model with n individuals nested within country k and religion-within-country jk.

Groups	N of groups	Avg. n obs. per group	σ^2	ρ
Country	$N_k = 56$	1368.70	0.456	0.095
Religion	$N_{jk} = 469$	163.40	0.071	0.015

In order to capture variations induced by individual specific characteristics *and* by institutional *and* cultural or social norms in the voluntary compliance with tax laws, we then depart from the existing literature by using a linear mixed model. Though tax morale is a purely individual behavior, its variation across individuals is affected by numerous policies pursued by national tax authorities—either in terms of penalty imposed to detected evasion or programs or public campaigns that are aimed to change the attitudes toward tax evasion—or by specific institutional setting of the country. Cultural norms that intrinsically prescribe individual contribution to the community are also expected to affect tax morale.

We capture these different sources of variation in factors other than pecuniary using a three-level nested model. Specifically, we model tax morale as an attitude that varies at individual level but that also substantially depends on religion specific features (level 2) and country specific characteristics (level 3). Each individual i then is assigned to a religion group j within a country k. Random effects then operate at both the country and the religion-within-country levels.[19] The role of religion groups varying within countries is meant to capture cultural diversity that might explain different behaviors across individuals in a country.[20]

Our estimations therefore account for the variation in tax morale within such a groups but also account for that induced by contemporaneous co-movement of variable at the country level. As our theory predicts in fact the tax morale/ethnic aversion nexus lines

[19]Lago-Peñas and Lago-Peñas (2010) is the only relevant exception we are aware of. The two authors estimate a multilevel model where tax morale is modeled exploiting variation within-regions (at individual level) and between-regions. They do not include religion groups random effect, though, that in our view accounts for a significant part of variation in tax morale.

[20]The role of culture—with their set of informal norms—on tax morale has been recently emphasized by a set of recent works, such as Halla (2012), DeBacker, Heim, and Tran (2015), and Kountouris and Remoundou (2013).

up or down according to each country k and steepens according to the degree of country decentralization. To model the relationship among tax morale, ethnic aversion, and a decentralized organization of the state we therefore estimate the following benchmark regression:

$$\begin{aligned} TaxMor_{ijk} = \alpha + \beta_1 AED_{ijk} + \beta_2 AED_{ijk} \times Dec_k + \beta_3 Dec_k \\ + X_{ijk}\gamma + u_{jk} + u_k + \varepsilon_{ijk}. \end{aligned} \tag{13}$$

Here, Dec_k indicates a decentralization measure that can be either a dummy or a continuous variable discussed in Section 4.1.2. In X_{ijk} we gather the surveyed individual characteristics introduced in Section 4.1.1—such as gender, age, marital status, education, income, and the size of the town where the survey respondent resides. u_{jk} is a random effect that we introduce to model cultural specific variations in tax morale within a country k. Those specific to each country k are modeled by including u_k. Finally, ε_{ijk} is the idiosyncratic residual that captures the unmodeled component in the tax morale behavior.

Since we want to distinguish the effect of aversion to ethnic diversity on tax morale in countries with various degree of decentralization, we add up in equation (13) the interaction term between a measure of decentralization and the individual aversion toward ethnic diversity. Our testable hypotheses imply a negative sign of β_1 and a positive sign of β_2. The first parameter, in fact, captures the effect of ethnic aversion on tax morale—and we expect that, within a country and within a nested religious group, more averted individuals toward ethnic diversity think cheating on taxes is somehow justifiable. A positive sign of β_2 indicates that the negative effect of ethnic aversion on tax morale is less pronounced in decentralized countries.

4.3 Results

Table 3 reports the estimated parameters in our regression benchmark (13). Columns differ in terms of the decentralization measure adopted. In column (1) we use the synthetic index discussed in Section 4.1.2. We then use (in order) $federal$, $autonomy$, the subnational expenditures and revenues. In the last column Dec_k is vertical imbalance. All the columns control the effect of ethnic aversion, and the mediated effect through decentralization, on tax morale using the country ethnic, language, and religion fragmentation indexes. They also include individual controls. The controls are not reported in the table due to a size constraint.

Data robustly reveal that individuals more averted to ethnic diversity are, on average, significantly less willing to comply with tax payment ($\hat{\beta}_1 < 0$) in all the columns

Table 3: Tax morale, decentralization, and ethnic aversion.

	(1) Dec_k is *Dec*	(2) Dec_k is *federal*	(3) Dec_k is *autonomy*	(4) Dec_k is *subn.exp.*	(5) Dec_k is *subn.rev.*	(6) Dec_k is *vert.imb.*
AED_{ijk}	-0.030***	-0.027***	-0.026***	-0.039***	-0.033***	-0.040**
	(0.005)	(0.005)	(0.005)	(0.009)	(0.009)	(0.017)
$AED_{ijk} \times Dec_k$	0.033***	0.026**	0.028**	0.001***	0.001**	0.000
	(0.010)	(0.011)	(0.011)	(0.000)	(0.000)	(0.000)
Dec_k	-0.355**	-0.464*	-0.144	-0.010*	-0.009	0.002
	(0.173)	(0.246)	(0.213)	(0.005)	(0.006)	(0.004)
N	30,647	30,647	29,250	25,524	24,940	25,076
$N_{jk}(N_k)$	219(32)	219(32)	205(30)	189(27)	182(26)	185(25)
R^2_{ijk}	0.016	0.015	0.016	0.018	0.019	0.018
$log-likelihood$	-64,740	-64,742	-61,741	-55,014	-53,671	-54,088

Notes: Dependent variable is tax morale. All the columns include ethnic, language, and religion fragmentation as well as individuals controls. Robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

presented in Table 3. Overall we find intrinsic motivations in tax compliance to be negatively affected by own belief about diversity *even controlling for disparate sources of diversity.* All specifications in our regression, in fact, look at countries with *same* level of ethnic, religion, and language fractionalization.

Among the survey respondents with higher levels of ethnic aversion those living in decentralized countries show higher desire to comply with the law ($\hat{\beta}_2 > 0$). Centralized states (with Dec_k equals to zero or small), on the contrary, offer to individuals more averted to ethnic diversity less motivations to pay taxes. This result casts light on the role of institutional features in influencing reciprocity and dimensions typically intrinsic to one person's self-image, pride, altruism toward others, honesty, or yet fulfillment of civic duties.

The marginal effects of ethnic aversion on tax morale are presented in Table 4. They range between -0.030 and 0, in centralized and decentralized countries respectively, when we consider dichotomous measures of decentralization (Dec, $federal$, and $autonomy$). When we use continuous variables of decentralization—such as subnational expenditures and revenues—this range broadens to $-0.040/0.012$, but results qualitatively do not change: in all specifications used decentralization undermines the effect of the aversion to ethnic diversity on tax morale—regardless the decentralization index

Table 4: Marginal Effects.

	0	1	*min*	$Q1$	$Q2$	$Q3$	*max*
Dec	-0.030^{***}	0.002					
	(0.005)	(0.008)					
autonomy	-0.027^{***}	-0.000					
	(0.005)	(0.009)					
federal	-0.026^{***}	0.002					
	(0.005)	(0.010)					
subn. exp.			-0.037^{***}	-0.031^{***}	-0.023^{***}	-0.006	0.008
			(0.009)	(0.007)	(0.005)	(0.007)	(0.012)
subn. rev.			-0.032^{***}	-0.029^{***}	-0.023^{***}	-0.010	0.009
			(0.008)	(0.007)	(0.006)	(0.007)	(0.015)
vert. imb.			-0.040^{**}	-0.024^{***}	-0.020^{***}	-0.017^{***}	0.012
			(0.017)	(0.006)	(0.005)	(0.006)	(0.009)

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

used.

Table 3 also reports informations on the number of observations in each nested group and the fraction of *explained variability* across individuals in their surveyed level of tax morale within a religion-within-country (R^2_{ijk}).[21] Higher values of R^2_{ijk} consistently move in accordance with the maximum of the log-likelihood function estimated with the data, reported in the last row as a goodness-of-fit approximation.

4.4 Sensitivity analysis

In this Section we run two robustness checks of the major analysis presented above. First, we control for additional controls at country-level that can potentially confound our main story. Second, we run the same exercise we did in Table 3 using other measures of decentralization from Fan et al. (2009).

4.4.1 Country-level omitted variables

Our results bring evidence in favor of decentralization as a major country-level factor affecting individual tax morale. Other country-level factors are however expected to confound the effect of ethnic aversion on tax morale in decentralized and centralized

[21] In each level $m = \{ijk, jk, k\}$, $R^2_m = 1 - \frac{\text{unexplained variance at level } m \text{ under the larger model}}{\text{unexplained variance at level } m \text{ under the null model}}$. See also Xu (2003) and Gelman and Pardoe (2006) on R^2 and linear mixed models.

states. For example, people more averted to ethnic diversity could report a lower degree of tax morale in decentralized states because those states are overall wealthier. The heterogeneous effect we have documented could then relies on income and wellbeing and *not* on that particular institutional feature we try to capture here. The GDP per capita level is then our first main concern. Other potentially omitted country-level variables that are generally considered in the field literature are corruption and some measures of government effectiveness.

In Table A3 in Appendix we present our estimations of regression (13), conditional on the logarithm of the GDP per capita, the WGI indices of corruption and government effectiveness as well as the logarithm of the population size in country k to provide a coherent across-country comparison. This exercise leaves things qualitatively substantially unchanged and in all the columns *both* the first two hypotheses are confirmed.

4.4.2 Other measures of decentralization

In this Section, we replicate our results using additional measures of decentralization from Fan et al. (2009) with the intention of running a sort of placebo test. The measures included here in fact, though related to some dimensions of devolution, do not capture our mechanism. This analysis complement the main placebo test that used the measure of vertical imbalance.

More precisely, we use here the following alternative measures of decentralization:

- *tier* that coded administrations with a state executive body that is funded from the public budget, it has authority over several public services, and with territorial jurisdiction;
- *bottier* that codifies the number of bottom level administrative units;
- *sizebot* that collect information on the average size (in squared kilometers) of the bottom level administrative units;
- *botel* is a variable that takes on 1 if executives at bottom tier are directly elected;
- *secel* is a variable that takes on 1 if executives at second lowest tier are directly elected;
- *subgemp* measures the non-central government employment as % of total government employment.

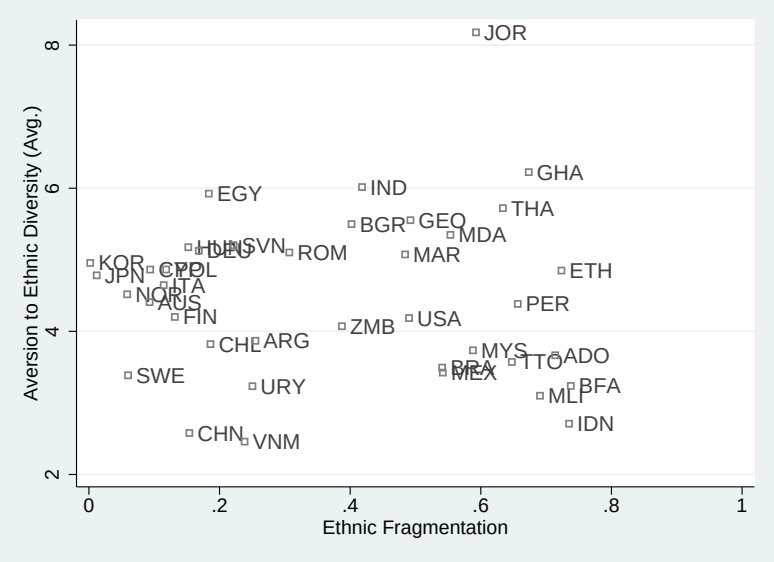

Figure 1: Countries scatterplot according to the average value of aversion to ethnic diversity (in the y-axis) and ethnic fragmentation (in the x-axis).

Summary statistics are reported in Table A4 in Appendix. In A5 we present our estimations using regression (13). All these measures, once included or interacted with the aversion of ethnic diversity, do not affect qualitatively our first comparative statics ($\hat{\beta}_1 < 0$)—confirming the negative relationship between negative attitudes toward ethnic diversity and tax morale. Nonetheless, our second prediction is not corroborated by the use of any of these measures and in all such specifications loss aversion still produces an effect on tax morale even in "decentralized" countries.

5 Just ethnic fractionalization or aversion to ethnic fractionalization?

Our theory emphasizes the substantially different role of individual beliefs about ethnic diversity and ethnic diversity itself. We showed how individuals negative view about the "other" potentially undermines their intrinsic motivation in complying with taxes–when taxation is seen as a redistributed mechanism. Beliefs about diversity are however not perfectly correlated with the degree of diversity in the country (Figure 1). India, for example, is one of the countries where individuals reveal the highest degree of aversion toward the other ethnicities (6.02 in the scale 0-10). However, according to the ethnic fragmentation index, it is not that fractionalized—it lies on the body of the cross-country

distribution.

In the previous section, we studied the empirical link among tax morale, ethnic aversion, and decentralization *within* countries with same level of ethnic fractionalization. We then now move on studying the direct impact of ethnic fractionalization on the tax morale ethnic aversion nexus. We then ask this question: Are more averted individuals to ethnic diversity less prone to comply with the law in more ethnically fractionalized countries? To answer this question, we now add up an additional interaction term in our benchmark regression. Our model of interest is then as follows:

$$\begin{aligned} TaxMor_{ijk} = \alpha &+ \beta_1 AED_{ijk} + \beta_2 AED_{ijk} \times Dec_k + \beta_3 Dec_k \\ &+ \beta_4 AED_{ijk} \times EthFract_k + \beta_5 EthFract_k \\ &+ X_{ijk}\gamma + u_{jk} + u_k + \varepsilon_{ijk}. \end{aligned} \tag{14}$$

Results are reported in Table 5. On the whole, we find a positive joint effect of ethnic aversion and fractionalization on tax morale ($\hat{\beta}_4 > 0$). In a more fractionalized country—but with *same* degree of decentralization—the negative effect of ethnic aversion on their attitude to comply with the tax payment is less pronounced. This finding therefore bring evidence in favor of a moderation (rather than an amplification) role of ethnic diversity on the negative link between aversion to ethnic diversity and tax morale, that our model predicted in section 3.3. According to it, we can therefore infer that the most prominent role in modern countries is the within-region source of ethnic fractionalization.

This effect adds up to that estimated interacting ethnic aversion and decentralization. Both the two effects are significantly positive. The gross effect of ethnic aversion on tax morale is then equal to $\beta_1+\beta_2+\beta_4$. The marginal effect can then be decomposed in order to have a better picture of the single contribution of the two country-specific factors.

We do that in Figure 2. It shows the marginal effect of ethnic aversion on tax morale in the two dimensions of interest using as decentralization measure the amount of expenditure charged at the subnational level. For a given level of decentralization, we can therefore appreciate the marginal effect of ethnic fractionalization on tax morale. The last row in Figure 2 reports the marginal effect of ethnic diversity on tax morale in substantially centralized fiscal systems. This effect is about -0.07 when the country is quite ethnically homogeneous, and increases up to -0.02 in highly heterogeneous ones. However the effect is negative.

In the first row, we can instead look at its effect that has been estimated in highly decentralized countries. This goes form about 0 in, low fragmented countries, to $+0.05$ in those where ethnic diversity is high.

The other measures show substantially similar patterns.

Table 5: Tax morale, decentralization, ethnic aversion, and ethnic fractionalization.

	(1) Dec_k is *Dec*	(2) Dec_k is *federal*	(3) Dec_k is *autonomy*	(4) Dec_k is *subn.exp.*	(5) Dec_k is *subn.rev.*	(6) Dec_k is *vert.imb.*
AED_{ijk}	-0.044***	-0.040***	-0.036***	-0.077***	-0.069***	-0.073***
	(0.010)	(0.010)	(0.009)	(0.015)	(0.015)	(0.022)
$AED_{ijk} \times Dec_k$	0.033***	0.027**	0.026**	0.001***	0.001***	0.000*
	(0.010)	(0.011)	(0.011)	(0.000)	(0.000)	(0.000)
Dec_k	-0.280*	-0.227	-0.139	-0.010**	-0.010*	0.001
	(0.152)	(0.176)	(0.196)	(0.005)	(0.005)	(0.004)
$AED_{ijk} \times EthFract_k$	0.036*	0.035*	0.028	0.079***	0.079***	0.059**
	(0.021)	(0.021)	(0.021)	(0.025)	(0.026)	(0.025)
$EthFract_k$	-0.743	-0.653	-0.707	-1.264***	-1.255**	-1.164**
	(0.483)	(0.484)	(0.523)	(0.485)	(0.505)	(0.480)
N	30,647	30,647	29,250	25,524	24,940	25,076
$N_{jk}(N_k)$	219(32)	219(32)	205(30)	189(27)	182(26)	185(25)
R^2_{ijk}	0.016	0.015	0.019	0.018	0.019	0.018
$log-likelihood$	-64,739	-64,742	-61,740	-55,009	-53,667	-54,086

Notes: Dependent variable is tax morale. All the columns include individuals controls. Robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

6 Conclusions

In this paper we analyzed the effects of the individuals' aversion to ethnic diversity on tax morale under different institutional frameworks. Our work is based on the idea that individuals who are averted to ethnic diversity are more reluctant to contribute to the provision of public goods which can benefit other (ethnic) groups. In decentralized countries, the individuals' welfare losses associated with the financing of public goods benefiting other ethnic groups is reduced because the provision of public goods and services is made by jurisdictions characterized by communities more homogeneous than the whole country, which increases the individuals' intrinsic motivation to pay taxes.

We presented a simple model showing the mechanisms at work and then tested the main predictions of our theory using microdata from the World Value Survey and various measures of fiscal decentralization. Our analysis led to two main results. First, a negative attitude toward ethnic diversity reduces tax morale in centralized political systems, while it does not have a statistical significant effect in decentralized ones. Second, the negative effect of individuals' ethnic aversion on tax morale is lower in homogenous countries than

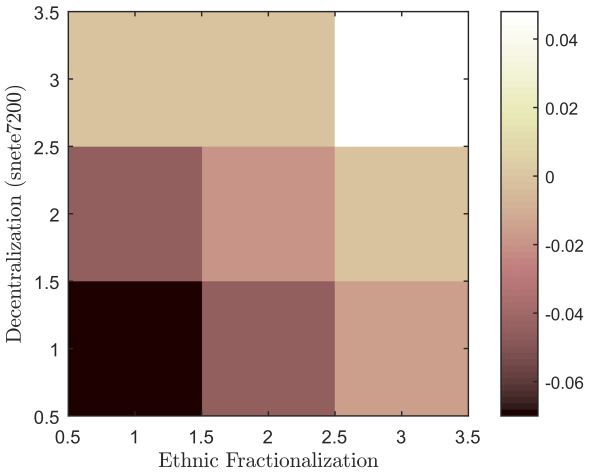

Figure 2: Marginal effect of ethnic aversion on tax morale as a function of decentralization (subnational expenditures), in the y-axis, and ethnic fractionalization, in the x-axis.

in ethnically fragmented states.

In terms of normative results, the question under what conditions the negative effects of individuals' aversion to ethnic diversity on tax morale may be reduced has policy relevance as many developing countries are ethnically fragmented and composed by groups with a negative attitude towards other ethnicities. This paper shows that a proper choice of the institutional setting (in this case, more fiscal decentralization) might improve tax morale and favors investments in state fiscal capacity.

References

[1] Alesina, A., Baqir, R. and Easterly, W. (1999). Public goods and ethnic divisions. *The Quarterly Journal of Economics*, 114(4), 1243-1284.

[2] Alesina, A., Devleeschauwer, A., Easterly, W., Kurlat, S., and Wacziarg, R. (2003). Fractionalization. *Journal of Economic Growth*, 8(2), 155-194.

[3] Alesina, A., Glaeser, E., and Sacerdote, B. (2001). Why doesn't the U.S. have a European style welfare state? *Brookings Papers on Economic Activity*, 187-278.

[4] Alesina, A., La Ferrara, E. (2005). Ethnic diversity and economic performance. *Journal of Economic Literature*, 43(3), 762-800.

[5] Alm, J., Torgler, B. (2006). Culture differences and tax morale in the United States and in Europe. *Journal of Economic Psychology*, 27(2), 224-246.

[6] Andreoni, J., Erard, B., Feinstein, J., (1998). Tax compliance. *Journal of Economic Literature*, 36, 818-860.

[7] Besley, T., Persson, T. (2013). Taxation and Develoment. In: Auerbach, A., Chetty, R., Feldstein, M., Saez, E. (eds.), *Handbook of Public Economics*.

[8] Besley, T., Jensen, A., Persson, T. (2015). Norms, Enforcement, and Tax Evasion, CEPR Discussion Papers 10372.

[9] Bordignon, M., Gamalerio, M., Turati, G. (2013). Decentralization, vertical fiscal imbalance, and political selection. CESifo Working Paper Series No. 4459.

[10] Dahl, R. (1986). Federalism and the democratic process. In Democracy, Identity and Equality. Oslo: Norwegian University Press.

[11] DeBacker, J., Heim, B.T., Tran, A. (2015). Importing corruption culture from overseas: Evidence from corporate tax evasion in the United States. *Journal of Financial Economics*, 117(1), 122-138.

[12] Dell'Anno R. (2009). Tax evasion, tax morale and policy maker's effectiveness, *The Journal of Socio-Economics*, 38(6), 988-997.

[13] Dell'Anno R., Teobaldelli D. (2015). Keeping both corruption and the shadow economy in check: the role of decentralization. *International Tax and Public Finance*, 22(1), 1-40.

[14] Elazar, Daniel J. (1995). From statism to federalism: a paradigm shift. *Publius*, 25(2), 5-18.

[15] Fan, S. C., Lin, C., Treisman, D. (2009). Political decentralization and corruption: evidence from around the world. *Journal of Public Economics*, 93, 14-34.

[16] Feld, L., Frey, B. (2002). Trust breeds trust: how taxpayers are treated. *Economics of Governance*, 3, 87-99.

[17] Fisman, R., Gatti, R. (2002). Decentralization and corruption: evidence across countries. *Journal of Public Economics*, 83, 325-345.

[18] Frey, B., Torgler, B. (2007). Tax morale and conditional cooperation. *Journal of Comparative Economics*, 35(1), 136-159.

[19] Gelman A. and Pardoe L. (2006). Bayesian Measures of Explained Variance and Pooling in Multilevel (Hierarchical) Models. *Technometrics*, 48(2), 241-251.

[20] Güth, W., Levati, V. and Sausgruber, R. (2005). Tax morale and (de-)centralization: an experimental study. *Public Choice*, 125(1), 171-188.

[21] Halla, M. (2012). Tax morale and compliance behavior: first evidence on a causal link. *The B.E. Journal of Economic Analysis & Policy: Advances*, 12(1).

[22] Hofmann, E., Hoelzl, E., and Kirchler, E. (2008). Preconditions of Voluntary Tax Compliance: Knowledge and Evaluation of Taxation, Norms, Fairness, and Motivation to Cooperate. *Journal of Psychology*, 216(4): 209-217.

[23] Koszegi, B., Rabin, M. (2006). A model of reference-dependent preferences. *The Quarterly Journal of Economics*, 121(4), 1133-1165.

[24] Koszegi, B., Rabin, M. (2009). Reference-dependent consumption plans. *American Economic Review*, 99(3), 909-936.

[25] Kountouris, Y., and Remoundou, K. (2013). Is There a Cultural Component in Tax Morale? Evidence from Immigrants in Europe. *Journal of Economic Behavior & Organization*, 96: 104-119.

[26] Lago-Peñas I., Lago-Peñas S. (2010). The determinants of tax morale in comparative perspective: Evidence from European countries. *European Journal of Political Economy*, 26, 441-453.

[27] La Porta, R., Lopez-de-Silanes, F., Shleifer, A., Vishny, R. (1999). The quality of government. *Journal of Law, Economics and Organization*, 15(1), 222-279.

[28] Li, X.S. (2010). Social identities, ethnic diversity, and tax morale. *Public Finance Review*, 38(2), 146-177.

[29] Lijphart, A. (1984). Democracies: patterns of majoritarian and consensus government in twenty-one countries. New Haven/London: Yale University Press.

[30] Luttmer, E. (2001). Group loyalty and the taste for redistribution. *Journal of Political Economy*, 109(3), 500-528.

[31] Luttmer, Erzo F. P., Singhal M. (2014). Tax morale. *Journal of Economic Perspectives*, 28(4), 149-68.

[32] Martinez-Vazquez, J. Torgler B. (2009). The evolution of tax morale in modern Spain. *Journal of Economic Issues*, 43(1), 1-28.

[33] Olson, M. (1965). The logic of collective action. Public goods and the theory of groups. Cambridge: Harvard University Press.

[34] Orviska, M., Hudson, J. (2003). Tax evasion, civic duty and the law abiding citizen. *European Journal of Political Economy*, 19, 83-102.

[35] Panizza, U. (1999). On the determinants of fiscal centralization: theory and evidence. *Journal of Public Economics*, 74, 97-139.

[36] Pommerehne, W., Weck-Hannemann, H. (1996). Tax rates, tax administration and income tax evasion in Switzerland. *Public Choice*, 88, 161-170.

[37] Riker, W. S. (1964). Federalism. Origin, operation, significance. Boston: Little Brown.

[38] Rodden, J. (2004). Comparative federalism and decentralization. *Comparative Politics*, 481-500.

[39] Schwarz P. (2011). The impact of federalism on tax morale: evidence from Spain. Available at (http://www.webmeets.com/SAEe/2011/prog/viewpaper.asp?pid=188)

[40] Stepan, Alfred. 2001. Arguing Comparative Politics, New York: Oxford University Press.

[41] Tajfel, H., Billig, M., Bundy, R. P., Flament, C. (1971). Social categorization and intergroup behaviour. *European Journal of Social Psychology*, 1(2), 149-178.

[42] Teobaldelli, D. (2011). Federalism and the shadow economy. *Public Choice*, 146(3-4), 269-289.

[43] Torgler, B., Schneider, F.G. (2007). What shapes attitudes toward paying taxes? Evidence from multicultural European countries. *Social Science Quarterly*, 88(2), 443-470.

[44] Torgler, B. (2006). The importance of faith: tax morale and religiosity. *Journal of Economic Behavior & Organization*, 61, 81-109.

[45] Torgler, B. (2007). Tax compliance and tax morale: a theoretical and empirical analysis. Cheltenham, UK: Edward Elgar Publishing.

[46] Torgler, B. (2005). Tax morale and direct democracy. *European Journal of Political Economy*, 21, 525-531.

[47] Torgler, B., Werner, J. (2005). Fiscal autonomy and tax morale: evidence from Germany. *Public Finance and Management*, 5(4), 460-485.

[48] Torgler, B., Schaltegger, C.A. (2005). Tax morale and fiscal policy. CREMA Working Paper Series 2005-30, Center for Research in Economics, Management and the Arts (CREMA).

[49] Torgler, B. Schneider, F., Schaltegger, C.A. (2010). Local autonomy, tax morale and the shadow economy. *Public Choice*, 144(1-2), 293?321.

[50] Treisman, D. (2007). What have we learned about the causes of corruption from ten years of cross-national empirical research? *Annual Review of Political Science*, 10, 211-244.

[51] Treisman, D. (2008). Decentralization dataset, 2008. Available at author's webpage.

[52] Tusicisny A. (2014). Is ethnic diversity a poverty trap? A complex relationship between ethnicity, trust, and tax morale. European University Institute MWP, 2014/09. http://hdl.handle.net/1814/31613

[53] Witte, E., Craeybeckx, J., Meynen, A. (2009). Political History of Belgium: From 1830 Onwards. Academic and Scientific Publishers.

[54] Xu (2003). Measuring explained variation in linear mixed effects models. *Statistics in Medicine*, 22(22), 3527-3541.

A Appendix

Table A1: Summary statistics.

	mean	sd	min	max	obs.
Individual-level variables					
Tax Morale	8.72	2.20	1.00	10.00	55,365
Ethnic Aversion	4.45	2.74	1.00	10.00	55,365
Sex	1.51	0.50	1.00	2.00	55,338
Age	41.66	16.38	15.00	98.00	55,224
Marital Status	2.71	2.19	1.00	6.00	55,245
Education	4.68	2.23	1.00	8.00	50,978
Social Class	3.33	0.98	1.00	5.00	51,968
Scales of Income	4.77	2.22	1.00	10.00	51,618
Size of Town	4.75	2.44	1.00	8.00	42,006
Country-level variables					
Dec	0.30	0.46	0.00	1.00	43
Autonomy	0.28	0.45	0.00	1.00	40
Federal	0.23	0.43	0.00	1.00	43
Subnat. Expenditure	24.45	16.18	2.14	54.84	36
Subnat. Revenues	19.58	14.58	1.60	51.48	35
Vertical Imbalance	62.26	21.21	0.00	92.17	31
Ethnic Fract.	0.36	0.24	0.00	0.74	38
Language Fract.	0.32	0.27	0.00	0.84	38
Religion Fract.	0.43	0.24	0.00	0.82	38
GDP per capita (log)	9.52	1.03	6.98	11.05	42
Population (log)	16.97	1.83	11.34	21.01	44
Corruption Index	0.38	1.02	-1.12	2.59	45
Gov. Effectiveness Index	0.45	0.92	-0.91	2.13	45

Table A2: Decentralization measures by country.

		Dec	*autonomy*	*federal*	*subnational expenditures*	*subnational revenues*	*vertical imbalance*
Argentina	ARG	1	1	1	37.968482	32.605483	
Australia	AUS	1	0	1	41.190838	27.540157	53.71882
Burkina Faso	BFA	0		0	3.4735385		76.06923
Bulgaria	BGR	0	0	0	18.290861	14.288232	65.43143
Brazil	BRA	1	1	1	34.239581	25.492137	68.21504
Switzerland	CHE	1	1	1	51.888997	45.912849	75.32173
Chile	CHL	0	0	0	6.5822997	5.0424785	71.96277
China	CHN	0	0	0	54.843189	51.481553	57.83129
Cyprus	CYP	0	1	0	2.1380194	2.8578643	91.17384
Germany	DEU	1	0	1	42.092175	35.578183	76.01637
Egypt	EGY	0	0	0			
Spain	ESP	1	1	1	19.987468	12.252808	57.71594
Ethiopia	ETH	0	1	0	2.2754571	2.8987799	92.1683
Finland	FIN	0	0	0	38.102237	31.235549	66.61002
Georgia	GEO	0	0	0			
Ghana	GHA	0	0	0			
Hungary	HUN	0	0	0	21.631288	12.279565	46.28557
Indonesia	IDN	0	0	0	11.890149	3.0805095	20.152
India	IND	1	1	1	45.473825	33.051234	60.507
Italy	ITA	0	1	0	21.18715	8.1266166	32.72783
Jordan	JOR	0	0	0	5.8557305	7.4937871	
Japan	JPN	0	0	0	43.457615	38.123117	
Korea	KOR	0	0	0	31.334226	14.804028	28.82753
Morocco	MAR	0	0	0	5.8066361	4.1232391	
Moldova	MDA	1	0	0	27.875636	23.565682	71.73647
Mexico	MEX	1	0	1	21.146239	20.251953	88.84158
Mali	MLI	0	0	0			
Malaysia	MYS	1	1	1	19.060285	15.951196	78.3403
Norway	NOR	0	0	0	34.602032	24.435636	65.82964
Poland	POL	0	0	0	22.835237	15.978326	59.0459
Romania	ROM	0	0	0	14.322803	9.8204822	57.52032
Serbia	SRB						
Slovenia	SVN	0	0	0	11.089915	9.058923	75.44896
Sweden	SWE	1	0	0	37.746384	32.234827	75.33686
Thailand	THA	0	0	0	10.517253	5.8969731	49.57942
Trinidad and Tobago	TTO	0	0	0	4.8329806	1.6047783	0
Turkey	TUR	0	0	0	50.706748	49.890498	
Taiwan, China	TWN	0	1	0			
Ukraine	UKR	0		0			
Uruguay	URY	0		0	9.2968712	9.2577896	91.47559
United States	USA	1	0	1	44.622662	40.079655	65.56709
Vietnam	VNM	0	0	0			
South Africa	ZAF	1	1	0	26.733982	13.525037	39.8257
Zambia	ZMB	0	0	0	5.131685	5.6210283	70.82536

Table A3: Tax morale, decentralization, and ethnic aversion. Additional country-level controls.

	(1) Dec_k is *Dec_DT*	(2) Dec_k is *federal*	(3) Dec_k is *autonomy*	(4) Dec_k is *subn.exp.*	(5) Dec_k is *subn.rev.*	(6) Dec_k is *vert.imb.*
AED_{ijk}	-0.030***	-0.027***	-0.026***	-0.039***	-0.033***	-0.041**
	(0.005)	(0.005)	(0.005)	(0.009)	(0.009)	(0.017)
$AED_{ijk} \times Dec_k$	0.033***	0.026**	0.028**	0.001**	0.001*	0.000
	(0.010)	(0.011)	(0.011)	(0.000)	(0.000)	(0.000)
Dec_k	-0.897***	-0.527	-0.490	-0.016**	-0.011	-0.002
	(0.259)	(0.335)	(0.357)	(0.008)	(0.009)	(0.005)
N	30,647	30,647	29,250	25,524	24,940	25,076
$N_{jk}(N_k)$	219(32)	219(32)	205(30)	189(27)	182(26)	185(25)
R^2_{ijk}	0.016	0.016	0.016	0.018	0.019	0.018
$log-likelihood$	-64,738	-64,741	-61,740	-55,012	-53,670	-54,087

Notes: Dependent variable is tax morale. All the columns include ethnic, language, religion fragmentation and the logarithm of the gdp per capita and of the population. Corruption and government effectiveness index as well as individuals controls are also included. Robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A4: Summary statistics of alternative measures of decentralization.

	mean	sd	min	max	obs.
tiers	3.60	0.90	2.00	6.00	41
bottier	15519.92	40529.66	13.00	237333.00	38
sizebot	1.33	2.93	0.01	13.21	38
botel	0.83	0.35	0.00	1.00	32
secel	0.47	0.49	0.00	1.00	30
subrevgdp	7.23	5.20	0.66	18.37	31
subgemp	3.33	3.38	0.20	15.10	33

Table A5: Tax morale, decentralization, and ethnic aversion. Alternative measures of decentralization (Placebo analysis).

	(1) Dec_k is *tier*	(2) Dec_k is *bottier*	(3) Dec_k is *sizebot*	(4) Dec_k is *botel*	(5) Dec_k is *secel*	(6) Dec_k is *subgemp*
AED_{ijk}	-0.108***	-0.035***	-0.011**	-0.043***	-0.047***	-0.007
	(0.018)	(0.005)	(0.005)	(0.010)	(0.007)	(0.007)
$AED_{ijk} \times Dec_k$	0.023***	0.000***	-0.004***	0.010	0.001***	-0.003*
	(0.004)	(0.000)	(0.002)	(0.012)	(0.012)	(0.002)
Dec_k	-0.034	-0.000**	-0.010	-0.323	0.013	0.064**
	(0.097)	(0.000)	(0.027)	(0.261)	(0.192)	(0.026)
N	29359	27838	27838	23745	21203	23461
$N_{jk}(N_k)$	210(31)	198(29)	198(29)	163(23)	146(21)	179(24)
R^2_{ijk}	0.016	0.015	0.016	0.018	0.019	0.018
$log-likelihood$	-62,295	-58,997	-59,033	-50,383	-44,793	-53,014

Notes: Dependent variable is tax morale. All the columns include ethnic, language, religion fragmentation as well as individuals controls. Robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Piazza San ponziano 6, 55100 Lucca, Italy
www.imtlucca.it