Peer's effects and social conformity in tax compliance: An experimental study

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Abstract

The lab experimental study described in this paper aims at investigating the impact of both received and chosen information about others' tax compliance behaviour on the level of tax compliance among taxpayers. The subjects are provided with information about the tax behaviour previously observed among the whole community (made of the 20-subject group they belong to in the lab session), and they are also given the possibility to get information about the tax behaviour of a subgroup of their fellow subjects, which they can choose (on the basis of a tax morale criterion). By allowing us to investigate the impact of information on tax compliance both at the whole-community level and at a reference-group level, our strategy gives us the opportunity to study the role played by a local social norm (conveyed by the individually chosen reference group) relative to a more global social norm (at the community level). Our main results are threefold. First, we show remarkable stability of tax evasion/compliance behaviour regardless of the informational context, suggesting strong intrinsic preferences toward taxation. Second, our findings are in line with the existing literature as regards the role of tax morale, probability of audit and awareness of public good provision. Thirdly, and more importantly, we find a significant informational and social norm effect, but the intensity and direction of this effect depends on the nature of information provided/chosen.

Keywords: Tax compliance, Information dissemination, Tax morality

JEL Codes: H26, H26, D91

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1 Introduction

Tax evasion is a reality almost everywhere. It has become an issue for many countries, as well as a hot topic in the media. Part of the yellow jackets movement in France has rooted in the perception of deep income inequalities and a strong feeling of tax injustice, based on the notion that wealthiest people are both insufficiently taxed and suspected of tax evasion (or at least avoidance by all means). In the same vein, tax evasion scandals (such as the Panama Papers) involving politicians, popular actors, directors or top athletes all around the world may seriously undermine that feeling of fairness and equity among taxpayers at the grassroots level. Moreover, the fact that these scandals are widely relayed may contribute to enhance the taxpayers perception that tax evasion is everywhere and everybody is cheating around. The everybody does it Bardach (1989) observation may then offer a comfortable self-justification argument to start evading taxes for those who did comply in the first place: they may feel authorized to evade in their turn even though the extensive media coverage of a few tax evasion cases gives a wrong (overestimated) idea of how prevalent tax evasion really is. Even compliant taxpayers may feel sheepish and ashamed when realizing, or feeling, that they have been the fall guys the only ones to abide by the law and contribute to the society, while others did behave selfishly and enriched themselves on the back of the beast.

These examples suggest that compliance does not only respond to financial, asocial considerations, and that both the perception of, and information about, how others in the society behave, are likely to affect one's tax behaviour. Moreover, it seems important to try to better define who these others are (that is to identify those social groups whose tax behaviour is under the scrutiny of taxpayers) and to what extent they may inflect one's own tax behaviour. Our experimental study focuses on this issue. In real life, people are usually not able to directly get by themselves some information about others' behaviour. But, thanks to investigations conducted by journalists, unions, political parties, and even researchers, many pieces of information are actually disclosed the media. And this amount of information appears not to be innocuous, in terms of social reactions at least the possible impact on tax behaviour is obviously much more difficult to estimate. Since our purpose was to investigate the influence on tax compliance of information-based communication regarding others behaviour, we choose to run an artefactual field experiment, that is a lab experiment with a more diverse pool of subjects (see Harrison and List (2004) for a typology of field experiments). The lab is most appropriate for our purpose, and actually, only the lab is suitable: in each experimental session, we needed real-time information about the participants' behaviour in previous rounds to use it as an informational input in further rounds; we also needed to get information at a finer level (that of reference groups based on tax morale), which could not be done in the field.

The novelty of our experimental design is that we wish to differentiate two levels of others. The first level is that of the whole fiscal community: quite standardly, the subjects are given the mean rate of tax compliance among her fellow participants in the experimental session. The second level is that of each subject's reference group. The subjects are first all classified depending on their position on a relevant tax-related criterion (namely tax morale, which can be regarded as tax civism); then, each subject is given the opportunity to get some information on the tax behaviour of the subjects whose tax morale index was higher, lower or equal to hers. This amounts to giving the subjects the possibility

of deciding whether they want to get some information about a more specific sample of subjects, and in that case, they can also choose which reference group to get information about.
The main originality of our framework is twofold. First, we choose to introduce both a basic standard tax system with exogenous features (exogenous probability of audit, no public good), and a more realistic framework involving endogeneous features (an endogenous probability of audit, and a public good equally redistributed among the taxpayers). The first setting corresponds to the standard portfolio model of tax evasion, which considers tax evasion as an individual portfolio choice with no consideration for social interactions among taxpayers and may give some precise insights in how information affects tax compliance in such a simplistic context. On the other hand, the second framework is more realistic: the audit probability depends on the amount declared by an individual and also on the average amount declared by the others and tax revenues are used to finance a public good. Since we introduce both the endogenous probability of audit and the public good, we are obviously not able to identify changes in behaviour due to one or the other factor. Nevertheless, this strategy enables us to observe the influence of information in a pretty realistic context. In other words, we choose to implement two extreme cases, a simple setting, for the sake of both control and comparison with existing studies, and a more complex setting, for the sake of realism. Comparing the effect of information on behaviour across the simple and complex settings should give us nice insights into how the existence of social interdependence among taxpayers may inflect or not the pure informational effect observed in the basic treatment.
The second originality is the use of reference group. Even though we are obviously not the first ones to be interested in the notion of a reference group and the influence that information regarding its behaviour may have on the taxpayers own behaviour (see for instance Fortin et al. (2007)), we are not aware of any other paper that lets the subjects choose their reference group on the basis of an announced individual preference towards tax compliance prior to knowing the type of game they would play. Introducing that degree of freedom in the experimental design obviously brings some unusual complexity to the analysis, but it also gives the opportunity to go a step further in the understanding of which information taxpayers focus on when making their tax decisions. Also, letting each subject choosing her reference group implies that reference groups are subject-specific. With these features, we try to come close to the basic nature of a reference group. Moreover, we do not oblige the subjects to get information about some reference group: each subject can either choose a reference group to get some information about their behaviour, or choose not to get any such information. Our design thus allows us to take into account the subjects' heterogeneity toward the search for information, and the nature of information chosen. Finally, we introduce two kinds of information, corresponding to two levels of social membership: the societal level, that of the fiscal community as a whole (through the provision of information about the rate of tax compliance among other members of the experimental session), and the social level, that of smaller groups within the society (through the provision, or not, of information about the rate of tax compliance among the members of a reference group chosen by the subject).

The paper is organized as follow: Section 2 presents the literature our paper is related to and Section 3 describes the theoretical framework and derives the hypothesis that will be tested. Section

4 describes the experimental design and Section 5 presents the results. The last section concludes.

2 Related literature

In the last 50 years, much theoretical research has been devoted to the question of what makes tax compliance compelling or not. Empirical and experimental research has grown accordingly, both to speak to theorists by testing existing theoretical attempts and to search for (new) facts (Roth, 1986). The above-mentioned examples suggest that the basic analysis of tax compliance, based on a à la Becker economics-of-crime portfolio approach and starting with Allingham and Sandmo (1972)s seminal model (see Pyle (1991) for a nice survey), is not enough to account for either tax compliance and tax evasion. Some attempts have been made afterwards to improve the seminal model, both to make the structure of the standard model more realistic and to try to conciliate it with the observation of a rather low level of tax evasion in real life (see Sandmo (2005) for a survey). But the puzzle of compliance has remained partly unexplained though. Then the next step has been to apply some news insights drawn from behavioural economics to the study of tax evasion (Hashimzade et al., 2013).
The most abundant strand of literature is that derived from the second behavioural economics approach, based on the dropping of the self-interest assumption. In a broad sense, this strategy amounts to acknowledging that the story of tax evasion involves more than amoral cost-benefit calculation (Slemrod, 2007), and claims that tax compliance should be addressed using a more comprehensive approach (Alm et al., 1992; Alm and Torgler, 2006), based on process-oriented, not only outcome-oriented, decision making (Elster, 1989). This approach thus opens the possibility that the taxpayer does not only respond to economic, external, extrinsic, incentives, but also to non-economic, internal, intrinsic motivations (Alm et al., 1992; Hofmann et al., 2008; Sandmo, 2005), based on ethics, moral feelings (e.g., guilt, remorse and shame), moral values (such as empathy, sympathy fairness and altruism), social norms, and the sense of civic duty (see (Andreoni et al., 1998; Christian and Alm, 2014; Erard et al., 1994; Hofmann et al., 2008; Kirchler et al., 2008; Wenzel, 2005; Kirchler, 2007) for a survey).
Among the many social factors affecting tax compliance that have have been theoretically studied, is the behaviour of others. Gordon (1989) and Myles and Naylor (1996) investigate the way other's tax behaviour affects one's behaviour, through the mediating influence of internalized social norms, resulting in damaged self-image (guilt) or social image (shame, social stigma) when deviating. In these models it is assumed that tax compliance is a social norm, however, the ethical rule underlying taxpayers behavior is exogenous to the model. An endogeneous ethical rule is considered by Bordignon (1993). Taxpayers are assumed to be motivated by fairness and reciprocity considerations: they are willing to pay a "Kantian tax" which is defined as the marginal cost of producing the public good, equally distributed across taxpayers, provided the other taxpayers pay such a fair tax. This Kantian tax acts as a constraint in the utility maximization problem. The amount of evasion which is considered fair by an individual is the difference between the actual tax and the fair contribution. Modelled as a fairness constraint the ethical rule underlying taxpayers' behaviour is endogenised, in that it depends on the tax structure, public expenditure and perceived evasion by other taxpayers. Another finding is that, as shown by Bazart and Bonein (2014), heterogeneity prevails among taxpayers. In

Traxler (2010), tax morale is incorporated in the seminal Allingham and Sandmo (1972)s model, as an endogenous variable, which depends on the rate of evaders in the society and decreases as tax evasion increases. Taxpayers are assumed to be conditionally cooperative, depending on others' behaviour. The model is interestingly extended to a society in which different communities, thus different social norms toward tax compliance, coexist. In that case, the weakening of the tax compliance norm within a group may weaken the norm elsewhere through a negative externality mechanism. Traxler (2010) thus highlights the role that high prestige leaders should play to circulate the proper norm among the different levels of the society and avoid vicious spirals among the followers.

Obviously, real life gives us some opportunity to get information about others tax behaviour. That may happen through the media disclosure of a tax evasion case (e.g. a politician being caught evading; an artist being reproached to live in a tax haven to avoid taxes) or a free-flowing discussion with friends or colleagues on the legitimacy of State intervention. Intuitively, we may expect such information to influence our subsequent fiscal decisions. To better know how this influence works and to what extent, a number of lab and field studies have been run. In these previous studies, the other taxpayers whose tax behaviour an individual may be interested in is either the fiscal community as a whole (Blumenthal et al., 2001; Fortin et al., 2007; Fellner et al., 2013; Bazart and Bonein, 2014; Castro and Scartascini, 2015), or a subpart of the fiscal community that might be viewed as particularly significant by the taxpayer, such as her loved ones, her neighbourhood (Del Carpio, 2014), her colleagues at work, or even politicians or football players. Information about the behaviour of others is presented in different ways, from completely descriptive to purely normative. In Blumenthal et al. (2001) for instance, the compliant behaviour of the majority is given as well as the prescription that the subject should comply to be part of the majority. Some other studies give the proportion of compliant taxpayers, with no peculiar normative overtone (Del Carpio, 2014; Castro and Scartascini, 2013), letting the subject decide whether this is significant information or not.

Note that in most experimental studies, giving additional information about others' compliance does not significantly increase the level of tax compliance of the subjects as compared to the basic treatment in which only a reminder letter is sent. Mixed results are drawn from these studies. A reason for that could be the heterogeneity among taxpayers: low-compliance people realize that the overall level of compliance is not so high as they expected, which gives them an excuse to evade even more after getting information about others behaviour (see Mascagni, 2018, p. 283). Another argument could be that early studies do not control for personal factors, which may confounds the interpretation of the data (Trivedi et al., 2003). Finally, it may be that social and moral factors are good at explaining why the level of tax compliance is high or low in a country, in comparison with other countries, for instance - but they may not be very good variables to manipulate to increase tax compliance from its baseline (Mascagni, 2018).

Social norms define the rules of behaviour that the members of the group in which they prevail should follow; obedience to these rules is partly sustained by the existence of informal positive feedback (social approval) in case of compliance, and sanctions (social disapproval) in case of defection. Each different group may have its own norms, but all groups in a given society are subject to the norms that prevail at the level of the whole society, that is societal norms (which does not preclude their violation, though). As regards tax compliance, the societal norm toward compliance has been called

tax morale since the 1960 (Schmölders, 1960; Strümpel, 1969). It can be related to the notions of tax ethics Pommerehne and Frey, 1992; Torgler and Murphy, 2004, civic duty, which is the feeling of responsibility to society (Orviska and Hudson, 2003), and even patriotism (Konrad and Qari, 2012). Empirically, the most common way to measure tax morale has been to use the respondents position toward a specific item (e.g. citizens should not cheat on their taxes) which can be found in many attitudes and values surveys (such as the World and European Values Surveys; see F., 2013 for references). A number of papers have also investigated the socio-demographics and personality correlates of tax morale, as well as the role played by institutional factors to explain differences in tax morale across countries. But the main focus has been put on investigating the impact of tax morale on tax behaviour. The results of these studies are not clear-cut. For instance, Blumenthal et al. (2001) and Fellner et al. (2013) do not find any effect of moral appeals on tax compliance. Conversely, based on a meticulous empirical study that tries to avoid all the shortcomings of previous empirical studies, Halla (2012)s findings support the existence of a causal link that makes tax compliance an increasing function of tax morale.

Our paper is related to the different strands of the literature on tax compliance, social norms and information about other's tax behavior. Tax morale plays an important methodological role in our study. After being elicited for each subject in a standard way, it is first used as a control variable in our econometric regressions. It is also, and most importantly here, used as the qualifying criterion for the construction of our reference groups.

3 Theoretical framework

Our theoretical model is based on the standard income tax evasion framework described by Allingham and Sandmo (1972), in which we introduce behavioural components to account for non pecuniary motives to tax compliance. Its structure is similar to that of other recent models by combining "rational choice with social influence mechanisms" (Noguera et al., 2014). Since our aim is to investigate how the taste for social conformity (resp. anti-conformity) affects the willingness to comply with taxes, we choose to expand the basic theoretical set-up in three different directions. First, we introduce a public good to capture the basic nature of taxes in the real world (which is to finance public expenses) and allow for redistribution among taxpayers. Second, we acknowledge the existence, in each individual, of an intrinsic but psychologically-, morally- and socially-determined motive to compliance. Called "tax morale", this multifaceted motive has been widely investigated, both theoretically and empirically, to define and capture the taxpayer's intrinsic motivation or internalized willingness to pay taxes Braithwaite and Ahmed (2005); Torgler (2007). In this view, tax morale can be seen as an individual characteristic that defines her general attitude toward taxes. Following this approach, we include tax morale in our model as an individual parameter, which differs across taxpayers. In that, our model departs from Di Gioacchino and Fichera (2020)'s, in which tax morale is a variable that can be affected by others' tax morale. Finally, as in Méder et al. (2012), we consider that the taxpayer bears a psychic cost for deviating from, or conforming to, the tax behavior of a given group that is important to her and can be called her reference group. This cost depends on the difference between the income reported by the individual and the average income reported among her reference group. As

in Myles and Naylor (1996), we give the taxpayer the possibility to take into account other taxpayers' behaviour when making her own decision to report her income, by adding a parameter that captures her taste for conformity. The novelty here is that we authorize the taste for conformity to be either positive or negative, depending on whether the taxpayer wishes to conform to the other taxpayers' behaviour, thus to the implicit social norm at play within this group, or prefers not to conform to this social norm. Hence, and this is the novelty of our approach, we lift the usual theoretical restriction put on preferences as regards the desirability of social conformity for any individual. Doing so, we are able to account for more diversity in behaviour.

In our setting, the utility function of a taxpayer is given by:

$$U(x) = E[u(x_i); p] + \frac{g}{n}[(n-1)t\bar{X}_{-i} + tx_i] - F(x_i; \Delta_{i,k,t-1}, \theta, \alpha_i) \tag{1}$$

where,

- $E[u(x_i; p)]$ denotes taxpayer is expected utility as in Yitzhaki (1974), and is given by:

  $$E[u(x_i; p)] = (1-p)u(R - tx_i) + pu(R - tx_i - t(1+\pi)(R - x_i))$$

  with p is the audit probability, R the income of the individual, x_i her reported income, t the tax rate and π the fine rate on evaded taxes.

- $\frac{g}{n}[(n-1)t\bar{X}_{-i} + tx_i]$ represents the part of the public good from which taxpayer i benefits. In eq.(1), X_{-i} denotes the average income reported by the $(n-1)$ taxpayers with whom the individual contributes to the public good through the payment of taxes, xi her own contribution (i.e. her reported income) and g an efficiency factor that allows to leverage the amount of collected taxes to constitute the public fund (as in Christian and Alm (2014)). This public fund is redistributed equally among the n taxpayers.

- $F(x_i; \Delta_{i,k,t-1}, \theta_i, \alpha_i)$ is a cost function reflecting the psychological pain of paying taxes. This psychic cost depends on the individual i's reported income, on the reported income gap $\Delta_{i,k,t-1}$ and on two individual parameters θ_i and α_i.
  $\Delta_{i,k,t-1}$, defined as reported income gap, denotes the difference between individual i's reported income x_{-i} and the average reported income in reference group k in previous period $(t-1)$, and is written as:

  $$\Delta_{i,k,t-1} = (x_{i,t-1} - \bar{X}_{k,t-1}) \tag{2}$$

  The parameter α_i capture taxpayer i's taste for social conformity with group k: α_i can be either positive if individual i has a taste for conformity or negative if she rather has a taste for anti-conformity[1]. Finally, $\theta_i \in [0, 1]$ captures taxpayer i's tax morale.

[1] With the narrow and unloaded meaning we give to this word here.

We assume that the psychic cost is convex with x_i ($F'_{x_i} \geq 0$ and $F''_{x_i} \geq 0$). Moreover the marginal cost of tax income reporting decreases with a higher level of tax morale θ_i : $F''_{x_i\theta_i} \leq 0$. A taxpayer who is fully tax moral ($\theta_i = 1$) bears a smaller disutility of paying taxes than taxpayers who are not fully moral ($\theta_i < 1$). We further assume the marginal cost of tax reporting to depend on the way the taxpayer considers the social norm, that is, here, the gap between her behaviour and the average behaviour of other taxpayers. If the individual has a taste for social conformity ($\alpha_i > 0$), the marginal cost of reporting is increasing in $\Delta_{i,k,t-1}$ and the individual has an incentive to conform to the behaviour of the other taxpayers (which captures the implicit social norm of the group). So, if the reported income gap is positive (resp. negative), the conformist individual will be induced to decrease (resp. increase) her declaration. On the contrary, if the individual has a distaste for conformity ($\alpha_i < 0$), the marginal cost of reporting is decreasing in $\Delta_{i,k,t-1}$ and the individual prefers to distance herself from the social norm that is reflected by the groups behaviour. Then, the sign of the cross derivative depends on the taste for conformity with social norm of taxpayer i (α_i):

$$\begin{aligned} F''_{x_i,\Delta_{i,k,t-1}} > 0 \quad if \quad \alpha_i > 0 \\ F''_{x_i,\Delta_{i,k,t-1}} < 0 \quad if \quad \alpha_i < 0 \end{aligned}$$

Finally, we assume that the probability of detection $p = p(x_i, \bar{X}_{-i})$ is a decreasing function of the reported income x_i ($p'_{x_i} \leq 0$)[2]as well as an increasing function of $\bar{X}_{-i}$ ($p'_{\bar{X}_{-i}} \geq 0$) and we set that $p''_{x_i} = 0$, $p''_{\bar{X}_{-i}} = 0$ and $p''_{x_i\bar{X}_{-i}} = 0$.
We now turn to the predictions that can be derived from the comparative statics of our simple theoretical model (See Appendix 1). Since these predictions are the hypotheses that will be tested using the following experimental study, we use the notation Pj to identify them:

P 1. *Tax morality limits tax evasion behaviors* $\left(\frac{\partial x_i}{\partial \theta_i} > 0\right)$.

The higher the taxpayers tax morale, the lower her amount of tax evasion.

P 2. *A high audit probability decreases tax evasion / An increase in the average reported income of an agent's group decreases the agent's tax evasion* $\left(\frac{\partial x_i}{\partial \bar{X}_{-i}} > 0\right)$

The higher the audit probability, the lower the taxpayers amount of tax evasion / An increase in the average reported income within the reference group decreases the taxpayers amount of tax evasion. The equivalence between these two predictions comes from the fact that the average reported income determines the audit probability of the taxpayer. To be more specific, a high average reported income requires a high level of compliance from the taxpayer in order to avoid a high audit probability[3].

P 3. *The benefit drawn from the public good contribution decreases tax evasion* $\left(\frac{\partial x_i}{\partial g} > 0\right)$

P 4. *The effect of the reported income gap (i.e. the gap between the reported income of the taxpayer and the average reported income of a specific group) depends on the taste for social conformity of the*

[2]This assumption is grounded on the screening models of audit (Reinganum and Wilde, 1985; Scotchmer, 1987; Macho-Stadler and Pérez-Castrillo, 2002). In these models, tax enforcement authorities pre-commit to an audit strategy which depends on the reported income. The optimal reporting decision of the taxpayer implies that the optimal audit rule declines with reported income.

[3]Note that if the audit probability is given, we have $\frac{\partial x_i}{\partial p_i} > 0$ (See Appendix A).

taxpayer (i.e. on the sign of α_i).

- *if $\alpha_i = 0$: an increase in the reported income gap has no impact on the agent's tax evasion: the taxpayer does not care about the tax behaviour of others* (**P 4.a**).
- *if $\alpha_i > 0$ i.e. the taxpayer likes to conform to others' behaviour:*
  - *if $x_i > \bar{X}_k$, an increase in the reported income gap increases taxpayers amount of tax evasion $\left(\frac{\partial x_i}{\partial \Delta_{i,k,t-1}} < 0\right)$. This can be referred to as a "fall guy" effect* (**P 4.b**).
  - *if $x_i < \bar{X}_k$, an increase in the reported income gap ($|\Delta|_{i,k,t-1}$ increases), lowers the taxpayers amount of tax evasion $\left(\frac{\partial x_i}{\partial |\Delta|_{i,k,t-1}} > 0\right)$. This can be referred to as a "guilty feeling" effect* (**P 4.c**)[4].
    When the taxpayer reports a lower amount than the others, she will decrease the marginal cost of reporting by increasing the reported income gap, i .e. by reducing her amount of tax evasion.
- *if $\alpha_i < 0$ i.e. the taxpayer does not like to conform to otherss behaviour:*
  - *if $x_i > \bar{X}_k$, an increase in the reported income gap decreases the agent's tax evasion $\left(\frac{\partial x_i}{\partial \Delta_{i,k,t-1}} > 0\right)$. This can be referred to as a "self secrifice" effect* (**P 4.d**).
  - *if $x_i < \bar{X}_k$, an increase in the reported income gap increases the taxpayer's amount of tax evasion $\left(\frac{\partial x_i}{\partial |\Delta|_{i,k,t-1}} < 0\right)$. This can be referred to as a "pure selfish" effect* (**P 4.e**)[5].
    When the taxpayer reports a lower amount than the others, she will decrease the marginal cost of reporting by decreasing the reported income gap, i.e. by increasing her amount of tax evasion.

Thus our model enables us to take a broader approach to tax compliance by considering a profit-maximizing rational actor who is also motivated by moral considerations and affected by social dynamics.

4 The Experimental design and tested hypotheses

Based on our theoretical model, the purpose of our experiment is to determine whether, to what extent, and in which direction, taxpayers' income reporting decisions are affected by information regarding the reporting behaviour of other taxpayers. As previously mentioned in the introduction, we distinguish two types of information. The first one is information about the average reported income of other taxpayers of the same fiscal community (which works as a proxy of the whole society). The second one

[4]It is easier to understand the mechanism with the absolute value of Δ. However, without considering absolute value we can see that an increase in the reported income gap ($\Delta_{i,k,t-1} < 0$ becomes more negative) lowers the agents amount of tax evasion and $\left(\frac{\partial x_i}{\partial \Delta_{i,k,t-1}} < 0\right)$

[5]Again, it is easier to understand the mechanism with the absolute value of Δ but without considering the absolute value we would have $\left(\frac{\partial x_i}{\partial \Delta_{i,k,t-1}} > 0\right)$

is information about the average income of a specific group chosen by the taxpayer (i.e. her reference group). In our experiment, the criterion through which reference groups are defined is tax morale, and more specifically the relative level of tax morale of others (as compared to each taxpayer's own level of tax morale). Subjects are asked whether they wish to get some information about the behaviour of taxpayers whose level of tax morale is equal to, lower than, or higher than, theirs before making their income reporting decision. They may either refuse to get any information about others' behaviour, or choose which information they prefer to get, depending on which information is of most interest to them[6]. So, what we aim at doing here is to investigate the influence of both a descriptive and injunctive social norm on subsequent tax compliance behaviour. Imposing tax morale as the basis of the reference groups contributes to complement the basic descriptive norm (namely, how others behave) with an injunctive component.

4.1 The experimental design

The tasks in direct relation with the main aim of our experiment (that is, testing the previous model and, more particularly, the impact of two kinds of information about others' income reporting decisions on the subjects' income reporting decisions) were the core of the second part (denoted Part 2 in the following) of the experiment. The experiment involved two other parts, as well as a post-experimental questionnaire (see Table 1).

The first part (denoted Part 1 in the following) was devoted to both eliciting each subject's risk attitude, and determining the level of her tax morale (which was used as an input in Part 2). The third part (denoted Part 3 in the following) of the experiment aimed at testing a framing hypothesis which is not the object of this paper; it will not be presented here. Finally, a post-experimental questionnaire allowed us to collect usual socio-demographic data (gender, age, status, income, etc.), and to get some qualitative insights into how the subjects viewed the experiment and consider tax reference groups in real life . We now present Part 1 and Part 2 more thoroughly.

4.1.1 Part 1

For the sake of tractability, we did not introduce the taxpayer's attitude toward risk into our theoretical model. Nevertheless, subjects in the experiment may not to be risk neutral, which may affect empirical measures. So it is worth eliciting the subjects' risk attitude to use this measure as a control in the econometric regressions. In our experiment we opted for the standard "Holt and Laury" procedure to get an index of risk aversion/seeking for each subject.

Besides, our model introduces reference groups, with each subject having a personal reference group (which is a subgroup of the whole tax community). The criterion on which each taxpayer's reference group is based is completely open in the model. For the experiment to be tractable, we chose a single criterion for all the subjects. This criterion is tax morale. Defined (as in Frey and Torgler (2007)) as the intrinsic motivation to pay taxes, it is either due to the moral obligation to pay taxes or to the belief that paying taxes contributes to society. Our purpose was to get in Part 1 an

[6]To be more specific, the subjects may get information about the income reporting behaviour of those fellow subjects (within the fiscal community) who either have the same level of tax morale as them, or a higher (resp. lower) level of tax morale than them.

Table 1: The experimental design

	Tasks
Part 1	•Risk attitude elicitation (Holt and Laury, 2002) • Tax morale assessment (opinion question 4)
Part 2	Income reporting decisions (Round 1/2 or Rounds 1/2/3)
Part 3	Not concerned here
Post-experimental questionnaire	•Socio-demographic features • Qualitative assessments difficulty of the experiment, (opinion about real life reference groups)

index of each subject's tax morale that could be further used as the basis for the building of reference groups in Part 2.
The elicitation of each subject's level of tax morale was made using a single item. The subject was provided with two opposing views and had to select her position between these views on a 7-point Likert scale:
Some people think that not declaring all of his income to the tax authority is fully legitimate when given the opportunity (score: 0). Others think that accurately reporting income to the tax authority is a civic or moral duty (score 7).
Where do you consider yourselves in the score ranking?

For our experimental purpose to remain hidden at this stage, it was important not to reveal that our interest was in tax morale. So the subjects were actually faced with 8 similar scenarios on different topics (environment, liberalization, competition...), among which taxation (Item 4), and asked to state their position on each of them.

4.2 Part 2

For the sake of realism, we wished to test our model in a rather realistic tax setting, with an endogenous probability of audit and a redistribution process through the funding of a public good. As shown in the model, both mechanisms can be expected to be favorable to tax compliance, by creating interdependence between the taxpayers. For several reasons[7], they were introduced together in the experiment, instead of separately as in the model. The resulting "realistic" treatment will be denoted T2 in the following. To be able to disentangle the impact of information from that of interdependence between taxpayers, we also introduced a theoretically standard "baseline" treatment, denoted T1, with an exogenous probability of audit and no redistribution. Now, as regards information about

[7]Financial and time constraints obviously played a role in the choice of this design component, which precluded us from disentangling the influence of the endogenous probability from that of redistribution. But this is not a huge concern here, since both components contribute to tax compliance in the same direction, and testing each component separately was not a priority.

others' reporting decisions, four informational decision settings were introduced in each treatment T1/T2, allowing us to investigate the impact of 2 kinds of information on income reporting decisions, while controlling for the order in which information was provided. Provided information was either the average income reporting value within the subject's whole experimental group (denoted "average information" hereafter), or the average income reporting value within a given subgroup chosen by the subject (denoted "reference group information" in the following). In the following, we denote A, B, C, and D these 4 decision settings, which are each characterized by a different informational sequence.

In decision settings A and B (resp. C and D), the individuals had to make 3 (resp. 2) income reporting decisions. In all decision settings, the first income reporting decision was made with no information, while the subsequent one(s) (was) were made after being given a piece of information. In both decision settings A and B, pieces of information were given separately and an income reporting decision was made after each information. By contrast, in decision settings C and D, pieces of information were given at the same time, and only one income reporting decision was made after that. To control for information order effects, the order in which "average" and "reference group" information was provided in Rounds 2 and 3 (resp. Round 2) was counterbalanced between A and B (resp. C and D). The fact that in all decision settings, the income reporting decision with no information came first made it possible to collect and gather Round 1 behavioural data to be used as provided information in Rounds 2 and 3.

Our two-treatment design allowed us to run two kinds of data analysis. First, the comparison of reported income across informational decision settings A, B, C and D in treatment T1 allowed us to get insights into the pure effect of "average" and "reference group" information on tax behaviour[8]. Second, the comparison of reported income across the two treatments T1 and T2 in each informational decision setting A/B/C/D allowed us to get insights into the pure effect of interdependence between taxpayers on tax behaviour.

The main features of our experimental design (similar for each treatment T1 and T2) are presented in Table 2 below.

Until now, we have just pointed out the distinction between the two kinds of information displayed in the experiment, namely the "average information" and the "reference group information". It is now time to present the way these kinds of information were built in the experimental design, using behavioural data collected during Round 1. What we call "average information", and is faced by a given subject in either Round 2 or Round 3, corresponds to the value of the income reported, on average, by all the members of her group, except her, in Round 1. The "reference group information", faced by a given subject in either Round 2 or Round 3, corresponds to the value of the income reported in Round 1, on average, by all the members of the subgroup she chose (in case she chose one). Now, the reason why we chose to define the reference (sub)groups on the tax morale criterion is twofold. First, tax morale is rather easy and quick to assess quantitatively at the individual level. This assessment

[8]Of course, the postulate here is that any change in income reporting behaviour after being provided with a piece of information, all other things being equal, is due to the provision of information.

Table 2: Fiscal game design

Decision setting / Round i	A	B	C	D
Round 1	No information			
	Decision: income reporting (1)	**Decision:** income reporting (1)	**Decision:** income reporting (1)	**Decision:** income reporting (1)
Round 2	**Info:** average reported income	**Before info:** choice of the reference group **Info (or not):** reference group reported income	**Info:** average reported income + **Before info**: choice of the group **Info (or not):** reference group reported income	**Before info**: choice of the reference group **Info (or not):** reference group reported income + **Info:** average reported income
	Decision: income reporting (2)	**Decision:** income reporting (2)	**Decision:** income reporting (2)	**Decision:** income reporting (2)
Round 3	**Before info:** choice of the reference group **Info (or not):** reference group reported income	**Info:** average reported income		
	Decision: income reporting (3)	**Decision:** income reporting (3)		

was actually performed in Part 1 and used in the following to classify the subjects and served as an informational input. Second, and most importantly, the fact is that real life taxpayers are interested in others' declared tax morale as well as in others' actual tax behaviour. More specifically, they appear to be concerned with the possible gap and distortion between the two, and they may change their own behaviour after observing others' behaviour, especially when this behaviour is not in line with their self-declared tax morale[9]. We used this empirical observation to build the "reference group" part of our experimental design. The subjects were asked whether they wished to get information about the average tax behaviour of a subgroup of subjects, based on the level of their self-declared tax morale index, before being invited to report their income.

To be more specific, each subject was given the choice to get (or not) information about the average reported income of those fellow subjects whose level of tax morale was either the same as hers, or lower/higher than hers. She thus had 4 options including the refusal to get any information. Even though the criterion on which the subgroups are based (that is, tax morale) was not chosen by the subjects, they could either choose their subgroup of interest (if they had one among those suggested) or choose not to receive any information (if they were not interested in any of the 3 subgroups at their disposal). Thanks to this four-option menu, subgroups that are chosen by the subjects can be fairly viewed as genuine "reference groups" in the context of the experiment.

We now present the hypotheses that could be tested thanks to the experimental study.

4.3 The main hypotheses

The theoretical model allowed us to elaborate several predictions, most of which can be tested using our specifically-designed experimental study. Moreover, the specific features of the experimental design allow us to investigate some additional hypotheses.

Even though our experimental design does not allow us to disentangle the influence of the audit probability and the influence of the public good, since both ingredients are introduced together in Treatment T2, we are still able to investigate whether the more realistic fiscal setting T2 induces a different income reporting behaviour than the more basic framework (with fixed audit probability and no redistribution of taxes) T1.

Following Predictions P2 and P3, our hypothesis here is actually that some difference should occur between behaviour in T1 and T2, following the idea that citizens are more likely to pay taxes and report their income in full when they get some benefit from the taxes they pay, and the audit probability they face is not exogenous but depends on their income reporting behaviour.

[9]Several recent social and political movements, everywhere in the world, suggest that laypeople are very sensitive to the frequent distortion between the high level of morality publicly stated by political and so-cial elites, and their actual misconduct when they are caught red-handed behaving dishonestly. Moreover, their outstanding position gives these people (such as politicians, very wealthy people, popular singers and actors, etc.) the expected duty to set an example. Bad behaviour on their part alleviates the moral burden and responsibility of each other individual, and opens the way for laypeople to misbehave in their turn. As regards tax behaviour, the observation of widespread tax evasion, especially among those people who are expected to behave in an irreproachable way is often viewed by people at the grassroots as a good reason to evade taxes in their turn ("why should I make the effort to comply, when those who should be the most compliant do evade?"). As a moral failure, tax evasion among the elites contributes to weaken the injunctive norm toward tax compliance. By also changing the descriptive norm, it may lead other peo-ple to change their behaviour toward tax evasion too.

H 1. *The level of income reporting should be higher in T2 than in T1.*

As regards the influence of tax morale on income reporting behaviour, our model suggests that a higher level of tax morale should enhance tax compliance.

H 2. *The higher the level of tax morale, the higher the level of tax compliance.*

In our experiment (but not in the theoretical model), risk attitude is introduced. Since tax evasion is a risk taking behaviour, our expectation is that risk aversion should play against tax evasion.

H 3. *The higher the level of risk aversion, the lower the level of tax evasion.*

Now we come to the core of both the theoretical model and experimental study: the influence of information about other taxpayers' behaviour on one's behaviour. Our experimental study was actually designed to test the descriptive accuracy of the core assumption made in our model that the taxpayer's present income reporting decision x_i is affected by the difference between her previous income reporting decision and the previous income reporting decision of others ($\Delta_{i,k,t-1}$), or, to put it in a nutshell, to test whether α_i is significantly different from 0 or not. Then, if it turns out that α_i is significantly different from 0, our experimental design further allows us to determine the sign of α_i, thus to investigate the way (and direction) the social norm affects the taxpayers utility function. We actually expect social norms to enter differently the utility function depending on whom the individual is led (or chooses) to refer to (either the whole group of taxpayers or people who have higher, lower or the same degree of tax morale) when making her decision.

The design of the experiment allows us to determine the sign of α_i by observing the sign of $\frac{\partial x_i}{\partial \Delta_{i,t-1}}$ as suggested by the comparative statics of our model. Each of those participants who are interested in the behaviour of the same reference group observes a different $\bar{X}_k$ and makes a different reporting decisions x_i. Investigating the correlation between $\Delta_{i,k,t-1}$ and x_i across subjects should give us some insights into how social norms enter the utility function.
We expect differences in behaviour to occur depending on the informational setting, and subjects to change their income reporting decision after receiving information about other subjects' income reporting decisions (either the average reported income of the entire group or the average reported income of a sub-group of subjects chosen by the taxpayer). On the contrary, we expect no change in behaviour for those subjects who do not want to get information about any reference groups behaviour.

H 4. *Income reporting changes after receiving information about others income reporting*

H 4a. *After getting information about average income reporting, the taxpayers income reporting tends to come closer to that average value, thus to move downward (resp. upward) for those taxpayers whose income reporting was higher (resp. lower) than average.*

H 4b. *After getting information about the average behaviour within the reference group she chose, the taxpayer's income reporting tends to get closer to that "reference group" average value, thus to move downward (resp. upward) for those taxpayers whose income reporting was higher (resp. lower) than average.*

H 4c. *Income reporting does not change for those taxpayers who do not wish to get any "reference group" information.*

Finally, we expect no differences across groups within each treatment in Round 1, as well as no differences in behaviour in Round 2 across groups C and D, and no difference in behaviour between A in round 2 and B in round 3 (resp. between A in round 3 and B in round 2). Moreover, we expect no difference across treatments T1 and T2 as regards the evolution of behaviour after getting information.

5 The experimental results

5.1 The experimental procedures

The experiment was programmed using the z-tree software. It was conducted in February and March 2016 at Experimental Economics Laboratory at Ecole Polytechnique with 240 participants divided in 12 sessions. The experimental subject base used for experiments at Ecole Polytechnique was contacted through mailing. The resulting subject pool is obviously not a representative sample of the French population, but it is more diverse than standard lab experimental subject pool, and rather appropriate for our purpose.

As shown in Table 4 below, the main characteristics of our subject pool are tightly related to the composition of the population from which it is drawn: Most subjects are students (53%), and most students are "Polytechniciens" (40% of the total subject pool), who are not standard students, since they earn money and already pay taxes from the age of 20[10]. Other students are Master graduates (who usually earn little money) and PhD students at Ecole Polytechnique (13%). Most of them are men. Administrative staff comes second (34% of the whole subject pool), the main part of which is female[11]. Finally, a number of permanent researchers, both male and female, took part in the experiment (13%). This mix of features result in a specific socio-demographic picture, with more men than women (58% vs. 42%), rather young subjects (45% of subjects less-than-24 years old, only 29% subjects of more-than-35 years old), and a 30% of the subjects who are very low income earners (only 27% of the subjects earn more than 26700 euro per year. However, given the purpose of our study, the most important, and reassuring, points are that 1) a huge majority of our subjects (87%) regularly earn a living, so they have already paid taxes in their real life, 2) nearly half of our subject pool is made of people who are no longer students, who are older than students, and who have had to pay taxes for years. Finally, note that 2/3 of the subject pool had already taken part in an experiment before ours, which is not surprising given the way experiments are organized (from a potential subjects' list) nowadays.

[10] Ecole Polytechnique is the best (and most famous) engineering Grande Ecole (graduate school) in France. One of its main specificities is that it is a public military school, the students of which (the "Polytechnicians") are military public servants, who get paid by the French State during their 5-year graduate program.

[11] A huge majority of Polytechniciens are males, and, most of all, all of them have a high scientific and computational bent of mind, which may induce them to behave in lab experiments in a very specific way (as in pure mathematical games). So it was thus important that our subject-pool include more diversity in terms in rationality and cognitive patterns, for the results of the study to present decent external validity (even though external validity is not our main purpose here).

Table 3: Subjects per group and treatment

Treatment	T1				T2			
Decision setting	A	B	C	D	A	B	C	D
Number of sessions (total=12)	2	2	1	1	2	2	1	1
Number of subjects (total=240)	40	40	20	20	40	40	20	20

All the participants-to-be registered for one of the proposed slots, did not have any information at this stage about the content of the experiment[12]. The participants were each allocated to a 20-subject session, characterized by the combination of two features, namely the underlying treatment (T1 or T2) and the decision setting (A, B, C, or D). As shown in Table 3, we had 12 sessions of 20 subjects in total: for each treatment, we conducted 2 sessions of 20 subjects (resp. 1 session of 20 subjects) for each A and B group (resp. for each C and D group).

In each session, the experiment included 3 parts as well as a post-experimental questionnaire. Only Part 2 was different across sessions, depending on both the treatment and the informational decision setting. The whole experiment was calibrated to take approximately 45 mn. On average, it lasted one hour.

A show-up flat-fee of 5 euros was given to all participants. An incentivized payment procedure was also introduced in Part 2 to make the income reporting task procedure more real[13]. At the outset of the session, in the general instruction-sheet, the subjects were informed that they would earn some money in the experiment, an amount between 5 euros (the show-up fee) and 20 euros (resp. 23,50) in Treatment 1 (resp. Treatment 2). No further detail was given at this stage. At the outset of Part 2, the subjects were further informed that, at the end of the whole experiment, one of their Part 2 reporting income decisions would be selected at random to be played for real. They were also reminded to make their decisions as they would do in real life facing such income reporting decisions. The final earnings of each subject thus depended on both her behaviour (either full compliance or partial/complete tax evasion) and the random draw of audit based on its probability[14]. The participants were paid in cash in a separate room at the end of the experiment. The average earning (including the show-up fee) was 18,46 euros

Now, as regards the conduct of a session, each of the 20 subjects was welcomed in front of the experimental room and signed a registration form before entering the room. She was then invited to take a seat at a given, selected at random, computer station. The subjects were not allowed to talk

[12]Since our design required 20-subject sessions, we had to ensure the presence of 20 people per session, no matter what. So we used overbooking to avoid the deleterious consequences of possible defections. Supernumerary participants who showed up received the 5 euro flat-fee.

[13]Decisions made in the first and third parts of the experiment were not incentivized.

[14]Remember that, in Treatment 2, the probability of audit was not exogenous but depended on both the subject's behaviour and the average behaviour in her session. The actual probability of audit was calculated by the computer program based on the "probability table" and applied to determine whether the subject would be audited or not.

with each other, and they did not get any direct information about anybody else's characteristics or behaviour[15]. However, by construction[16], the experimental design helped the 20 subjects of a session to feel as the members of a single tax community. On their computer table, the subjects found a consent form which they had to fill in first. Then they were given time to read a document with general instructions, before we let them listen to a recorded message, with the same instructions. After that, they could call on us for some clarification if necessary[17]. General instructions did not say a word, either about the aim of the experiment or about the further tasks to be completed. The subjects were just informed that the experiment would involve several parts and that they would have to make economic decisions. They were invited to turn off their mobile phone and put it away and to double-click on their computer to start the experiment.

For all the subjects, the first part of the experiment started, with no additional documents, with a lottery game meant to assess their risk attitude based on the "Holt and Laury" (HL) procedure. The amounts in the lotteries were chosen to be of the same order of magnitude as those manipulated in the tax part of the experiment (Part 2), in which all the subjects started with a 1000 (tokens) income. In the HL procedure, the subjects were faced with a 11-line table involving a safe lottery, called Option A (1000, p; 800, (1-p)) and a riskier one, called Option B (1925, p; 50, (1-p)), with p increasing (from line to line) from 0% to 100% with constant step of 10%. On the first line, Option A stochastically dominates Option B since 800 ¿ 50. On the last line, Option B dominates Option A since 1925 ¿ 1000. So a basically rational subject should switch from Option A to Option B between the second and ninth line depending on her level of risk aversion, with risk aversion being all the stronger since the switch point is higher in the table. The switch point gave us a basic index of risk attitude between 1 and 10, with risk neutrality at 5 and risk seeking for lower values and risk aversion for higher values. On the whole, this index follows roughly the expected pattern, with low risk seeking (8%) and large risk aversion (45%). Two specific features deserve to be mentioned, though (see Table 4). First, the large rate of risk neutral subjects (25%), which may be due to the high proportion of Polytechniciens in the subject pool (they are prone to basic calculations rather than to intuitive choices when facing lotteries). Second, the rather high rate of inconsistent choices[18] (nearly 22%), which may be due to the presence of a number of subjects (the administrative staff) who are not familiar with lotteries and may have not understood the task.

Afterwards, following the strategy described above, the subjects faced a series of 8 pairs of opposing statements on a number of economic topics, and, on each pair of statements, had to indicate their position between the two on a 7-point scale. Only the 4th item (the tax one) was of real interest to us, since it was used to assess a basic tax morale index at the individual level. This index took values between 0 and 7, with 0 indicating the absence of any tax morale and 7 indicating absolute tax

[15]So, their anonymity was preserved, which ensures there was no direct social pressure.

[16]This was achieved through the framing of the whole experiment, as well as through several mechanisms. In particular, it was done for all the subjects in Part 2, by giving them information about the average behaviour within their session group, and giving them the possibility to get more specific average information about the behaviour of a subgroup. Moreover, for subjects in Treatment 2, the sense of being interdependent and belonging to a community was strengthened by the endogenous probability of audit and the fact of contributing to, and benefitting from, redistribution.

[17]They were told we would come to them and our communication would remain private, so that they felt free to call on us without the fear of being judged by other subjects.

[18]Inconsistent answers may be of several kinds, with no switching point (thus a violation of stochastic dominance at one bound), or more than one switching point.

Table 4: Sample: Descriptive statistics

Variable		Whole pool	Groups A/B	Groups C/D
Sex				
	male	58.33%	55.625%	63.75%
	female	41.67%	45.375%	36.25%
Age				
	$18-24$	45.42%	41.875%	52.5%
	$25-34$	25.42%	26.875%	22.5%
	$35-54$	17.91%	18.75%	16.25%
	≥ 55	11.25%	12.5%	8.75%
Tax morale				
	Perfect tax morale (7)	45%	45%	45%
	High tax morale (4-6)	44.58%	44.375%	45%
	Low tax morale (0-3)	10.42%	10.625%	10%
Risk attitude				
	risk seeking (score < 4)	8.33%	6.25%	12.5%
	neutrality ($4 <$ score < 6)	25.00%	26.875%	21.25%
	weak risk aversion ($6 <$score < 8)	31.25%	28.125%	37.5%
	strong risk aversion ($8 <$ score < 10)	13.75%	13.125%	15%
	inconsistent answers	21.67%	25.625%	13.75%
Income				
	income < 9700 € per year	31.67%	30.%	35%
	$9700 <$ income < 26700	41.67%	42.5%	40%
	$26700 <$ income <71000	18.75%	18.125%	20%
	income > 71000 or no answer	7.91%	9.375%	5%
Status				
	Graduates from Ecole Polytechnique	40.00%	35.625%	48.75%
	Graduate student, PhD Student, Post-Doc	12.92%	15.625%	7.5%
	Professor, researcher, Engineer	13.33%	11.875%	16.25%
	Administrative, technician, other	33.75%	36.875%	27.5%
Experience				
	not the first experiment	62.08%	60%	66.25%
	first experiment participation	37.92%	40%	33.75%

morale. Based on self-declaration, our data suggest that almost half of the population (45%) exhibit full tax morality, while only 10% of the population acknowledges to be far from tax morale.

The descriptive statistics of our subject pool are summarized in Table 4.

After the two tasks about risk and tax morale were completed, a new screen indicated "Part 2". Once all the subjects had attained this screen, the subjects were made aware that they were now going to make several tax decisions through an income reporting task. A new series of documents were distributed to provide them with instructions, which they were asked to read carefully. The first document provided them with general instructions about the tax game and the payoff they would receive at the end of the session of Part 2. A second folder contained a thorough description of the tax system and some examples, to help them understand mechanisms at work and consequences of income reporting decisions[19]. A third document presented the details of the performance-based payment

[19]The idea was to make the subjects aware that: 1) taxes are paid on reported income, but not on unreported income; 2) there was a certain risk of audit and, in case of audit, all unreported income would be uncovered, so they would end up not only paying taxes on their whole income (reported+unreported), but also paying an additional amount of taxes (a fine) on their undeclared income.

Table 5: Parameters' value

Variable	Definition	Value
R	Income	1000 tokens
π	Fine rate	1
g	Efficiency factor of the public good	1
p	Audit probability	0.3 in TR1
		$p \in [0.1, 0.5]$ in TR2 [22]

procedure[20], as well as the exchange rate, here equal to 15/1000, since all the amounts involved in the tax games were in experimental money (tokens).

In T2, the subjects were additionnally informed that the probability of audit would depend on both their own behaviour (i.e., their reported income) and their group's behaviour (i.e., the average reported income among her fellow taxpayers – the members of her experimental group). They were provided with a fourth instruction sheet, on which a table reported the value of the audit probability, as a function of these two variables (see Table in the Appendix).

The main stimuli values are given in Table 5[21]. The notations refer to those introduced in the theoretical model. For the sake of comparability, as well as to avoid any confounding factor, all the subjects were given the same income R (= 1000 tokens) in the experiment. The fine rate $\pi(= 1)$ was also identical across sessions. However, some of the parameters concern T2 sessions only: the endogenous (varying) probability of audit p and the efficiency factor of the public good g ($g = 1$ in our protocol). In T2, the audit probability p took values within interval $[0.1, 0.5]$, centered at 0.3, with $p = 0.3$ the exogenous (fixed) audit probability in T1. In T2, we introduced a basic redistribution system based on equal division, among the 20 taxpayers, of the total amount of tax collected in the first place. The subjects were informed that the amounts of taxes and penalties further collected after audits would not be included in that common pot (as in the theoretical model).

The subjects were given comfortable time (10 mn) to read the documents and call on us for some clarification if necessary. After that, the subjects were asked to read carefully, and follow the instructions, on their computer. To give them the opportunity to practice before making "real" decisions, and collect better-quality data, Part 2 started with 2 trials. We told the subjects that, after these 2 trials, further decisions would be made for real, in that they could be selected for the final payment and have real financial consequences. We also emphasized the importance of making their income reporting decisions as they would do in real life, that is, of putting themselves in the shoes of a taxpayer trying to complete her income reporting sheet. Note that, even though we introduced an explicit tax environment, we tried to use as neutral wording as possible to avoid influencing the subjects toward more or less tax compliance[23]. In each of the 2 or 3 rounds (depending on the

[20] We had to provide the subjects with a number of details and examples to ensure that the procedure was well-understood (especially in Treatment 2, in which the probability of audit was endogenous).

[21] According to the parameters given in Table 2, a risk neutral taxpayer who only cares about maximizing her financial gains is inclined to report a zero income. This is also the case for a risk averse taxpayer who exhibits a log utility function. A risk neutral taxpayer would report her whole income for any p ¿ 0.5 (unrealistic level of audit probability) which is consistent with the Allingham and Sandmo (1972) and Yitzhaki (1974)'s puzzle.

[23] For instance, in French, the word which is commonly used in the medias to refer to the tax authority is "fisc". But

decision setting A, B, C, and D), the subjects were invited to assess how much of their 1000-token income they were willing to report to the tax authority. In Round 1, the subjects made a simple reporting decision with no further information than that given in Instruction sheets, but well-aware of how the tax system worked and of the payment rule. Round 1 served as a benchmark, and also allowed us to identify the influence of several available variables (degree of morality, risk aversion and usual socio-demographic variables). In Rounds 2 and 3, information about the tax behaviour of either all or some other taxpayers of the same session was provided/proposed, following the framework presented in Section 5.1.2. supra and the timing of information delivery detailed in Table 2. The order in which average and reference-group information was provided was inverted in Sessions A and B, as in C and D. Moreover, in A and B, the two kinds of information gave rise to 2 income reporting decisions (in Rounds 2 and 3), while in C and D, they were given at the same time and gave rise to a single income reporting decision (in Round 2).

Each session ended with a questionnaire including usual socio-demographic items (e.g., gender, age, occupation, yearly income) as well as feedback questions about the level of understanding of the experiment and a number of qualitative opinion questions about tax compliance and tax morale. The subjects were also asked whether they had already participated to an experimental study in economics, and whether they had already completed an income reporting form. After that, the payment procedure was automatically implemented on each computer. Each subject saw which of her decisions had been played for real, and whether an audit was performed. Her final gain appeared on the screen of her computer. The next step was to go to the next room to get her payment individually, in cash.

5.2 Summary statistics

Table 4 presents descriptive statistics of our sample. Among the main information to be retained, let us note that the sample is almost balanced between men and women, the subjects are mainly young (70% of the sample is less than 35 years old), which implies that nearly 3/4 of the sample has a low yearly income. However, the sample is not restricted to students as nearly 50% of the sample has a permanent position. The tax morale index extracted from the answers to question 4 in the first part of the experiment shows that almost half of the population (45%) declares itself to be fully tax moral. Only 10% of the population acknowledges to be far from tax moral. The risk aversion index is fairly well distributed in the sample.

Before drawing insights from the summary statistics, we first check for differences within each treatment. We run the two-sample Kolmogorov-Smirnov test to see if the distributions of the different groups are statistically identical. In addition, we run the non parametric Wilcoxon-Mann-Whitney test to check whether the means of the distribution functions are statistically identical between groups. The results indicate that groups C and D and groups A and B are not statistically different. Based on these results, we have chosen to pool groups C and D. Next, we compare the group CD with group A and group B for each treatment. The results show that CD is not statistically different from A but statistically different from B. This result can be explained by a higher proportion of young men (students from Ecole Polytechnique) in Group C/D compared to A/B (See Table 4). Thus, for the

this word often has a pejorative flavour. So we rather chose to say "administration fiscale", which is a more neutral description of what "fisc" is.

rest of the analysis, we will consider 3 groups: A, B and C/D.

Table 6 presents a summary of income reporting. First, we observe a difference in tax income reporting between Treatment 1 and 2. To check if this result is due to differences in tax morale among treatments, we isolate the full moral agents from the others. As shown in Table 16 in the Appendix, we still observe this difference in income reporting between the two treatments when agents are fully tax moral. This tends to confirm that the difference is driven by a public good effect and/or an audit probability effect. However, we are not able to isolate one of these effects. Table 6 highlights a rather higher average income reporting in round 3 than in round 1 and 2 but more interestingly, the standard deviation is slightly lower in round 2 than in round 1 and much lower in round 3. At first glance, we can say that providing information about others' income reporting tends to diminish the gap between taxpayers' compliance behavior. It seems that subjects are sensitive to social norms since the discrepancy in income reporting tends to decrease in rounds 2 and 3.
Table 6 also provides information about the number of "deviators", that is to say, people who modify their income reporting once they receive the information, all other things being equal: α_i is non-zero for 45% of the subjects. The share of subjects who deviate from their previous reporting is fairly stable between the 2 rounds (nearly 40%) but surprisingly, among the 64 subjects who change their statement between rounds 2 and 3, 23 of them (1/3) did not change their statement between rounds 1 and 2. However, among these 23 subjects, 4 of them did not ask for or did not receive information between round 2 and 3, and for 10 of them, the information received showed a discrepancy between the information and their reported income of less than 100 tokens.
Among the 131 subjects that did not change their declared income between rounds 1 and 2, nearly half of them (65) report 1000 for each round they play. Among the whole sample, 65 subjects (27.1%) reported the maximum income during the whole game (2 or 3 rounds depending on the group). Their descriptive statistics are presented in Appendix (Table 17). These subjects are characterized by a high or full tax morale, a mainly high degree of risk aversion and they are mostly not young compared to the whole sample. Finally, the subjects who did not request any information of a particular group have a lower tax morale than the whole sample (see Table 17).

Table 7 shows whether changes in income reporting is driven by conformity or anti conformity preferences. Here, $INFO_1$ stands for the information received just before round 2 income reporting. For Group C/D it corresponds to both types of information received. Unsurprisingly, most deviation behavior (88 over 109) is motivated by a taste for conformity (in bold). Running the Chi square test confirms the dependence between the position of the first income reporting relative to the information received and the direction of the income reporting change[24]. Thus the full guy effect and the guilty feeling effect are those which are dominating to validate **H4**.

To confirm that the adjustment of income reporting depends on whether the previous taxpayer's report was above or below the income level given by the information, we compute the Spearman rank

[24]Chi square values are respectively 36.81 and 13.31 that implies rejection of independence (1%)

Table 6: Income reporting: Summary statistics

Variable	Obs	Mean	Std. Dev.	Fully tax moral Nb (%)	Changes Nb (%)	Δ^+ Nb (mean)	Δ^- Nb (mean)
Income reporting 1	240	710.92	332.583	108 (45%)			
TR1	120	642.5	390.36	46 (38.33%)			
TR2	120	779.33	345.62	62 (51.67%)			
GR A	80	791.25	308.37	41 (51.25%)			
GR B	80	718.75	301.41	31 (38.75%)			
GR C/D	80	622.75	366.37	36 (45%)			
Income reporting 2	240	712.45	324.95	108 (45%)	109 (45.42%)	58 (171.7)	51 (-188)
TR1	120	637.4	381.57	46 (38.33%)	48 (40%)	23 (207.78)	25 (-215.64)
TR2	120	787.5	234.76	62 (51.67%)	61 (76.25%)	35 (148)	26 (-161.54)
GR A	80	815.21	301.51	41 (51.25%)	28 (35%)	19 (166.74)	9 (-139)
GR B	80	712.62	299.86	31 (38.75%)	38 (47.5%)	21 (177.62)	17 (-248.23)
GR C/D	80	609.51	342.34	36 (45%)	43 (53.75%)	18 (170.05)	25 (-164.8)
Income reporting 3	160	776.32	282.28	72 (45%)	64 (40%)	28 (254.1)	36 (-142.5)
TR1	80	696.46	336.94	29 (36.25%)	30 (37.5%)	11 (242.06)	19 (-159.47)
TR2	80	856.19	184.2	43 (53.75%)	34 (42.5%)	17 (242.06)	17 (-123.53)
GR A	80	818.15	277.67	41 (51.25%)	25 (31.25%)	11 (215)	14 (-152.14)
GR B	80	734.5	282.36	31 (38.75%)	39 (48.75%)	17 (279.41)	22 (-163.36)

Table 7: Taste for divergence / convergence

	$x_{i2} > x_{i1}$	$x_{i2} < x_{i1}$
$x_{i1} > INFO_1$	13	**42**
$x_{i1} < INFO_1$	**45**	9

x_{it} is tax reporting at round t

	$x_{i3} > x_{i2}$	$x_{i3} < x_{i2}$
$x_{i2} > INFO_2$	10	**29**
$x_{i2} < INFO_2$	**18**	7

correlation coefficients. The results in Table 8 highlight both the direction (α_i) -and thus the conformity or anti conformity decision-, and the strength of the correlation between the income reported at round t and the average reported income of agents in group k. These results are consistent with those observed in public good contribution experiments that show a reciprocal behavior by subjects : *"if a subject changes his contribution from one period to the next, he adjusts it toward the previous group average. In other words, he increases his contribution if it was below the group average in the previous period and decreases it if it was above"* (see Keser and Van Winden (2000)).

Finally, Table 9 suggests that tax compliance is a persistent decision. A huge proportion of subjects who complied in the previous round also comply in the current round (around 87%). The effect is even worse for evasion as the percentage reaches 95%. Thus, we observe fairly stable types of decisions accross the sample but also within the different groups, suggesting that evasion is even more persistent than compliance.

5.3 Income reporting determinants

To determine the extent to which the income reporting can be explained by tax morale and public good provsion, we regress the income reporting without information on the variables summarized in

Table 8: Spearman correlation between round 2 tax reporting and information (either on average information or reference group information)

	Correlation $x_{i,2}$ and $INFO_1$		Correlation $x_{i,3}$ and $INFO_2$	
	$INFO_1 < x_{i,1}$	$INFO_1 > x_{i,1}$	$INFO_2 > x_{i,2}$	$INFO_2 < x_{i,2}$
Full tax moral	0.4775^{***}	0.4788^{***}	0.0612	0.2288^{*}
Tax moral	0.4239^{***}	0.3546^{***}	0.2756	0.1750
No tax moral	0.50	0.6299	0.7197^{**}	0.1081
Nb	124	88	46	84
	Correlation $x_{i,2}$ and $\bar{X}$		Correlation $X_{i,3}$ and X_{ref}	
	$\bar{X} > x_{i,1}$	$\bar{X} < x_{i,1}$	$\bar{X}_{ref} > X_{i,1}$	$\bar{X}_{ref} < X_{i,1}$
Full tax moral	0.5767^{***}	0.3206^{***}	0.5134^{***}	0.5416^{***}
Tax moral	0.4191^{***}	0.2161	0.3275^{***}	0.5697^{***}
No tax moral	0.5275^{***}	0.6809^{**}	0.3012	0.3766
Nb	96	144	131	79

$INFO_1$ is information received just before step 2 tax reporting

$INFO_2$ is information received just before step 3 tax reporting

$\bar{X}$ is the average reported income of the whole sample of the session declared at round 1

$\bar{X}_{ref}$ is the average reported income of the reference group chosen by the subject declared at round 1

Table 9: Persistance checks

	Complied in t	Evade in t
Complied in $t-1$	86.9%	13.1%
Evade in $t-1$	4.37%	95.63%

(a) All sessions/All treatments ($t = 2, 3$)

	Complied in t	Evade in t
Complied in $t-1$	87.8%	12.2%
Evade in $t-1$	8.63%	91.37%

(b) Groups A and B

	Complied in t	Evade in t
Complied in $t-1$	73.68%	26.32%
Evade in $t-1$	0%	100%

(c) Group C/D

Table 3. We find that the tests for heteroskedasticity are significant, and therefore correcting for heteroskedasticity and estimating by feasible GLS helps improving estimation efficiency. The resulting coefficient for OLS and GLS regressions is similar, and the only difference between the regressions is that GLS improves the significance of age 35-55. Therefore we report only the results for GLS. Table 10 provides detailed estimation results with GLS for various model specifications. The results are expressed in units of tockens. The amounts correspond to the variation with respect to a reference behavior of a male student from Ecole Polytechnique, aged between 18 and 24, fully tax moral and risk neutral. Treatments and sex are treated as dummies while groups, tax morale, risk aversion, age, status and income are treated as categorical variables. The benchmark works for Treatment 1 and Group A.

Results show that tax morale is highly significant, but surprisingly, risk aversion does not appear to be significant for income reporting, except for low risk aversion (RA3). Compared to fully tax moral

agents, being partially tax moral tends to decrease income reporting by 130 (13 % of the total income) while it amounts to 160 for no tax moral taxpayers. This shows that **H1** is supported by data.
Results also confirm that treatment matters in the reporting income decision. Belonging to treatment 2 increases income reporting by almost 100 compared to Treatment 1. The benefit due to the tax contribution to the public good provision and/or the impact of tax cheating on the audit probability tends to limit tax cheating. Therefore, **H2** and/or **H3** are supported by the data. Due to the construction of the treatments, we are not able to disentangle the effect of public good redistribution from the effect of audit probability. However, we observe that a more realistic situation implies a lower level of ax cheating. This confirms that a basic theoretical model based on pecuniary concerns a la Allingham and Sandmo (1972) cannot capture all the determinants of the taxpayer compliance behavior.
Finally, income reporting depends on age and sex: young subjects tend to declare less since older subjects report 150 more than younger taxpayers. Women declare more than men (around 100 more tokens). Neither Income nor Status is significant in determining reported income. This can be explained by the fact that the Income or Status variables tend to represent the same type of characteristics that can also be partially captured by the "AGE" variable. Thus, in what follows, we drop the INCOME and STATUS variables.
The significant effect of the group to which subjects belong implies that we will not be able to ignore the group variable when determining the effect of information on tax compliance.

5.4 The information effect

To determine whether social norms through information dissemination can influence income reporting decisions, we isolate the effect of information given to participants by analyzing the impact of the reported income gap on the change in tax reporting between rounds.

We specify a linear regression for Δx_i that characterizes the change in taxpayer reporting, which is modeled as dependent on explanatory variables and on an unobserved component as detailed in the following equation:

$$\Delta x_i = \beta_0 + \beta_1 \Delta INFO_{i,k} + \beta_2 Y_i + \varepsilon_i \tag{3}$$

Where $\Delta INFO_k = x_{is} - \bar{X}_k$ is reported income gar, i.e the gap observed by the taxpayer between her income reporting at round s and the average income reporting of the group k in round 1. Δx_i is the difference in income reporting between the round after receiving the information (round 2 or 3) and one of the rounds before receiving the information (round 1 or 2).
Again we compute GLS regressions because of significant tests of heteroskedasticity with OLS regressions.

Table 11, columns (1) to (4), highlights the effect of the information received (either at round 2 or 3 depending on the group) taking round 1 as the benchmark. We leave aside the order effects by focusing on the nature of the information: either information about the whole group (columns (1) and (2)) or about the reference group chosen by the taxpayer (columns (3) and (4)). More precisely, we have $\Delta x_{it,av} = \{x_{it} \mid \overline{X}\} - x_{i1}$ with $x_{it} \mid \overline{X} = x_{i2,av}$ for Groups A and C/D and $x_{it} \mid \overline{X} = x_{i3,av}$ for

Table 10: Reporting income with no information - round 1

	(1) Round1Income	(2) Round1Income	(3) Round1Income	(4) Round1Income
TR2	118.8***	120.9***	123.1***	111.7***
	(39.49)	(39.64)	(39.56)	(41.63)
TAXMORAL2	-129.3***	-121.9***	-127.0***	-123.9***
	(42.06)	(43.55)	(41.59)	(42.25)
TAXMORAL3	-160.4**	-149.8**	-157.9**	-142.5**
	(59.77)	(60.58)	(58.69)	(64.03)
GRB	-68.39	-58.00	-76.51	-57.95
	(44.25)	(44.23)	(45.28)	(45.04)
GRC/D	-144.9***	-149.4***	-141.5***	-140.8***
	(49.58)	(50.08)	(49.21)	(50.16)
WOMEN	98.78**	94.14**	108.1**	117.2***
	(41.26)	(41.85)	(44.87)	(40.85)
AGE2534	107.4**	118.8**	136.6	139.0**
	(49.93)	(50.55)	(84.61)	(70.28)
AGE3554	135.4***	147.3***	211.1**	143.4*
	(51.39)	(52.32)	(90.27)	(73.93)
AGE55	150.6**	156.1**	225.8**	138.1*
	(63.31)	(72.01)	(94.85)	(81.52)
RA2		125.6		
		(85.20)		
RA3		92.30*		
		(55.57)		
RA4		96.30		
		(70.59)		
RA5		66.82		
		(60.55)		
STATUS2			54.54	
			(84.15)	
STATUS3			-78.94	
			(104.89)	
STATUS4			-76.91	
			(95.1)	
INCOME2				-100.1*
				(68.09)
INCOME3				18.41
				(82.63)
INCOME4				-22.89
				(99.99)
Constant	687.3***	609.1***	681.6***	706.1***
	(52.09)	(70.07)	(58.25)	(63.86)
Observations	240	240	240	240
R^2	0.220	0.235	0.231	0.242

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
See Table 7.3 in the Appendix for a detailed definition of the variables.

Group B. Moreover, $\Delta INFO_{av} = x_{i1} - \overline{X}$ where $\overline{X}$ can be either broadcast at the beginning of round 2 or 3 depending of the groups. Similarly, $\Delta x_{it,ref} = \{x_{it} \mid \overline{X}_{ref}\} - x_{i1}$ and $\Delta INFO_{ref} = x_{i1} - \overline{X}_{ref}$ with $x_{it} \mid \overline{X}_{ref} = x_{i2,ref}$ for Groups B and C/D and $x_{it} \mid \overline{X}_{ref} = x_{i3,ref}$ for Group A. Results are presented for both the full sample (columns (1) and (3)) and for the subsample of subjects who change their income reporting between rounds, hereafter referred to as *reactive subjects* (columns (2) and (4)). The sample in column (3) is reduced to 198 subjects instead of 240 because 25 of them did not request any information and 17 received no information because they requested information that did not match any of the participants in the session[25].

Columns (5)-(8) stand for the changes in income reporting between two consecutive rounds based on the gap between the information received at the beginning of the round and the income reporting made in the previous round. Thus $\Delta x_{it,av} = \{x_{i2} \mid \overline{X}\} - x_{i1}$ for Groups A and C/D and $\Delta x_{it,av} = x_{3t} \mid \overline{X} - x_{i2,av}$ for Group B. Concerning the information from the reference group we have, $\Delta x_{it,ref} = \{x_{i2} \mid \overline{X}\} - x_{i1}$ for Groups B and C/D and $\Delta x_{it,ref} = x_{3t} \mid \overline{X} - x_{i2,av}$ for Group A.

Results from Table 11 highlight a significant effect of the gap between the reported income and the information received on the reported income of others on the change in income reporting relative to the first round (without social information). The adjustment is stronger when information is received on the average reported income of the whole group than on the average reported income of the reference group chosen by the taxpayer. In the first case, a positive difference of 100 tokens (the subject reported 100 tockens more than the average) implies a decrease in the reported income of 24 while in the second case, the response is only 19. These reactions are more than doubled when we focus only on the reactive subjects. The sign of the response implies that α_i in our theoretical setting is positive: taxpayers like to conform to others. This highlights either a *fall guy* effect (**HA**.**b**) (reporting less when observe that others report less than we do) and a *guilt feeling* effect (**H4**.**c**) (reporting more when we observe that the others report more than we do).

Belonging to Group B appears to be significant when considering the reference group information. This means that Group B subjects tend to adjust their reporting (49 tokens) more than subjects from group A and C/D. The effect is still significant for reactive subjects to a greater extent (97). This points out an order effect regarding the delivery of the reference group information. When this information is delivered first, subjects tend to adjust more than when this information is delivered second or simultaneously with the average information about the whole group.

The difference observed between reporting reactions according to the information provided leads us to further analyze the choice of the "reference" group. Specifically, Table (12) shows that most of the information requested (for nearly 3/4 of the subjects) concerns subjects who are equally or less tax moral than themselves. It can be argued that subjects who request information about the income reporting of the less tax moral subjects anticipate that the information they receive will indicate a lower income reporting than their own since they know that all subjects are assigned the same income. Thus, even if they adjust their income reporting, they do so to a lesser extent than they would with information about the average income reporting of the entire sample.

[25]For example, if a subject answered "3" to the tax morale question (low tax morale) and asked for information about taxpayers who reported being less tax moral than him, in the case where none of the subjects answered less than "3" to the tax morale question, he would not receive information about the amount of income reported. Instead, he was told that none of the participants matched the requested characteristics.

The results in columns 5 through 8 confirm that the reference group information has a much smaller effect on changes in income reporting than information about the average group. The changes are also slightly smaller than those that occur when income without information is considered as the benchmark income. It may be because some of the changes are the result of changes between round 3 and 2, and subjects who have already changed their income reporting between rounds 2 and 1 only marginally readjust their report based on the new information received.

Table 13 decomposes the information effect by rounds of the game. Specifically, in column (1), we observe the determinants of the change in income reporting between round 2 and round 1. We have $\Delta x_{i,21} = x_{i2} - x_{i1}$ and $\Delta INFO_1 = x_{i1} - \overline{X}_k$. Here, $\overline{X}_k$ represents the information received at the beginning of round 2, if any. It can be either the average income reporting of the entire sample or the average income reporting of the reference group. Column (2) only considers group A and B in order to compare the results with the next column. Column (3) corresponds to the changes between round 3 and 2 with $\Delta x_{i,32} = x_3 - x_2$ and $\Delta INFO_2 = x_{i2} - \overline{X}_k$. In this case, $\overline{X}_k$ represents the information received at the beginning of round 3, if any. The reduced sample results from the fact that group C/D receive all the information in round 2 and play only 2 rounds. The results show a stronger effect on changes in income reporting between rounds 3 and 2 than between rounds 2 and 1. This is somewhat surprising because one would expect the larger adjustment to occur after the first delivery of information, while the second adjustment is more marginal. To further understand the mechanisms, we split the sample in two: those who receive an information higher that their income reporting and those who receive an information lower than their tax income reporting. The results are quite surprising and explain our first puzzling result. In round 2 those who react to the information received are those who declared more than the averange in round 1. And they decrease their income declaration. No statistically significant change (non-significant results and very low coefficients) is observed for those who declared less than the average in the first round. In the third round, the effect is the opposite. The subjects who react are those who were big evaders, but the accumulation of signals about their level of evasion makes them reduce their level of tax evasion. Finding that they reported 100 tockens less than the average, they increase their income reporting by 27 tockens. The result is not significant for low evaders. Again, the reduced samples are due to the fact that some subjects do not request any information about the reported income of a particular group and some of them do not receive any information even if they do request it because no subject matches the characteristics of the information they request.
In each case, we observe a significant effect of the gap between the information received and the subject's income reporting on his change in income reporting between two rounds. The effect is stronger when considering the final versus the first report. This may be explained by a smoothing effect resulting from attempts to converge on some sort of social "normality" for tax evasion. This supports the idea that, with the exception of agents who are fully tax moral and declare their whole income at each round, agents are not inclined to pay "instead of others" and adopt "conformity" behaviors ($\alpha_i > 0$).

Table 11: Income reporting variation after both types of information : full sample versus sub sample of reactive subjects

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Average income info		Ref income info		Average income info		Ref income info	
	$\Delta x_{i,av}$	$\Delta x_{i,av}$	$\Delta x_{i,ref}$	$\Delta x_{i,ref}$	$\Delta x_{i,av}$	$\Delta x_{i,av}$	$\Delta x_{i,ref}$	$\Delta x_{i,ref}$
$\Delta INFO_{av}$	-0.240***	-0.585***			-0.197***	-0.525***		
	(0.0354)	(0.0706)			(0.0325)	(0.0734)		
$\Delta INFO_{ref}$			-0.190***	-0.479***			-0.175***	-0.431***
			(0.0307)	(0.0647)			(0.0313)	(0.0724)
TR2	17.86	-10.71	15.36	16.39	16.53	4.325	8.823	4.702
	(21.71)	(40.46)	(20.20)	(38.14)	(19.66)	(39.61)	(20.25)	(42.97)
GRB	-10.67	-14.03	-49.47**	-97.64**	-2.216	1.487	-23.63	-44.69
	(26.43)	(49.15)	(24.67)	(48.72)	(23.93)	(48.83)	(24.70)	(59.76)
GRC/D	-31.29	-18.30	-10.39	-5.077	-32.33	-30.95	16.34	50.96
	(26.06)	(50.18)	(23.85)	(44.96)	(23.61)	(48.25)	(23.85)	(55.15)
WOMEN	23.80	39.39	20.66	53.86	24.10	48.81	27.24	77.16
	(24.90)	(45.11)	(22.74)	(42.20)	(22.53)	(45.57)	(22.75)	(50.19)
TAXMORAL2	-25.54	-54.11	-8.826	-36.07	-21.73	-30.55	-7.914	-7.423
	(23.65)	(43.49)	(21.59)	(42.28)	(21.42)	(43.70)	(21.62)	(47.67)
TAXMORAL3	-34.18	-62.26	-30.80	-28.50	7.636	-11.74	-42.98	-25.09
	(37.61)	(61.04)	(36.27)	(64.85)	(34.33)	(62.53)	(36.31)	(77.18)
RA2	-76.41*	-62.43	-54.86	-2.645	-26.39	-2.125	-51.17	-20.00
	(42.98)	(74.34)	(38.99)	(65.52)	(38.74)	(70.66)	(39.03)	(71.78)
RA3	-5.591	10.15	3.958	-13.62	10.76	36.73	-1.518	-25.57
	(29.37)	(52.74)	(25.87)	(50.48)	(26.51)	(52.25)	(25.94)	(57.62)
RA4	-9.704	57.04	16.24	62.32	7.212	74.96	20.94	81.86
	(36.56)	(92.06)	(33.41)	(94.43)	(33.06)	(103.8)	(33.44)	(120.6)
RA5	-8.923	1.056	3.042	-29.43	2.754	19.30	12.24	-13.28
	(34.24)	(60.59)	(32.17)	(58.16)	(30.98)	(61.68)	(32.19)	(66.91)
AGE2534	21.11	40.45	47.70*	58.57	35.08	58.28	55.16**	73.03
	(27.40)	(47.42)	(24.87)	(50.28)	(24.74)	(48.62)	(24.87)	(58.40)
AGE3554	37.53	65.47	67.01**	62.78	16.66	55.54	77.24**	86.26
	(33.06)	(59.35)	(30.06)	(50.43)	(30.03)	(60.58)	(30.06)	(56.74)
AGE55	-27.20	-36.23	25.65	50.76	-15.71	-10.73	11.81	17.24
	(39.84)	(65.64)	(38.88)	(67.45)	(36.02)	(65.42)	(38.99)	(77.06)
Constant	21.26	18.36	-10.24	-6.297	-0.326	-29.02	-38.73	-80.55
	(35.75)	(69.52)	(32.14)	(65.71)	(32.30)	(68.41)	(32.05)	(74.52)
Observations	240	119	198	94	240	110	198	86
R^2	0.208	0.448	0.218	0.467	0.177	0.410	0.202	0.418

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 12: information about reference group required

info required	no info	similar tax morale	higher tax morale	lower tax morale
sample	10.42 %	33.75 %	16.25%	39.58%
Fully tax moral	9	49	7	43
Tax moral	14	24	24	45
No tax moral	2	8	8	7

6 Conclusion

In light of the developing literature on tax cheating, this paper has shown that, in addition to traditional pecuniary incentives, tax cheating is motivated by non-pecuniary factors, namely tax morale, awareness of contribution to the public good, and social norms. In this paper, we have shown that the diffusion of information has a significant effect on tax cheating behavior in the sense that when agents observe that they cheat more or less than the "others", they tend to conform their own income reporting decision to that of the "others". Indeed, we observe a strong significant reaction to the information they receive, and the way they react supports the idea of a taste for conformity to the social norm. We observe a weaker effect when taxpayers choose the information they want to receive. Part of the reason for this may be that when they choose what information they want to receive, they are mostly concerned with subjects who are equally or less tax moral than they are. Hence, they are less to adjust their report to a large extent.

Table 13: Sequential reporting income variation

	(1) $\Delta x_{i,21}$ Full sample	(2) $\Delta x_{i,21}$ GR A,B	(3) $\Delta x_{i,32}$ GR A,B	(4) $\Delta x_{i,21}$ GR A,B	(5) $\Delta x_{i,21}$ GR A,B	(6) $\Delta x_{i,32}$ GR A,B	(7) $\Delta x_{i,32}$ GR A,B
$\Delta INFO_1$	-0.175***	-0.147***					
	(0.0310)	(0.0411)					
$\Delta INFO_1 > 0$				-0.211*			
				(0.115)			
$\Delta INFO_1 < 0$					0.0278		
					(0.102)		
$\Delta INFO_2$			-0.220***				
			(0.0452)				
$\Delta INFO_2 > 0$						-0.0630	
						(0.0883)	
$\Delta INFO_2 < 0$							-0.274**
							(0.131)
TR2	14.34	11.57	22.96	-13.76	-14.77	15.85	55.55
	(19.67)	(24.06)	(26.09)	(31.71)	(50.43)	(23.22)	(66.09)
GRB	-44.34*	-49.47**	10.50	-50.67*	-52.54	-37.53	91.55
	(24.33)	(23.87)	(26.06)	(30.22)	(45.31)	(23.09)	(64.05)
GRC/D	-31.01						
	(22.62)						
WOMEN	12.92	10.31	36.97	-6.164	72.07	5.642	73.07
	(22.40)	(27.79)	(29.88)	(32.94)	(61.23)	(25.12)	(79.03)
TAXMORAL2	-13.10	-17.47	-32.04	-10.68	-50.23	-27.06	-60.97
	(21.17)	(26.85)	(29.01)	(31.91)	(53.35)	(24.04)	(86.34)
TAXMORAL3	-42.99	-66.82	-16.67	-124.6**	-3.341	-28.39	-73.83
	(34.76)	(42.89)	(44.49)	(57.90)	(73.50)	(46.64)	(102.3)
RA2	-62.96	-153.5***	-12.43	-171.8**	-124.0	-36.72	35.73
	(38.41)	(52.01)	(58.71)	(65.30)	(94.89)	(49.24)	(190.0)
RA3	29.22	2.313	-69.82**	8.392	9.944	-50.50	-147.2*
	(26.05)	(31.34)	(34.34)	(41.00)	(54.21)	(31.63)	(85.60)
RA4	19.72	-5.801	-23.30	11.65	-22.30	6.027	-151.0
	(32.88)	(40.33)	(42.21)	(48.82)	(82.72)	(37.19)	(121.4)
RA5	4.019	-14.37	-10.70	-23.06	7.318	-16.76	15.85
	(31.94)	(37.89)	(38.11)	(43.02)	(86.77)	(32.86)	(102.0)
AGE2534	32.61	-0.630	32.83	34.85	-51.53	29.73	-4.755
	(24.53)	(29.35)	(31.98)	(34.81)	(55.31)	(27.09)	(90.72)
AGE5554	55.35*	38.01	11.59	47.00	47.48	40.51	-29.33
	(29.88)	(36.56)	(39.31)	(43.27)	(77.68)	(32.95)	(113.7)
AGE55	-21.56	-14.25	15.12	-8.633	-63.60	13.95	70.11
	(36.06)	(43.74)	(50.72)	(52.21)	(89.68)	(44.65)	(134.8)
Constant	-3.033	38.10	7.325	51.22	125.3	2.237	-5.865
	(32.09)	(38.94)	(40.93)	(53.39)	(88.89)	(39.65)	(114.6)
Observations	223	143	144	85	57	93	51
R^2	0.192	0.205	0.212	0.304	0.179	0.135	0.291

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

7 Appendix

7.1 Proof of the theoretical predictions

They maximize the following utility function with respect to x_i

$$U(x) = (1-p)u(I_{NA}) + pu(I_A) + \frac{g}{n}[(n-1)t\bar{X}_{-i} + tx_i] - F(x_i; \Delta_{i,k,t-1}, \theta_i, \alpha_i)$$

With:

$$I_{NA} = R - tx_i$$

stands for the income when non audited and

$$I_A = R - tx_i - t(1+\pi)(R - x_i)$$

stands for the income when audited.
The first order condition writes.

$$-t(1-p(x_i, \bar{X}_{-i}))u'_{I_{NA}} + p'_{x_i}(u(I_A) - u(I_{NA})) + p(x_i, \bar{X}_{-i})t\pi u'_{I_A} + \frac{g}{n}t - F'_{x_i} = 0$$

We define the function H as a function of our endogenous variable x_i and a set of parameters $(\bar{X}_k, \tau, \pi, \theta_i, \alpha_{k,i}, g, n)$ such that

$$H(x_i, \bar{X}_k, t, \pi, \theta_i, \alpha_i, g, n) = -t(1-p(x_i, \bar{X}_{-i}))u'_{I_{NA}} + p'_{x_i}(u(I_A) - u_(I_{NA})) + p(x_i, \bar{X}_{-i})t\pi u'_{I_A} + \frac{g}{n}t - F'_{x_i}$$

The second order condition gives us:

$$H'_{x_i} = 2p'_{x_i}(u'_{I_A}\pi t + u'_{I_{NA}}t)) + t^2(1-p(x_i, \bar{X}_{-i}))u''_{I_{NA}} + p(x_i, \bar{X}_{-i})t^2\pi u''_{I_A} - F''_{x_i} < 0$$

Since we have assumed $p''_{x_i} = 0$, $p'_{x_i} < 0$, $u'' < 0$ and $F''_{x_i} > 0$.

We use the implicit function theorem to derive some comparative statics. Since the denominator is strictly negative ($H'_{x_i} < 0$), the signs of the ratios are the opposite of that of the numerator.

$$\frac{dx_i}{d\theta_i} = \frac{F''_{x_i\theta_i}}{H'_{x_i}} > 0 \tag{4}$$

$$\frac{dx_i}{dg} = -\frac{t/n}{H'_{x_i}} > 0 \tag{5}$$

$$\frac{dx_i}{d\bar{X}_{-i}} = \frac{-p'_{\bar{X}_{-i}}(1+\pi)t}{H'_{x_i}} > 0 \tag{6}$$

$$\frac{dx_i}{d\Delta_{i,k,t-1}} = \frac{F''_{\Delta_{i,k,t-1}}}{H'_{x_i}} < 0 \iff \alpha_i > 0 \tag{7}$$

fixedgiven, we can rewrite:

$$\hat{H}(x_i, \bar{X}_k, t, \pi, \theta_i, \alpha_i, g, n, p) = -t(1-p)u'_{I_{NA}} + pt\pi u'_{I_A} + \frac{g}{n}t - F'_{x_i}$$

and

$$\hat{H}'_{x_i} = t^2(1-p)u''_{I_{NA}} + pt^2\pi u''_{I_A} - F''_{x_i}$$

Which is negative for any $F''_{x_i} > 0$. For $F''_{x_i} < 0$, The marginal utility effect must dominate the marginal cost effect which reduces to:

$$\pi > \frac{F''_{x_i} - t^2(1-p)u''_{I_{NA}}}{pt^2 u''_{I_A}}$$

we deduce:

$$\frac{dx_i}{dp} = -\frac{tu'_{I_{NA}} + t\pi u'_{I_A}}{\hat{H}'_{x_i}} > 0$$

7.2 Treatment 2: endogenous audit probability

Le revenu moyen déclaré par chaque autre membre du groupe → / Mon revenu déclaré ↓	0	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000
0	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
50	43%	48%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
100	35%	40%	45%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
150	28%	33%	38%	43%	48%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
200	20%	25%	30%	35%	40%	45%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
250	13%	18%	23%	28%	33%	38%	43%	48%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
300	10%	10%	15%	20%	25%	30%	35%	40%	45%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
350	10%	10%	10%	13%	18%	23%	28%	33%	38%	43%	48%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
400	10%	10%	10%	10%	10%	15%	20%	25%	30%	35%	40%	45%	50%	50%	50%	50%	50%	50%	50%	50%	50%
450	10%	10%	10%	10%	10%	10%	13%	18%	23%	28%	33%	38%	43%	48%	50%	50%	50%	50%	50%	50%	50%
500	10%	10%	10%	10%	10%	10%	10%	10%	15%	20%	25%	30%	35%	40%	45%	50%	50%	50%	50%	50%	50%
550	10%	10%	10%	10%	10%	10%	10%	10%	10%	13%	18%	23%	28%	33%	38%	43%	48%	50%	50%	50%	50%
600	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	15%	20%	25%	30%	35%	40%	45%	50%	50%	50%
650	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	13%	18%	23%	28%	33%	38%	43%	48%	50%
700	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	15%	20%	25%	30%	35%	40%	45%
750	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	13%	18%	23%	28%	33%	38%
800	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	15%	20%	25%	30%
850	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	13%	18%	23%
900	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	15%
950	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
1000	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%

Figure 1: Audit probability

7.3 List of variables

Table 14: List of Variables

Variable	Definition
TR2	Treatment 2
TAXMORAL2	High tax moral
TAXMORAL3	Low tax moral
GRB	Groupe B
GBC/D	Groupe C/D
WOMEN	Women
AGE2534	Age between 25-34
AGE3554	Agen between 35-54
AGE55	Older than 55
RA2	risk seeker
RA3	Weak risk seeker
RA4	weak risk aversion
RA5	strong risk aversion
STATUS2	Graduate student, PhD Student, Post doc
STATUS3	Professor, Reseracher, Engineer
STATUS4	Administrative, technician, other
INCOME2	income between 9700 euros and 26700 euros per year
INCOME3	income between 26700 euros and 71000 euros per year
INCOME4	income higher than 71000 euros per year

7.4 Particular samples

Table 15: Descriptive statistics on particular subjects

Variable		over 65 subjects who reported 1000 during the whole game % of the sub sample	over 25 subjects who did not ask for reference group info % of the sub sample
Sex			
	male	31 (47.7%)	12 (48%)
	female	34 (52.3%)	13 (52%)
Age			
	$18-24$	22 (33.85%)	9 (36%)
	$25-34$	24 (36.92%)	7 (28%)
	$35-54$	12 (18.46%)	5 (20%)
	≥ 55	7 (10.77%)	4 (16%)
Tax morality			
	Perfect tax morale (7)	44 **(67.69%)**	9 (36%)
	High tax morale (4-6)	18 (27.69%)	14 (56%)
	Low tax morale (0-3)	3 (4.61%)	2 (8%)
Risk aversion			
	neutrality ($4 <$ score < 6)	12 (18.46%)	5 (20%)
	risk seeking (score < 4)	3 (4.61%)	2 (8%)
	weak risk aversion ($6 <$score < 8)	19 (29.23%)	5 (20%)
	strong risk aversion ($8 <$ score < 10)	17 **(**26.15%**)**	4 (16%)
	inconsistent answers	14 (21.54%)	9 (36%)
Income			
	income $<$ 9700 € per year	17 (26.15%)	6 (24%)
	$9700 <$ income < 26700	25 (38.46%)	13 (52%)
	$26700 <$ income <71000	16 (24.61%)	5 (20%)
	income $>$ 71000 or no answer	7 (10.77%)	1 (4%)
Status			
	Graduates from Ecole Polytechnique	21 (32.31%)	5 (20%)
	Graduate student, PhD Student, Post-Doc	10 (15.38%)	6 (24%)
	Professor, researcher, Engineer	9 (13.84%)	5 (20%)
	Administrative, technician, other	25 (38.46%)	9 (36%)

Table 16: Fully tax moral people

Variable	Obs	Mean
Income reporting 1	108	810.18
TR1	46	780.43
TR2	62	832.25
Income reporting 2	108	811.94
TR1	46	771.95
TR2	62	841.62
Income reporting 3	72	893.66
TR1	29	851.69
TR2	43	921.97

Table 17: subjects who always declare 1000

%	all subjects	TR1			TR2		
Group		A	B	C/D	A	B	C/D
Declare 1000 systematically	27.1	40	17.5	25	45	25	5
Other strategies	72.9	60	82.5	75	55	75	95

7.5 Appendix E

The tax report in round 1 is given by:

$$x_{i1} = \alpha_0 + \alpha Y_i + \varepsilon_{i1} \tag{8}$$

In round 2 the tax report also depends on the information received at the beginning of the round

$$x_{i2} = \gamma_0 + \beta(x_{i1} - \bar{X}_k) + \gamma Y_i + \varepsilon_{i2} \tag{9}$$

The difference gives:

$$\Delta x_i = x_{i2} - x_{i1} = \beta_0 + \beta_1 \Delta INFO_{i,k} + \beta_2 Y_i + \varepsilon_i \tag{10}$$

with: $\Delta INFO_{ik} = x_{i1} - \bar{X}_k$, $\beta_0 = \alpha_0 - \gamma_0$, $\beta_1 = \beta$, $\beta_2 = \alpha - \gamma$, $\varepsilon_i = \varepsilon_{i2} - \varepsilon_{i1}$.

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