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THE EFFECT OF TAX ENFORCEMENT ON TAX MORALE

by Antonio Filippin•, Carlo V. Fiorio• and Eliana Viviano*

Abstract

In this paper we argue that tax enforcement is an additional contextual factor affecting tax morale, one of the most important determinants of tax compliance. By using a unique dataset that merges a representative sample of Italian households with administrative data on tax enforcement, we find first that tax morale is positively correlated with tax enforcement. Second, to deal with possible endogeneity of tax enforcement, we show that results are confirmed in an IV specification using the change in the tax gap at the provincial level as an instrument for tax enforcement. Finally, we provide evidence that the impact of tax enforcement and social environment is stronger at low quantiles of tax morale. Our results show that apart from lowering the expected value of tax evasion, tax enforcement has an additional and indirect effect on tax compliance through its effect on tax morale.

JEL Classification: H26, H29, D70.
Keywords: tax morale, tax enforcement, tax gap.

Contents

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1 Introduction[1]

Tax morale has been proposed in the literature as one of the key explanatory variables for the observed level of tax compliance. Tax morale is a non-monetary factor that has been defined as the *intrinsic* motivation to pay taxes (e.g. Cummings et al., 2005), since at first glance it has nothing to do with the system of external rewards and punishments. In some studies tax morale has been treated as an exogenous characteristic of the individual. It can be thought as a moral obligation towards tax compliance or it can be justified by the positive feeling of contributing to the society. In fact, as shown by Lubian and Zarri (2011), tax morale is also positively correlated with reported happiness.

More recently tax morale has also been related to the characteristics of the environment in which the taxpayer takes his decision and a substantial effort has been exerted in order to identify external variables that play a significant role in shaping tax morale besides that played by individual characteristics (age, religiosity, gender, marital and occupational status) that have been regularly found to correlate with it. A combination of microdata on tax morale with aggregate data on contextual factors has been used in Feld and Frey (2002) and Torgler (2005) who examine the relationship between direct democratic rights and tax morale. Güth et al. (2005), Torgler et al. (2010) examine the relationship between some indicator of local autonomy (i.e. fiscal autonomy, decentralization) and tax morale. Barone and Mocetti (2011) discuss how public spending inefficiency of local authorities affects tax morale.

Tax morale has been shown to react to trust in the legal system (Alm and Torgler, 2006) and to the behavior of the other taxpayers (Frey and Torgler, 2007) on a reciprocity basis. The fact that the other taxpayers are perceived to report fairly their income increases one's tax morale. The intuition is very similar to the conditional cooperation mechanism that systematically emerges in the experiments about the

[1] We would like to thank the *Guardia di Finanza* and the Italian Revenue Agency for providing the data used in this paper. We are also grateful to comments and very constructive advices by Massimiliano Piacenza.

provision of public goods, in which individual contributions tend to correlate positively, although not perfectly, with the behavior of the opponents.[2] Similarly, Traxler and Winter (2012) report that the frequency of the occurrence of a norm violation negatively affects individuals' inclination to punish the violation.

Our paper contributes to the stream of literature that improves the understanding of the determinants of tax morale focusing on contextual variables. We use microdata on opinions about taxation included in the Survey on Household Income and Wealth, conducted in 2004 by the Bank of Italy. We calculate an index of tax morale at the individual level and, based on this measure, we aim at testing whether the degree of tax enforcement affects tax morale. The importance to answer such questions is immediately evident. Besides providing a better understanding of tax morale and indirectly of tax compliance, it could offer a rationale for part of the cross-country variance in the average reported levels of tax morale that would otherwise be confounded with other cultural characteristics. Moreover, interesting policy implications can be derived, as policy makers may find instruments to influence those variables that have an impact on tax morale.

More in general, the link between tax enforcement and tax morale can be encompassed in the analysis of the relationship between formal and informal institutions. Within our framework, both types of institutions are already recognized to play a major role. In fact, compliance with tax laws is not only shaped by formal sanctioning, i.e. tax enforcement, but also by informal institutions such as social and individual norms (like tax morale). The original contribution of this paper is to analyze whether, and in case to what extent, this two types of institutions interact, a topic that has received surprisingly little attention in the literature.[3] Using field data on the Italian economy, our paper aims at analyzing whether a stricter formal law enforcement may support or hinder tax morale, thereby exerting an additional indirect effect on tax compliance. There is no theoretical *a priori* as for the significance and the sign

[2]See for instance Fischbacher and Gachter (2010) and references therein.

[3]One of the few examples is Kube and Traxler (2011), who provide experimental evidence that the introduction of formal sanctions crowds out punishment based on social norms.

of the relationship between tax enforcement and tax morale. Hence, we look for an empirical answer, also trying to support a causal interpretation of the results. In fact, we control for possible endogeneity of our measure of tax enforcement. First, even if tax enforcement is likely to be exogenous to individual tax morale, it is possible that the tax authority allocates more resources in detecting tax evasion where morale is lower. Hence we use the change in tax gap at the province level between 2003 and 2002 (i.e. the fiscal years preceding the time of the SHIW interview on tax opinions) as an instrument for tax enforcement in 2004. Second, to avoid possible problems involved in using individual subjective perceptions, we build an objective measure by using information on the activity of the Italian tax police in each province after partialling out its correlation with local GDP, population size and tax crime rate at the local level.

Results show that indeed tax enforcement and other contextual variable affect tax morale and that high as opposed to low levels of tax morale are less affected by tax enforcement. Hence, our results suggest that stronger tax enforcement, besides making evasion less profitable, also shapes taxpayers' behavior reinforcing their motivation to truthfully declare their income.

We believe that these results significantly add to the understanding of tax morale, since there are very few contributions in the literature concerning tax enforcement and with no conclusive evidence. The effects of the characteristics of the tax system on tax morale have been studied, for instance, by Lago-Penas and Lagos-Penas (2010), who find that a high tax burden makes the taxpayers feel entitled to evade. They also find that the degree of regional redistribution matters since the citizen of regions that are net contributors may find more acceptable not to pay taxes in order to increase the fairness of the system at the national level. The role played by tax enforcement in explaining tax morale has instead received surprisingly little attention, most likely because of limited data availability. In some cases available data include the *subjective* perception of the probability of being caught. Its use in empirical analysis is, however, flawed by serious endogeneity problems since, as shown for

instance by Scholz and Pinney (1995), citizens reporting a higher tax morale tend to overestimate their probability of being audited. To the best of our knowledge the only contributions that use an objective measure of the probability of being audited are Torgler (2005) and Torgler and Schneider (2007) but they do not find any significant effect.[4]

The outline of the paper is as follows. In section 2 we describe the conceptual framework of our paper. In Section 3 we describe out dataset and in Section 4 we present the results. Section 5 briefly concludes.

2 Theoretical Framework

Since the seminal contribution of Allingham and Sandmo (1972) the behavior of a taxpayer is commonly described as the rational choice of an expected utility maximizer. His choice X amounts to how much to report in the tax declaration given his actual level of income W (with $X \leq W$):

$$E[U] = (1-p)U(W-\theta X) + pU(W-\theta X-\pi(W-X)), \tag{1}$$

where p is the probability of being audited, θ is the tax rate, and π is the fraction of the undeclared income levied if the taxpayer is found evading: π is higher than the tax rate θ as it also includes the fine. It can be easily shown that $p\pi < \theta$ makes rational risk neutral taxpayers to fully declare their income. In contrast, if $p\pi > \theta$ a positive amount declared should rely upon taxpayers' risk aversion. This model has been recently extended by Kleven et al. (2011) to allow for the key distinction between third-party- and self-reported income, showing that tax evasion is substantial for the latter. These results allow to reconcile the evidence about compliance and reasonable levels of risk aversion. In fact, for a long period many authors have looked for other variables in order to rationalize the seemingly irrational compliance rate of

[4]Data refer to Switzerland and the authors use an objective proxy, namely the number of tax auditors as a percentage of the total number of taxpayers based on data gathered by Frey and Feld (2002) sending a questionnaire to tax authorities.

the taxpayers.

Allingham and Sandmo (1972) already consider the effect of non-monetary factors. In fact, an additional variable s, which they name 'reputation,' is included in the utility function to capture the fact that the taxpayer strictly prefers not being detected given the same level of expected monetary outcomes. In other words it holds that $U(W, X, s_0) > U(W, X, s_1)$, where W is actual income and $s_0 > s_1$ represent different levels of reputation. A reason why $s_0 > s_1$ can be found in the stigmatization, i.e. the price that is paid in terms of loss of reputation when evasion is detected (Kim, 2003). As long as reputation decreases the marginal utility of money, disposable income and reputation turn out to be substitutes. Hence, taxpayers will optimally choose a higher declared income as long as they care about maintaining a good reputation. Another factor that decreases the marginal utility of money and that can be regarded as a substitute for disposable income is tax morale. *Ceteris paribus* a positive level of tax morale, m, determines an increase of the optimally declared income X^*.[5] The corresponding extended version of the Allingham and Sandmo (1972) model is:

$$E[U] = (1-p)U(W - \theta X, s_0, m) + pU(W - \theta X - \pi(W - X), s_1, m), \qquad (2)$$

which can be solved for the optimal level of X^* as a function of the characteristics of the tax system (p, π, θ) and of reputation and tax morale (s, m).

Note that although reputation and tax morale can have observationally equivalent effects towards tax compliance from an empirical point of view, theoretically speaking they are two clearly distinct concepts. Both are non-monetary factors in the utility function, but their nature is different. The non-monetary cost implied by the loss of reputation is conditional on the fact that evasion is detected or not, while tax morale is unrelated to the realization of the outcome implicit in the tax audit lottery. This point is immediately evident in the limit case where the probability of being detected is equal to zero. In this case no loss of reputation occurs, while tax morale still affects

[5] Orviska and Hudson (2003) point out that law abidance has a similar effect.

the optimal choice.

Tax morale has initially been proposed by some scholars as a purely intrinsic motivation. More recently, however, it has been investigated to what extent tax morale can also be affected by a socialization process in which several contextual variables play a role, thereby emphasizing its extrinsic component. In particular, Gordon (1989), Myles and Naylor (1996) and more recently Traxler (2010) emphasize how morale could also depend on the behavior of the other taxpayers. The idea is that the higher evasion is in the society, the weaker the social norm for tax compliance and the lower the internal cost of not adhering to the social norm. As social norms can vary across communities, Traxler (2010) shows that tax morale can help explaining the heterogeneity in tax compliance within countries characterized by comparable monetary incentives for evasion. Recently, Halla (2012) shows that tax morale has some causal impact on tax compliance levels.

In this paper we go one step forward and we analyze whether tax morale also reacts to the degree of tax enforcement. As available data would not allow us to estimate a full structural model such as in Equation 2, we limit ourselves to the estimation of a reduced-form model where tax morale (m) is assumed to be a function of the degree of tax enforcement and individual as well as contextual characteristics (C and E, respectively). In what follows we refer to the characteristics of the tax system and to tax enforcement focusing only on a measure of the probability of being audited (p). Other characteristics such as the tax burden or the fine are certainly relevant as well, but such factors are constant across Italian households *ceteris paribus* and therefore no variance can be exploited in our dataset in order to identify their role. Eventually, we estimate the following model:

$$m = f(p, C, E). \tag{3}$$

The empirical investigation of Equation 3 amounts to check whether tax enforcement also displays a correlation with tax morale besides directly affecting the degree of compliance as shown in Equation 2.

As already mentioned in the introduction, there is no obvious reason *a priori* to expect that m reacts to the level of p. Also the sign of $\partial m/\partial p$ in case it is different from zero, is not defined *a priori*. On the one hand, one could argue that taxpayers internalize an increase of tax enforcement changing their scale of values accordingly, i.e. $\partial m/\partial p > 0$. On the other hand, even the opposite relation $\partial m/\partial p < 0$ could be observed if stricter formal deterrence ends up crowding out informal institutions such as tax morale. The crowding out of tax morale is consistent with the so-called spite effect, which has been defined as the behavior of individuals who decrease their declared income following an increase of tax enforcement. It is a form of costly punishment because it also decreases individual expected earnings, and it must therefore be driven by non-monetary factors. Although counterintuitive at first glance, it has been observed in laboratory experiments as a reaction to draconian levels of tax enforcement (Cullis and Soliman, 2012). Which of these relationships hold is an empirical question that we address in Section 4.

3 Data and empirical model

The data used in this paper are produced and provided free of charge to the academic community by the Bank of Italy in the Survey of Household Income and Wealth (SHIW). These data are the main source of information for the analysis of income distribution and socio-economic trends in Italy as they provide a representative sample of the population of Italian households since the end of the 1970s. Starting from the late 1980s it is characterized by a biannual frequency and a sample size of about 8,000 households.

In the 2004 wave the SHIW survey included an *ad hoc* section on opinions regarding public spirit and taxation, which was asked to a random sample of all householders (i.e. those with an odd year of birth), which we are using extensively here for the analysis of tax morale in Italy. In this section 3,798 householders were asked about their interest in politics, their involvement in groups and associations, their use of networks of family and relatives to find work and to deal with government red tapes

and, most importantly for our aims, their attitudes about tax evasion. About three quarters of respondents rate tax evasion as a serious or very serious problem and about 60% of them have a fair perception of the size of tax evasion. In fact, they report that the government loses between 10 and 30 percent of tax revenues as a result of tax evasion, in line with the estimates of ISTAT, the Italian National Institute of Statistics.

In this section of the SHIW questionnaire respondents are also asked to rank their agreement with some statements about Italy's tax system. In particular, they had to choose their degree of agreement between "not at all", "very little", "so-so", "quite a lot", "very much", coded from one to five, respectively. Some of the proposed statements are closely related to tax morale and, similarly to Barone and Mocetti (2011), we build our index using the following subset:[6]

- Paying taxes is one of the basic duties of citizenship (Statement 3);
- Not paying taxes is one of the worst crimes a person can commit because it harms the whole community (Statement 4);
- It is not right not to pay taxes even if you think they are unfair (Statement 6);[7]
- Even if someone thinks a tax is unfair, he/she should pay it first and then complain if necessary (Statement 8);
- It is right to pay tax because it helps the weak (Statement 11).

Based on the answers to these five statements, we computed an individual index of tax morale using principal component analysis (PCA).[8] Table 1 reports the correlation

[6] A thorough description of this SHIW section can be found in Fiorio and Zanardi (2008), while the complete questionnaire is available at `http://www.bancaditalia.it/statistiche/indcamp/bilfait/docum/ind04/Quest_ing2004.pdf`.

[7] The original statement is "It is right not to pay taxes if you think they are unfair" but we reversed it to keep coding consistency.

[8] We also computed a measure of tax morale based on PCA excluding Statement 11, which is related to redistributive preferences, but results do not change substantially and we opted for leaving it in.

matrix of items used. The first principal component explains around 40 per cent of the total variance of the underlying variables (see Table 2). Along with our preferred measure of tax morale based on PCA, we also computed the simple average of the degree of agreement with the five statements related to tax morale. They are all presented in Figure 1 showing that the distribution of tax morale is skewed to the left and it is defined over a one-to-five bounded support with an average of about 3.7.

In this paper we aim at estimating the determinants of tax morale as in equation (3) and we focus on whether, after controlling for a vector of individual characteristics tax morale is affected by the environment in which taxpayers take their decisions. In particular, we want to assess whether tax morale is shaped by the interaction with tax authorities. The reason is that tax morale could be – to some extent – forged by the intensity of tax enforcement as long as it is somehow internalized by the taxpayers' scale of value.

As a measure of tax enforcement (p), we rely on information provided by the *Guardia di Finanza* (henceforth GdF), a tax police dependent on the Italian Ministry of the Economy and Finance, in charge of tax enforcement on behalf of the government. GdF provided us with data on the total number of controls, on both sellers and customers, for tax receipts emissions upon the purchase of goods and services at the provincial level. These data are produced regularly since 2004 but no consistent measurement is available for earlier periods. This variable is the closest available proxy for the GdF activity aimed at tackling tax evasion, but it cannot be directly used as a measure of tax enforcement. In fact, *ceteris paribus* the same level of GdF activity translates into a lower probability of being audited the larger the population of the province, the more intense the economic activity, and the higher the level of tax law infringements. Moreover, the GdF is not uniformly nor randomly assigned across provinces. In contrast, it is likely to be concentrated more in areas where the crime rate is higher, thereby raising issues of possible endogeneity.

To limit endogeneity on tax enforcement activity we follow a conservative approach regressing the proxy for GdF activity on the population size, the GDP, and the level

of tax crimes all at the province level.[9]

$$\widehat{p} = \underset{[38.29]}{2257.53} - \underset{[-4.34]}{.025} \times Crime + \underset{[22.04]}{3170.95} \times Pop + \underset{[6.64]}{34.45} \times GDP \tag{4}$$

The reduced form shows (t-statistics in brackets) that the variables used as controls significantly correlates with the GdF activity. The negative sign of the crime variable means that the reverse causality problem, if present, does not prevail as it would imply a positive correlation between the two variables.

We then use the residuals of this reduced form as a proxy for the strength of tax enforcement. The idea is that what we call tax enforcement is how the GdF activity differs with respect to what should be expected on average, given the intensity of the economic activity and tax crimes, capturing how GdF activity is likely to impact the taxpayers' probability of being audited. Note that for all these variables we rely upon objective measures, thereby avoiding the endogeneity issues that self-reported variables would imply.[10]

Assuming a linear specification, the empirical model we estimate turns out to be:

$$m = \beta_0 + \beta_1 \widetilde{p} + C'\beta_C + E'\beta_E + \epsilon. \tag{5}$$

where $\widetilde{p}$, is the residual of Equation 4 ($\widetilde{p} := p - \widehat{p}$), which we use as proxy for tax enforcement, and C and E are the set of personal and contextual characteristics, respectively. We first estimate the average tax morale using standard ordinary least squared estimation (OLS). This specification, however, could hide reverse causality problems: a higher tax morale might lead to more tax compliance, making tax enforcement less important. Such a negative correlation between tax enforcement and tax morale would imply that an OLS estimation that explains tax morale by enforcement efforts would yield a downward biased coefficient. Hence, we also provide

[9]The dependent variable underlying Equation 4 is the number of tax police controls at the province level and not the ratio with population as we include province population in the right-hand side. Crime data come from the Italian Ministry of Interior and refer to corruption, money laundering and more generally crimes against business activities.

[10]The SHIW dataset includes a question on perceived likelihood of tax audits that turns out to be orthogonal to our measure of tax enforcement.

an instrumental variable (IV) approach where the possibly endogenous variable $\widetilde{p}$ is instrumented. Finally, we investigate whether the relationship between tax morale and tax enforcement is constant throughout the distribution of tax morale, using a quantile regression estimation approach.

In what follows, all empirical results are presented controlling for a bunch of demographic and socio-economic variables, provided in the SHIW data set. Although this sample of respondents is only representative of the Italian population of householders, it is certainly well-suited to analyze the determinants of tax morale as they earn about three quarters of the total income earned by households. The average age of respondents is 57 and over 60% are male. Around 63% of them live in a couple, with an average household size of 2.6, and over 35% of them has a primary education degree. On average around 14% of household heads take part in groups or associations in their community (see Table 3 for more descriptive statistics).

4 Discussion of main results

Table 4 presents estimates of the tax morale model (equation 5). In the first column tax morale is estimated including our proxy for tax enforcement and controlling for individual and social characteristics. Interestingly, tax enforcement is statistically significant. It has a positive sign meaning that tax morale is positively correlated to the audit probability enforced by the tax authorities as well as that there is no spite effect at these levels of tax enforcement. In contrast, taxpayers – by increasing their tax morale – seem to internalize in their scale of values a stronger social effort aimed at reducing tax evasion.[11] This result has straightforward and extremely important policy implications because it shows how tax enforcement may have an indirect and additional effect of increasing compliance via taxpayers' morale, besides the obvious direct effect of making evasion less profitable. The coefficient on tax enforcement

[11] Note that excluding tax enforcement from the regression would not have any relevant effect on the individual characteristics suggesting that it is not strongly correlated with observable characteristics. Results are available upon request.

is robust to the inclusion of a measure of respondent's involvement in volunteering activity (column 2) and, additionally, of home-ownership (column 3). The size of the estimated coefficient suggests that the effect of tax enforcement is not negligible. It implies that moving from the 25th to the 75th percentile of the distribution of tax enforcement, tax morale increases by 1.2%.

In column (4) we control for possible endogeneity of our measure of tax enforcement. Even if tax enforcement is likely to be exogenous to individual tax morale, it is possible that the tax authority allocates more resources in detecting tax evasion where morale is lower. Hence we use the change in tax gap at the province level between 2003 and 2002 (i.e. the fiscal years preceding the time of the SHIW interview on tax opinions) as an instrument for tax enforcement in 2004.

Tax gap is defined as the difference between potential and actual tax revenues. Potential revenues are estimated on the basis of the potential tax base (which includes also estimates of the undeclared one) and tax rates given the current legislation. In Italy the tax gap is calculated at the province level comparing the actual revenues from VAT, firms' production tax (IRAP), and personal income taxation with the corresponding levels that would be compatible with National Account data.[12] In this paper we use the difference between 2003 and 2002 in the absolute per capita tax gap at the province level.

The goodness of our instrument relies on two assumptions. First, the tax authority can promptly access this information and adjust tax enforcement accordingly, at least to some extent. Second, respondents to the survey may have some knowledge of the tax gap at the local level, but they do not know the map of changes of the tax gap in all the provinces in the two previous years. Both assumptions are reasonable. On the one hand, the explicit aim of the tax gap estimate is to guide tax police in their audit activity across the country. On the other hand, the time spell before data on tax

[12]Estimates of the tax gap for the period that we consider have been produced by the joint effort of the Italian Statistical Office, Istat, and the Ministry of Economy and Finance, and kindly made available by the Italian Revenue Agency for this research project. See Braiotta et al. (2013); D'Agosto et al. (2013); Giovannini (2011); OECD (2008) for further methodological details.

evasion are made public domain by the Italian Government and/or Istat (typically 2 years later the reference year) guarantees that when the survey was collected the change in the tax gap was private information of the tax authority.

As expected the variable measuring the change in the per capita tax gap has a positive and highly significant sign, suggesting that higher differences in tax gaps are positively correlated with number of tax audits in the subsequent year, with a first-stage F-statistic (slightly) larger than 10, which allows us to accept the instrument according to common econometric practice. In column (4) the coefficient of tax enforcement is still positive and significant at 10% level and it is remarkably higher than in standard OLS. This result suggests that our OLS estimates can be interpreted as a lower bound for the effect of tax enforcement on tax morale, consistently with our guess as for the direction of the bias discussed in Section 3.

Finally, column (5) reports OLS estimates obtained by the use of a multilevel model to control for region, province and municipality-level nesting of individuals, as an alternative to error clusterization. While the effect of tax enforcement remains significant and similar to the one obtained by standard OLS models in columns (1)-(3) the effect of population size is not significant. We have also estimated a IV model, where the second stage is estimated by the use of a multilevel specification of the error components. In this specification the coefficient of tax enforcement remains positive, but it is not significant, most likely because of the low variability within clusters. All these estimates provide evidence that even under different assumptions about endogeneity and the structure of the error term, it is plausible to expect that higher levels of tax enforcement positively affect tax morale.[13]

As for the other controls, in columns (1)-(4) of Table 4 population size displays a statistically significant negative sign. We use the population size of the town of residence of respondents in the year the survey was conducted. This is the exact

[13]To check whether our results are affected by the fact that our measure of tax morale ranges between 1 and 5, we have normalized tax morale and modeled this new variable by the use of a logit transformation, as proposed by Papke and Wooldridge (1996). The results of these additional regressions are qualitatively very similar to the ones obtained by OLS and are available upon request.

count as it comes from population registry offices. The larger is the taxpayer's town of residence, the lower is tax morale *ceteris paribus*. Our interpretation of this result is that population size is likely to act as a proxy for the cost of an antisocial behavior as small communities are characterized by more intertwined relationships.[14]

Population size has sometimes been used in the literature, but without providing conclusive evidence. For instance, Prieto-Rodriguez et al. (2005) report that citizens of small cities turn out to be more tolerant with respect to fiscal frauds. In this case the variable is categorical and refers to Spain. The authors interpret the results as mainly driven by the fact that such municipalities are located in rural areas that receive huge subsidies from the EU. Lubian and Zarri (2011) also find a negative correlation between population size and tax morale using the same SHIW data set that we are using here, although considering a categorical variable for population size. They interpret it as a greater sense of community and civicness that characterize small towns.

Our favorite interpretation of the population size coefficient is in terms of stigma, because tax revenues are highly centralized while the social cost of misbehaving is paid locally. Therefore, the closeness of the relationships is likely to matter only if evasion is detected and not inducing more compliance in order to benefit the community. However, as the community size may shape other traits that could in turn correlate with tax morale, thereby capturing features different than stigma, we try to minimize this possibility by including a wide range of variables that can be used as controls in our dataset (local amenities, local economic conditions, home-ownership, civil status, etc.). In particular, the dataset contains information about the participation to associations, which allows us to capture and therefore to partial out the role played by the sense of belonging to a community of an individual, which is very likely to differ by community size.[15]

[14]There is also experimental evidence showing that group identity is stronger the smaller the group (Weng, 2013).

[15]The volunteering activity variable is derived from an explicit question in the SHIW questionnaire asking: "In the last year, have you taken an active part in gatherings of any of the following groups or associations: associations/groups involved in social, environmental, union policy, religious, cultural,

The significance and magnitude of the coefficients remain unchanged by the inclusion in the specification of the volunteering activity variable (column 2), which is highly significant and positively associated with tax morale, as expected. Note that controlling for whether the taxpayer is involved in social activities such as gathering of associations or groups, which is a proxy of the sense of community and civicness, has no effect on the coefficient of population size. In column 3 we add home-ownership among the explanatory variables, because it could also capture a sense of belonging to the community, possibly correlated with population size. The coefficient of this variable turns out to be not significantly different from zero and, again, the other coefficients are unchanged.

The magnitude of the coefficient of population size is lower than that of tax enforcement, as the coefficient of population size implies a decrease of tax morale by .2% moving from the 25th to the 75th percentile of the distribution of population size.

Finally, tax morale increases with education, age and income and it is significantly lower for self-employed workers. These results are broadly consistent with empirical evidence on the determinants of tax morale that has been extensively discussed by many authors. The large and statistically significant coefficient on self-employed suggests that the higher level of evasion of self-employed is not only shaped by the fact that their income is not third-party reported, as suggested by Kleven et al. (2011), but (potentially) also by a lower tax morale.[16]

Our general results are also supported by several robustness checks meant to test alternative interpretations of both tax enforcement and population size. Some of them are reported in Table 5. First, one might argue that our results are driven by local amenities, which are typically higher in small towns. Therefore in the empirical model reported in the first column of the table we include a composite quality-of-life

sports or recreational, professional, or voluntary activities?" The variable is coded 1 if the respondent gave a positive answer with a least one group/association and 0 otherwise.

[16]The lower average tax morale of residents in the South is also something that has already been discussed as a peculiar characteristics of Italy (e.g., see Fiorio and Zanardi, 2008).

index for year 2004, calculated for all the Italian provinces by the "Il Sole 24 ore."[17] The corresponding coefficient is not significant. More importantly, the coefficients of both population size and tax enforcement remain unchanged and are still significant at standard levels (column 1). Second, we control for individual happiness as assessed by individuals interviewed in the SHIW dataset. Besides being very cautious about its interpretation due to strong endogeneity concerns, we are reassured that it does not affect either the pointwise estimate nor the significance of tax enforcement and population size variables (column 2). Then, to control for general economic conditions and the sectoral composition of local workforce, we include the local employment rate (column 3), the share of employed in services as in Italy tax evasion is typically higher in these sectors (column 4), the share of population with college education who typically have higher tax morale (column 5) and most or all of them together (columns 6 and 7). In fact, in some cases we find that the coefficient on tax enforcement, though being rather robust in magnitude becomes not statistically significant. However this is likely to be due to omitted variable bias and we are reassured by the fact that including all these controls in the same regression (column 7), we observe that our main results remain statistically significant and robust, thereby allowing us to exclude the role of these additional explanatory variables as confounding factors.

We then use a quantile regression approach (Koenker, 2005) to assess whether the average correlations that tax morale displays with tax enforcement as estimated in the last column of Table 4 actually hides more complex patterns.

Table 6 displays results of the conditional distribution of tax moral at some relevant quantiles, namely the 10^{th} and 25^{th} that provide a picture of the bottom tail of the distribution, the 50^{th} which is slightly above the mean given the left-skewed distribution of the tax morale measure (recall Figure 1), and the 75^{th} and 90^{th} quantiles that provide a description of the top tail of the distribution.

Focusing on tax enforcement, it is interesting to notice that it displays decreasing

[17] This is the most popular index of quality of life currently available in Italy, calculated by the most popular economic newspaper since the 1980s and based on a set of sub-indexes about economic and living conditions, pollution, congestion, public services, and cultural activities.

coefficients with increasing levels of tax morale. However, while tax enforcement is always significant, population size turns out to be not significantly different from zero for the highest quantiles. The results about population size as a proxy for stigma are in line with Friedrichsen and Engelmann (2013), who measure the willingness to pay for a Fairtrade item in a lab experiment finding that subjects with a lower intrinsic motivation are also those who display the stronger social image concerns. The significance of the coefficients on the other observable characteristics barely changes, apart from the age variable, which is statistically significant for top quantiles only.

Results using quantile regressions suggest that the highest levels of tax morale are *ceteris paribus* more likely to be driven by individual rather than contextual factors since only the role of tax enforcement remains significant, and lower in magnitude. In contrast, low levels of tax morale seem to react more to contextual variables, whereas some individual variables like age do not play any role. This also suggests that at high levels of tax moral intrinsic motivations play the major role whereas at low level of tax morale tax enforcement has a larger and significant effect as opposed to average levels.

5 Conclusions

In this paper we present some novel empirical evidence regarding tax morale, known in the literature as a very important determinant of tax compliance. Besides confirming some findings already known in the literature, i.e. that some individual characteristics like age and education are important determinants of tax morale, we also find supporting evidence that tax morale is not a purely intrinsic motivation as it also reacts to contextual variables.

The original contribution of the paper is to display that tax morale turns out to be also driven by tax enforcement, contributing to the thin literature that analyzes the interaction between formal and informal institutions. Exploiting an *ad hoc* survey on a representative sample of Italian household heads and information on tax enforcement, we find that not only tax morale is positively correlated with tax enforcement, but

that it is possible to attribute a causal interpretation to such a link. In fact, to deal with possible endogeneity of tax enforcement, we use the change in the tax gap at the provincial level as an instrument for tax enforcement. Results show that stricter formal law enforcement strengthens tax morale, thereby exerting an additional indirect effect on tax compliance.

The fact that tax morale reacts to tax enforcement even in the short-medium term may be interpreted within the literature about social norms. For instance, Henrich (2004) argues that the motivation to pay taxes may be influenced in the short run by the taxpayer's wish to fulfill the social norm and behaving according the society's rules.[18] Within this framework, tax enforcement can be interpreted as a restatement of the society's rules which have an effect on tax morale.

By using quantile regressions, we also show that tax enforcement has a decreasing effect as tax morale increases and that high levels of tax morale are mainly driven by individual characteristics. All in all, high levels of tax morale seem to be driven more by intrinsic motivation, while low levels are more sensitive to contextual factors.

Our results complement and extend those of Galbiati and Zanella (2012). They highlight the importance of social externalities of tax enforcement and suggest that tax enforcement has a large social multiplier, as social interaction allows a government to reduce tax evasion at a cost that is much less than the cost of directly inducing each taxpayer to abide by tax regulations. Our results suggest that tax enforcement has an additional and indirect effect on tax compliance as, besides lowering the expected value of tax evasion, it also helps increasing taxpayers' morale.

Finally, our results suggest to investigate further on the contextual factors affecting tax morale, hence on individual attitudes towards tax compliance. We believe that this topic should receive increasing attention, especially in those countries where severe public budget constraints are coupled with low levels of tax compliance.

[18] More precisely Henrich (2004) defines this behaviour as 'conformity'.

Tables and Figures

Table 1: Correlation matrix of the variables used in PCA

	Statement 3	Statement 4	Statement 6	Statement 8	Statement 11
Statement 3	1.000				
Statement 4	0.202	1.000			
Statement 6	0.183	0.515	1.000		
Statement 8	0.163	0.185	0.152	1.000	
Statement 11	0.053	0.217	0.201	0.159	1.000

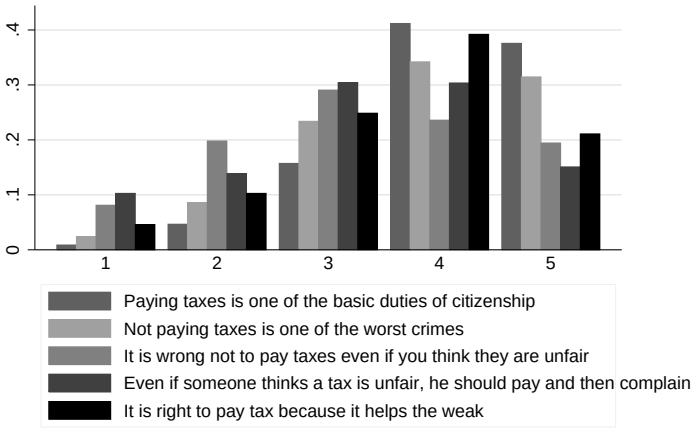
Source: Our calculations on SHIW data.

Table 2: Principal components

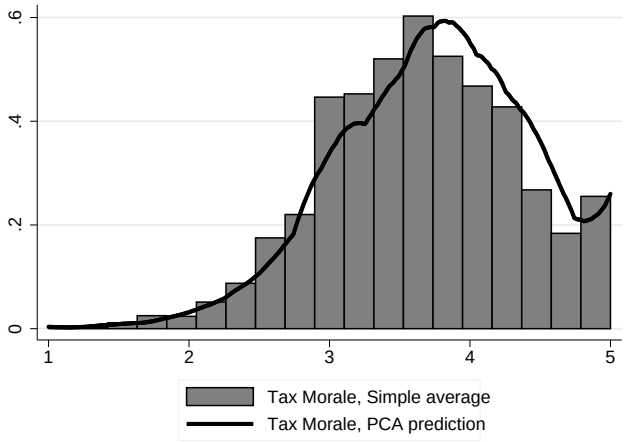
	Eigenvalue	Proportion of variance
Component 1	1.980	0.3961
Component 2	0.984	0.1967
Component 3	0.847	0.1693
Component 4	0.711	0.1423
Component 5	0.478	0.0956
Number of observations	3798	
Number of components	5	

Source: Our calculations on SHIW data.

Figure 1: Distribution of the tax morale measure and its single components



Note: The extent of the agreement to each question is as follows:
1: Not at all, 2: Very little, 3: So−so, 4: Quite a lot, 5: Very much



Note: Silverman optima bandwidth used in kernel density estimation

Table 3: Summary statistics.

	Obs	Mean	Std. Dev.	Min	Max
			Individual variables		
Tax Morale, PCA prediction	3,798	3.730	0.674	1	5
Tax Morale, Simple average	3,798	3.616	0.659	1	5
Statement 3	3,798	4.099	0.888	1	5
Statement 4	3,798	3.838	1.039	1	5
Statement 6	3,798	3.264	1.211	1	5
Statement 8	3,798	3.261	1.178	1	5
Statement 11	3,798	3.620	1.067	1	5
Self-employed	3,798	0.102	0.303	0	1
Log total disposable income	3,757	9.668	0.942	-0.893	13.826
Involved in volunteering	3,798	0.141	0.348	0	1
Homeowner	3,798	0.707	0.455	0	1
Age	3,798	57.031	15.817	19	97
Age squared	3,798	3,502.592	1,811.470	361	9,409
Female	3,798	0.387	0.487	0	1
Single	3,798	0.116	0.320	0	1
Divorced	3,798	0.070	0.254	0	1
Widowed	3,798	0.180	0.384	0	1
Lower secondary education	3,798	0.329	0.470	0	1
Upper secondary education	3,798	0.221	0.415	0	1
Tertiary education	3,798	0.091	0.287	0	1
Number of income receivers	3,798	1.681	0.757	1	5
Number of kids	3,798	0.788	0.964	0	7
Center	3,798	0.222	0.416	0	1
South	3,798	0.327	0.469	0	1
			Local variables (at the municipal level)		
Population size (Million)	344	0.153	0.384	.0003	2.542
			Local variables (at the provincial level)		
p tax enforcement (No. of controls)	103	5,502.442	3,683.485	1,070	17,198
$\widetilde{p}$ tax enforcement (residual of Eq. (4))	103	0.000	1.778	-2.948	8.338
GDP (Million euro)	103	26.354	34.025	1.544	142.608
No. of tax crimes	103	35,300	48,765	954	182,618
Change in p.c. tax gap 2003-02	103	9.046	327.217	-1,124.096	1,004.626

Notes: Statements variables refer to Section R2.9 of the SHIW data set. In particular, they refer to the following statements: 'Paying taxes is one of the basic duties of citizenship' (Statement 3), 'Not paying taxes is one of the worst crimes a person can commit because it harms the whole community' (Statement 4), 'It is not right not to pay taxes even if you think they are unfair' (Statement 6), 'Even if someone thinks a tax is unfair, he/she should pay it first and then complain if necessary' (Statement 8), 'It is right to pay tax because it helps the weak' (Statement 11). Population size is the population size at the municipal level and is expressed in million units. Tax enforcement p is equal to the sum of all controls carried out by the *Guardia di Finanza* in each province in year 2004, on both sellers and customers, regarding tax payments upon the purchase of goods and services. The variable $\widetilde{p}$ is the residual of the OLS regression of tax enforcement on population size, GDP and tax crimes (see also Eq. (4)). GDP is measured in million euro. No. of tax crimes records the number of crime controls against corruption, money laundering and more generally against business activities. Change in tax gap is the difference between the per capita tax gap between 2003 and 2002 at the province level, where the tax gap is defined as the difference between expected and actual tax revenues from all sources over a year. Source: Our calculations on SHIW, GdF, Italian Ministry of Interior and *Agenzia delle Entrate* data.

Table 4: Determinants of tax morale, OLS estimation

		OLS		IV	OLS Multilevel
	(1)	(2)	(3)	(4)	(5)
$\widetilde{p}$ (tax enforcement)	0.020	0.020	0.020	0.212	0.023
	[1.81]*	[1.80]*	[1.81]*	[1.69]*	[1.68]*
Population size	-0.125	-0.119	-0.122	-0.233	-0.109
	[3.45]***	[3.16]***	[3.19]***	[2.94]***	[-0.98]
Self-employed	-0.166	-0.161	-0.163	-0.179	-0.174
	[4.43]***	[4.32]***	[4.35]***	[4.21]***	[-5.38]***
Log total disp. income	0.055	0.052	0.057	0.056	0.047
	[3.77]***	[3.56]***	[3.97]***	[3.65]***	[3.87]***
Involved in volunteering		0.178	0.18	0.167	0.137
		[4.304]***	[4.371]***	[4.710]***	[4.86]***
Homeowner			-0.04	-0.057	-0.020
			[1.566]	[1.864]*	[-0.89]
Age	0.014	0.012	0.013	0.013	0.012
	[2.87]***	[2.62]**	[2.75]***	[2.35]**	[2.88]***
Age squared	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001
	[1.39]	[1.16]	[1.28]	[1.07]	[-1.68]*
Female	-0.023	-0.019	-0.014	-0.025	-0.008
	[0.75]	[0.62]	[0.45]	[0.82]	[-0.33]
Single	0.031	0.025	0.021	0.006	0.017
	[0.84]	[0.67]	[0.57]	[0.14]	0.5
Divorced	-0.062	-0.062	-0.072	-0.07	-0.098
	[1.18]	[1.21]	[1.37]	[1.38]	[-2.43]**
Widowed	-0.046	-0.043	-0.05	-0.059	-0.036
	[1.30]	[1.24]	[1.46]	[1.40]	[-1.09]
Lower secondary ed.	0.137	0.129	0.129	0.106	0.086
	[4.63]***	[4.36]***	[4.38]***	[2.89]***	[3.27]
Upper secondary ed.	0.285	0.269	0.27	0.231	0.215
	[8.37]***	[7.73]***	[7.73]***	[4.99]***	[6.94]***
Tertiary ed.	0.313	0.281	0.282	0.262	0.228
	[6.41]***	[5.63]***	[5.67]***	[5.07]***	[5.72]***
No. of income receivers	0.015	0.012	0.013	0.032	0.017
	[0.96]	[0.77]	[0.87]	[1.49]	[1.21]
No. of kids	0.027	0.026	0.025	0.012	0.011
	[2.01]**	[1.91]*	[1.86]*	[0.65]	[0.87]
Centre	0.051	0.049	0.053	-0.032	0.034
	[1.14]	[1.13]	[1.20]	[0.51]	[0.529]
South	-0.157	-0.152	-0.149	-0.117	-0.132
	[3.32]***	[3.16]***	[3.07]***	[3.29]***	[-2.414]***
Constant	2.545	2.598	2.538	2.609	2.747
	[13.50]***	[13.86]***	[13.30]***	[12.68]***	[16.96]***
Observations	3,757	3,757	3,757	3,757	3,757
R-squared	0.077	0.085	0.085	0.083	
First-stage					
Change in tax gap 2002-03				0.0004	
				[3.289]***	
F-statistics				10.81	

Notes. Columns (1)-(3): OLS estimation with errors clustered at the municipality level. Robust t-statistics in brackets. Column (4): IV estimates, t-statistics in brackets. Column (6): OLS multilevel estimates (three levels: region, province and municipality). z-statistics in brackets. *** p<0.01, ** p<0.05, * p<0.1
Source: Our calculations using SHIW, *Agenzia delle entrate* and GdF data.

Table 5: Robustness checks: determinants of tax morale, OLS estimation, using additional controls

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
$\widetilde{p}$ (tax enforcement)	0.021*	0.021*	0.016	0.028***	0.018*	0.023**	0.023**
	[1.890]	[1.848]	[1.443]	[2.646]	[1.673]	[2.193]	[2.217]
population size	-0.112***	-0.117***	-0.133***	-0.066	-0.080*	-0.086*	-0.084*
	[-2.656]	[-3.052]	[-3.063]	[-1.527]	[-1.894]	[-1.806]	[-1.765]
Local quality of life	-0.001					0.001	0.001
	[-1.104]					[1.573]	[1.633]
Happiness		0.036***					0.036***
		[5.397]					[5.473]
Local employment rate			-1.085**			-2.344***	-2.357***
			[-2.360]			[-3.175]	[-3.177]
Share of employed in services				-0.828**		-1.325**	-1.293**
				[-2.569]		[-2.539]	[-2.478]
Share of college educated					-1.794**	0.443	0.428
					[-2.122]	[0.361]	[0.351]
Individual characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,757	3,757	3,757	3,757	3,757	3,757	3,757
R-squared	0.086	0.094	0.089	0.091	0.090	0.099	0.107

Notes: OLS estimation using with errors clustered at the municipality level. Robust t-statistics in brackets. *** p<0.01, ** p<0.05, * p<0.1. All the models include individual characteristics as in column (3) of Table 4. People with high school degree is the share of province population with at least the high school diploma. Local quality of life is at the level of province.
Source: Our calculation using SHIW and GdF data.

Table 6: Determinants of tax morale, quantile regression estimation

	(1)	(2)	(3)	(4)	(5)
	Quantile q of tax moral				
	$q = .10$	$q = .25$	$q = .50$	$q = .75$	$q = .90$
$\widetilde{p}$ (tax enforcement)	0.032***	0.031***	0.028***	0.019**	0.020*
	[3.391]	[3.069]	[4.056]	[2.208]	[1.808]
Population size	-0.149***	-0.168***	-0.134***	-0.080*	-0.066
	[-3.339]	[-4.206]	[-3.269]	[-1.834]	[-1.522]
Self-employed	-0.126*	-0.167***	-0.225***	-0.197***	-0.099
	[-1.843]	[-3.062]	[-4.839]	[-3.832]	[-1.487]
Log total disposable income	0.058	0.066**	0.060***	0.052***	0.045*
	[1.428]	[2.413]	[3.494]	[2.893]	[1.859]
Involved in volunteering	0.194***	0.215***	0.181***	0.177***	0.179***
	[2.891]	[4.451]	[4.521]	[5.151]	[3.973]
Homeowners	-0.046	-0.047	-0.028	-0.027	-0.023
	[-1.065]	[-1.149]	[-0.915]	[-0.833]	[-0.536]
Age	0.003	0.007	0.011*	0.024***	0.027***
	[0.341]	[0.864]	[1.752]	[4.309]	[3.832]
Age squared	0.000	-0.000	-0.000	-0.000***	-0.000***
	[0.650]	[-0.085]	[-0.671]	[-2.864]	[-2.950]
Female	-0.029	-0.008	-0.017	-0.014	-0.028
	[-0.579]	[-0.182]	[-0.501]	[-0.428]	[-0.638]
Single	0.124*	-0.012	0.010	0.015	0.111
	[1.844]	[-0.194]	[0.180]	[0.278]	[1.557]
Divorced	-0.007	-0.103	-0.040	-0.075	-0.033
	[-0.086]	[-1.231]	[-0.617]	[-1.139]	[-0.427]
Widowed	-0.095	-0.106	-0.055	-0.038	-0.008
	[-1.116]	[-1.627]	[-1.040]	[-0.703]	[-0.128]
Lower secondary education	0.049	0.162***	0.125***	0.142***	0.104**
	[0.694]	[3.269]	[3.005]	[3.469]	[2.138]
Upper secondary education	0.227***	0.272***	0.279***	0.272***	0.198***
	[3.159]	[4.676]	[5.864]	[5.876]	[3.995]
Tertiary education	0.222***	0.278***	0.288***	0.287***	0.263***
	[2.735]	[3.798]	[4.674]	[5.162]	[3.476]
Number of income receivers	0.010	0.033	0.017	-0.002	-0.055**
	[0.288]	[1.236]	[0.681]	[-0.083]	[-2.092]
Household size	0.002	-0.082*	-0.001	0.012	0.081*
	[0.053]	[-1.950]	[-0.020]	[0.380]	[1.784]
Number of kids	0.055	0.113***	0.031	0.025	-0.037
	[1.209]	[2.583]	[0.775]	[0.699]	[-0.793]
Center	0.024	0.056	0.111***	0.035	-0.036
	[0.419]	[1.195]	[3.308]	[1.056]	[-0.866]
South	-0.147***	-0.174***	-0.157***	-0.160***	-0.153***
	[-2.799]	[-3.761]	[-4.463]	[-4.430]	[-3.720]
Constant	1.974***	2.346***	2.572***	2.711***	3.046***
	[4.514]	[7.898]	[9.302]	[11.519]	[9.530]
Observations	3,757	3,757	3,757	3,757	3,757

Notes: Quantile regression estimation with bootstrapped standard errors (number of replications is 999). Robust t-statistics in brackets. *** p<0.01, ** p<0.05, * p<0.1
Source: Our calculations using SHIW and GdF data.

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