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FRAMED NORMS.
THE EFFECT OF CHOICE-BELIEF INFORMATION ON TAX COMPLIANCE

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Framed Norms.
The effect of choice-belief information on tax compliance

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Abstract

Understanding the factors influencing people's choices in tax compliance decision-making is still important because tax evasion is a crucial issue for governments everywhere. This lab experiment investigates how social norms influence tax compliance behavior. We examine the effects of positive and negative empirical and normative expectations using the opinion-matching approach for measurement. According to our results, normative expectations—as opposed to empirical expectations—most strongly impact people's behavior. Surprisingly, positive empirical messages may have a negative effect, increasing tax evasion. Furthering our understanding of the causes of tax evasion, we also include a norm-following task to assess participants' propensity to adhere to norms. This study presents new viewpoints on tax compliance while replicating some established conclusions from previous research sheds new light on the interaction between tax compliance and social norms.

Keywords: Tax evasion, Social Norms, Other-regarding Preferences
Jel Classification: H26; E26; O17; D91; C92

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1 Introduction

Tax evasion is a significant phenomenon representing a difficult challenge for governments around the world. It refers to the illegal nonpayment or underpayment of taxes by individuals and businesses. Its effect results in a loss of revenue for governments, which can negatively impact public services and economic growth. According to the Tax Justice Network State (Network, 2020), "International corporate tax avoidance and private tax evasion cost nations collectively the equivalent of roughly 34 million nurses' yearly wages per year, costing nations a total of over $427 billion in lost tax revenue" (p. 4). It is easy to understand that, at least in principle, identifying strategies to contrast tax evasion and increase tax compliance represents a priority of policymakers, governments, and state agencies worldwide. Recently, the effectiveness of standard tools such as fines and audits have begun to be assessed within the framework of behavioral theories and evaluated using experimental methods both in the lab and in the field (OECD, 2017; World Bank Group, 2021). Classic enforcement instruments are based on the standard model by Allingham, Sandmo, and Yitzhaki (1972; 1974). According to this model, the decision to evade is based on the potential gains, and the related risk is based on the individual's expected utility. However, forty years of experiments (since 1978) and empirical studies on the topic have shown that using the standard model estimated coefficients generally lack statistical significance or have signs different from what the model predicts (Alm et al., 2019; Frey and Feld, 2002; Hashimzade et al., 2013). One problematic implication is that when we set the probability of an audit or the level of penalties close to that observed in reality, the model predicts that all taxpayers should evade. So much so that the question becomes why most individuals pay taxes instead of the more reasonable reason why the minority evade them (Alm et al., 2019). One of the limits of this traditional approach stems from the fact that the original model does not consider any social and relational aspects to which more recent research assigns a crucial role in the decision to comply with or not to tax legislation.

Conversely, the behavioral approach to the issue considers the impact of psychological and sociological factors (Schmölders, 1959) that may influence tax morale. This approach emphasizes the role of individual attitudes, values, and fiscal awareness in shaping agents' actions (James, 2006). Additionally, it explores how individuals' perceptions of fairness and other social and formal norms can impact tax avoidance behaviors. The behavioral approach has been tested mainly using field experiments with some positive results, for instance, manipulating social norms through messages addressed to late taxpayers (Bott et al., 2020; Hallsworth et al., 2017). However, the findings have not always been consistent. Other studies have found, in fact, ambiguous (Torgler, 2003, 2013; Wenzel, 2005; Wenzel and Taylor, 2004; Wenzel, 2007) or no effect at all (Blumenthal et al., 2001). Given the difficulties or even the impossibility of collecting complete micro-data on individual tax evasion in field experiments and their mixed results, over the last few years, the use of laboratory experiments has gained popularity (Haaland et al., 2023)[1].

[1] The interested reader may refer to Falk and Heckman (2009) and Kessler and Vesterlund (2015) to examine the limitations of field experiments thoroughly, the advantages of doing laboratory experiments, and how laboratory and field investigations might work in combination.

The first laboratory experiment to examine individual behavior on tax evasion (Tax Evasion Games or TEGs) dates back to 1978 (Friedland et al., 1978). Since that first experiment, over 130 TEGs have been published (Weber et al., 2014). According to Weber and colleagues (2014), laboratory experiments in the field of tax evasion are primarily aimed at three different goals: (1) to gather reliable data on individual tax evasion decisions (difficult to obtain in real-world settings), (2) to study the effectiveness of policy tools and (3) to test hypotheses about the cause and effect of policy interventions with a high degree of internal validity. This last aim is the same and motivates our experiment. We first developed a model to analyze the impact of social norms on an individual's compliance decision, and secondly, we tested it using data from a laboratory experiment that uses a new approach based on the social norm framework devised by Cristina Bicchieri (2005; 1997), further enriched to make it more representative of real-world situations (such as the real-effort task). As for other aspects, our experimental design is similar to that of Alm and colleagues (1992, 2017, 2019). This enables us to discuss our findings with respect to previous results that appeared in the literature.

2 Theoretical and empirical background

2.1 Social Norms

The importance of social norms in economic analysis, particularly in game theory, has been well-established for some time. The origins can be traced back to the work of Olson in 1965 and further developed by scholars like Schelling (1978), Akerlof (1980), Young (1993), and Booth (2019) in later years. When explicitly mentioned, the social norm framework used in tax evasion games finds its foundations in the work of Cialdini (Cialdini and Trost, 1998; Cialdini et al., 1991). Following this framework, social norms are defined as "rules and standards that are understood by members of a group and that guide and/or constrain social behavior without the force of laws" (Cialdini and Trost, 1998). More specifically, Cialdini considers "descriptive norms" those standards that develop out of observation and refer to how others behave in particular situations. Then he further distinguishes between "subjective norms", which relate specifically to the expectations of referent others, and "injunctive norms", which, instead, specify what should be done and constitute, therefore, the moral rules of the group. As much as this definition of social norm is widely accepted, it is way too general, making it difficult to measure. To overcome the problem of measurement, we adopt the framework defined by Cristina Bicchieri (Bicchieri, 2005) to create a novel variant of the well-known Tax Evasion Game (Friedland et al., 1978). Bicchieri's theoretical framework explains how social norms are formed, maintained, and changed. In her theory, norms are formed through social coordination in which individuals align their behavior with others to achieve a common goal or avoid negative consequences. Norms are upheld through a process of social monitoring in which individuals observe and evaluate the behavior of others and may apply sanctions or rewards in response. As individuals adjust their behavior to align with the behavior of others, this process of social monitoring can result in the formation of new norms or the modification of existing norms. In this view, social norms cease to be exogenous variables and are considered the endogenous

product of individuals' interactions. Following this, we can define three different kinds of norms, in the words of Cristina Bicchieri (Bicchieri, 2005):

- a custom is a pattern of behavior such that individuals (unconditionally) prefer to conform to it because it meets their needs;
- a descriptive norm is a pattern of behavior such that individuals prefer to conform to it on condition that they believe that most people in their reference network conform to it (empirical expectation);
- a social norm is such if the person following it believes that it exists and that a large enough part of her reference network follows it, and that they, in turn, expect her to follow that norm in the given situation in which it applies.

More specifically, using a game theoretical setting:
R is a social norm in a population P if there exists a sufficiently large subset $P_{cf} \subseteq P$ such that, for each individual $i \in P_{cf}$:

- **Contingency**: i knows that a rule R exists and applies to situations of type S;
- **Conditional preference**: i prefers to conform to R in situations of type S on the condition that:
  - (a) Empirical expectations: i believes that a sufficiently large subset of P conforms to R in situations of type S; and either
  - (b) Normative expectations: i believes that a sufficiently large subset of P expects i to conform to R in situations of type S
  - (b') Normative expectations with sanctions: i believes that a sufficiently large subset of P expects i to conform to R in situations of type S, prefers i to conform, and may sanction behavior

The extent to which followers make up a group is not universally known. People may hold varying opinions about the magnitude of the proportion of followers (Pf), leading to differences in their empirical predictions. When people follow social norms, their expectations become self-validating because they have an explanation for doing so in the form of the interaction between their empirical and normative expectations (described in conditions 2(a) and 2(b) or 2(b')).

2.2 Social Norm Measurement

Actions are typically influenced by rationality and norms (Elster, 1989). Economic theory offers different tools for measuring the rational choices of individuals. On the measurement of social norms, although their importance is recognized and the Smith - Durkheim duality (homo oeconomics - homo sociologicus) has long since been overcome, there is less agreement. Different methods capture different margins of normative expectations (Aycinena et al., 2023). The "belief survey" method asks participants to give their perceptions of how most other people would rank the appropriateness of various actions (Görges and Nosenzo, 2020). This method's reliance on subjective perceptions can introduce biases, as it assumes participants accurately understand and reflect broader social norms without direct incentives to align their responses with actual normative behaviors The "Krupka-Weber" method (Krupka and Weber, 2013)

is a belief survey method where subjects are incentivized if they rate the appropriateness of behavior as the average of others. While incentive is a strength on the one hand, on the other, it has been criticized because of the reliance on monetary incentives as a means of coordinating respondents and because while the emphasis on second-order beliefs is conceptually consistent with the concept of norms, it does not allow for the investigation of phenomena such as pluralistic ignorance. The "opinion matching" method (Bicchieri and Dimant, 2019; Bicchieri and Xiao, 2009) that we adopt in this paper has been devised to overcome some of the limitations of the previous two methods (Görges and Nosenzo, 2020). The "Opinion matching" is a two-step elicitation procedure focusing on second-order beliefs. Each subject read a message summarizing most of the subjects' actual choices (i.e., empirical information) or/and the majority beliefs about what ought to be done (i.e., normative information) in previous studies. By integrating both empirical and normative dimensions, the opinion-matching method offers a more holistic view of social norms, though it requires careful construction of scenarios to ensure that the information provided resonates accurately with participants' real-life context.

2.3 Tax Evasion Experiments and Social Norms

It is a robust finding that social norms matter for tax compliance, but it is unclear which direction. There have been, in fact, contradictory and inconsistent findings from previous field and lab studies: some positive findings, especially concerning the use of social norms typically included in messages within letters to taxpayers late in paying their taxes (Bott et al., 2020; Hallsworth et al., 2017). Other experiments have found no effects (Blumenthal et al., 2001) or have seen ambiguous effects (Torgler, 2003, 2013; Wenzel, 2005; Wenzel and Taylor, 2004; Wenzel, 2007). However, there is a widespread consensus about the fact that social information on others' tax compliance influences individual behavior (Frey and Torgler, 2007; Myles and Naylor, 1996; Traxler, 2010), although in some cases, asymmetrically and with counter-intuitive results. There is value in incorporating moral costs into taxpayer communication, and the framing of information influences tax behavior (Hallsworth et al., 2017) as demonstrated in various field experiments (Blumenthal et al., 2001; Del Carpio, 2013; Slemrod, 2016) although some other studies have shown no significant improvements (Ariel, 2012; Castro and Scartascini, 2015; Torgler, 2012). Moreover, for social norm messages, the "boomerang effect" appears to be a serious concern (Alm et al., 2019), where empirical norms showing common behaviors might backfire without a normative standard. We think that, on one hand, the cause of these contradictory results was the difficulty in clearly defining social norms in a way that makes them measurable and the significant heterogeneity of constructs used in the various experiments. This study aims to offer a clearer and measurable construct of social norms and test its effect on tax avoidance, particularly about empirical norms (referred to in other studies as descriptive norms), which have received much attention. On the other end, the normative norms, as defined by Cristina Bicchieri, that are close to the definition of subjective norms (Ajzen, 1991), have not received much attention in the field of tax compliance (Onu and Oats, 2014).

3 Experiment

3.1 Design and behavioral hypotheses

We use a 4-stage one-shot design experiment[2]. In the first stage, subjects perform a real-effort task through which they earn their income. In this respect, we follow Choo, Fonseca, and Myles (2016) in allowing for different individual-level variations in income where evasion can be accurately detected. In the second stage, each participant receives a message about the average level of contribution/evasion and other people's beliefs about the right norm to follow. After reading the message, in the third stage, the subjects must declare their earnings to be taxed in a framed environment. The disclosure and the amount declared are completely voluntary and under the control of the individual participant. In the fourth stage, each individual declaration can be subject to an audit with a probability of 10%. If the participant declared less than what she earned in the effort task and is audited, she must pay a fine we set equal to twice the amount earned per 25% tax rate. We preferred to implement an income declaration task and not a tax declaration task as in other studies because we think the former procedure is closer to what happens in real-life situations (Malézieux, 2018). This tax evasion game is played between subject designs under five different conditions. In each treatment, subjects receive a different message (Table 1), as in Bicchieri and Xiao (2009) aimed at manipulating their beliefs about others' behavior and eliciting different norms. It's important to note that the message delivered to participants before filing their taxes is the only difference between the five treatments, and they include real information specifying the date of the study from which the data came to avoid deception in any way. All other aspects of the procedures stayed the same at all times. The content of the different messages is reported in Table 1. Their wording differs in terms of choice/belief and honesty/dishonesty. As for the former dimension, we report either the percentage of people that "declared" (choice) and "think it is right to declare" (belief), while the second dimension refers to the choice or the belief to declare "honestly" or "dishonestly".

Treatment	**Message**
Control (C)	-
Honest Belief (HB)	In a recent study conducted in 2019, close to 60% of participants said that people should declare the correct amount of income[3] .
Honest Choice (HC)	In a recent study conducted in 2016, close to 60% of participants declared the correct amount of income[4]
Dishonest Belief (DB)	In a recent study conducted in 2020, close to 60% of participants said that people should sometimes evade taxes[5]
Dishonest Choice (DC)	In a recent study conducted in 2016, close to 60% of participants declared less than the correct amount of money[6]

Table 1: Social Norm Messages randomly shown to the subjects

[2]Pre-Registered in AsPredicted, 112778.

The general questions we try to answer refer, first, to whether eliciting social norms impacts tax compliance and, secondly, to the possibility of differential effect when the norms are framed in terms of *normative expectations* (honest or dishonest beliefs) or *empirical expectations* (actual honest or dishonest choices). Let's denote with PE_k the percentage evaded in the treatment $k \in \{C, HB, HC, DB, DC\}$ where $E_k = earnings - declaration$ and $PE_k = \frac{evasion}{earnings} * 100$. We test the following behavioral hypotheses:

- H_{1a}: $PE_C > PE_{HB}$
- H_{1b}: $PE_C > PE_{HC}$

We expect that, compared with the control treatment (C), messages with honest empirical (HC) and normative expectations (HB) will reduce tax evasion.

- H_{2a}: $PE_C < PE_{DB}$
- H_{2b}: $PE_C < PE_{DC}$

Symmetrically, we expect that messages of dishonest empirical (DC) and normative expectations (DB) increase tax evasion as a percentage of what is earned when compared to the control treatment (C). When in previous studies, injunctions (the group's preferences and dislikes resembling normative expectations in our experiment) are presented in either an approval or disapproval frame, there is an increase in taxes paid (Alm et al., 2019; Coleman, 1996) although in some cases no effect has been recorded (Blumenthal et al., 2001) and among various types of social norms, personal norms (individual anticipations regarding proper behavior or ethical principles) exert a significantly greater influence (Bobek et al., 2013). That's why we hypothesize that:

- H_3: $PE_{DB} > PE_{HB}$

The evasion percentage in the dishonest belief treatment (DB) is higher than in the honest belief treatment (HB). From previous studies, we know that when individuals are exposed to the "good example," their behavior does not change significantly, but, on the contrary, it worsens when they are exposed to the "bad example" of previously observed lower rates of compliance (Lefebvre et al., 2015). This leads us to our next hypothesis:

- H_4: $PE_{DC} > PE_{HC}$

The percentage of evasion in the dishonest choice (DC) treatment is higher than in the honest choice treatment (HC);

- H_5: $PE_{HC} > PE_{HB}$

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[3] OECD, Tax Morale: What Drives People and Businesses to Pay Tax?, 2019. Average of Rest of the World; percentage of respondents never justifying cheating on taxes

[4] J. Alm et al., 2016. Honesty or dishonesty of taxpayer communications in an enforcement regime. Data from Table 5: "Official audit policy not announced", actual compliance rate at 10% audit rate. Exact percentage: 57.6% compliance

[5] M. Ahmad et al., 2020. The determinants of tax morale: Survey evidence from undergraduate students. Question: Tax evasion is ethical if tax rates are too high. The percentage of people indicated "agree". Exact percentage: 59.8% (NACS treatment)

[6] J. Alm et al., 2016. Data from Table 5 "Official audit policy announced" actual compliance rate at 10% audit rate. Exact percentage: 41.6% compliance.

The percentage of evasion in the honest choice (HC) treatment is higher than in the honest belief treatment (HB);

- H_6: $PE_{DC} > PE_{DB}$

The percentage of evasion in the dishonest choice (DC) treatment is higher than in the dishonest belief treatment (DB).

3.2 Procedures

The experiment was carried out at the CentERlab of Tilburg University. We enrolled 130 subjects through the Sona system. Data collection occurred during five sessions between December 7 and 14, 2022. The experiment was programmed with oTree Studio (Chen et al., 2016). Participants are randomly assigned to a computer; the experimenter reads the general instructions aloud while the subjects read them on the screen. The participants are informed about the tasks to complete and the rules determining their final earnings. Before starting, they must correctly answer six control questions to check their understanding of the rules. If they fail to answer correctly, a window that explains the correct answer pops up, and the question is presented again. Further, more detailed instructions are shown before each task.
In the real effort task, subjects must complete as many double-digit additions as they can in a ten-minute period (Ariely and Norton, 2007) knowing that they will earn 1 ECU [7] for each correct addition. Once informed about the total earnings, the participants have to decide how much to declare, knowing that there is a 10% probability of an audit, and in case of an unfaithful declaration, they will have to pay taxes on what they did not declare, plus a fine. Subjects were informed of the audit rate and the fine amount. Finally, the participants are informed that, as in Coricelli and colleagues (2010), the amount collected through taxes will finance other experiments at Tilburg University.
At the end of this step, subjects fill in a brief questionnaire designed to elicit social norms (Bicchieri and Xiao, 2009). We do not pay participants for their beliefs to avoid hedging or pseudo-hedging issues (Blanco et al., 2010; Cagala et al., 2019; Gächter and Renner, 2010; Schlag et al., 2015). Those among the participants selected for the audit are informed, and all receive the summary information on how much they have earned and declared, the fines, and overall gain from this first part of the session. In the end, the subjects performed two further tasks: a lottery task to measure their risk preferences (Falk et al., 2018) and the norm-following task to measure the individual's propensity to obey non-biding rules (Kimbrough and Vostroknutov, 2018)[8]. At the end of the session, subjects filled out a socio-demographic questionnaire plus a set of other control questions concerning the understanding of the tasks (Kogler et al., 2016), motivation for choices (L. Choo et al., 2013), risk preferences (Falk et al., 2018). Finally, for each subject, one of the three tasks (tax evasion game, risk lottery, norm following task) is randomly selected to determine the participant's actual payment[9].

[7] See Appendix A (Instructions) for the conversion rates in the different tasks.
[8] See the appendix for a detailed description of these two tasks
[9] Subjects are made aware at the beginning that the tasks are designed to offer, on average, the same potential payoff. Different conversion rates are applied for the three tasks for the final payment to keep the payoffs stable across tasks.

Finally, subjects are informed about which task was chosen for final payment and how much they earned. The average payment was about 13.26 euros, including the show-up fee of 6 euros. The sessions lasted about 25 minutes.

4 Results

4.1 Normative and Empirical Expectations

First, we investigate participants' empirical expectations of honest choice, EE(honest). Following the "opinion matching method", we asked, "How many subjects in this room do you think declared the correct amount of money?". We calculated the percentage of expected honest choices for each subject i in each treatment k. We then obtained the overall mean percentage of honest choices expected by subjects for each treatment. The global average result was 60.1% (sd. 22.6), 57.1% for males, and 62.48% for females.

$$EE_i^k = \frac{\sum EE_i^k(honest\ choice)}{n_k}$$

We then obtained the overall mean percentage of honest choices expected by subjects in each treatment. The global average result was 60.1% (sd. 22.6), 57.1% for males and 62.48% for females (table 2).

Treatment	**Average Empirical Expectations**
Control	65.3
Honest Belief	64.2
Honest Choice	62.41
Dishonest Belief	52.71
Dishonest Choice	54.78

Table 2: Average Empirical Expectations by Treatment

To elicit normative expectations, subjects were asked, first, whether they thought subjects should declare the correct amount of money (79.3% answered "yes") and second, how many subjects they believed answered "yes" to the first question (table 3).

$$NE_i^k = \frac{\sum NE_i^k(honest\ choice)}{n_k}$$

As expected (Bicchieri and Xiao, 2009), EE(honest choice) and NE(honest choice) in HB and HC treatments are higher than those in DB and DC treatments. This confirms that the manipulation of expectations was successful. For empirical expectations, Dishonest treatments are both statistically different from the control, $Pr(T > t) = 0.0540$; $Pr(T > t) = 0.0585$. For the normative expectations, only the Dishonest Choice treatment is statistically different from the control group $Pr(T > t) = 0.0809$.

Treatment	Average Normative Expectations
Control	77.07
Honest Belief	73.72
Honest Choice	72.78
Dishonest Belief	69.17
Dishonest Choice	68.48

Table 3: Average Normative Expectations by Treatment

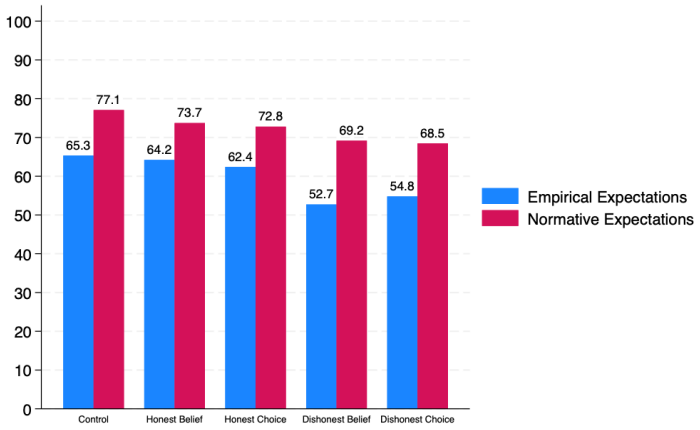


Fig. 1: Mean of empirical and normative expectations per each treatment

It can be seen that for each group, normative expectations are higher than empirical expectations. The interpretation of this is straightforward: according to the treatment, subjects expect more (+3.25% in honest treatments compared to control) or less compliance (-21.6% in dishonest treatments compared to control) from others (empirical expectations), but they expect others to think it is fair (-5.25% for honest treatments; -12% for dishonest treatments) to declare taxes (normative expectations). This is the first confirmation of how exposure to different messages works, with those exposed to dishonest messages having lower expectations. Differences between normative expectations are slightly statistically significant for the difference between the control group and Dishonest Choice and statistically significant between the control group and Dishonest Belief for empirical expectations.

	Spearman's	Mann–Whitney test	Kruskal–Wallis rank test
Control vs T2	0.2555	0.253	0.253
Control vs T3	0.247	0.2447	0.2447
Control vs T4	0.1665	0.1679	0.1651
Control vs T5	0.0682	0.069	0.0684

Table 4: Normative Expectations Test Results

	Spearman's	Mann–Whitney test	Kruskal–Wallis rank test
Control vs T2	0.5765	0.5734	0.5734
Control vs T3	0.5751	0.5722	0.5722
Control vs T4	0.049	0.0496	0.0496
Control vs T5	0.1031	0.1028	0.1028

Table 5: Empirical Expectations Test Results

There is a moderate negative correlation between empirical expectation and percentage of evasion (-0.3757)[10] while the correlation between the normative expectations and percentage of evasion is weak (-0.0955)[11] but the association is statistically significant $(p < 0.05)$.

4.2 Tax Evasion

In the Real Effort Task, subjects solved, on average, 107.33 additions (sd. 32.97), obtaining an average endowment of 107 ECUs.

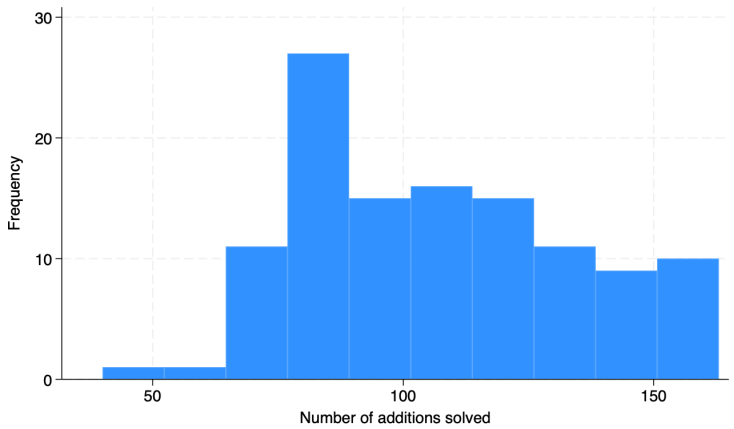


Fig. 2: Real Effort Task Distribution Result

We now report the tax evasion results regarding the probability of evasion and the amount evaded. Pooling across all treatments, 58.73% of subjects reported their income unfaithfully, results perfectly in line with the percentage reported in the messages of dishonest treatments. The average evasion, in percentage, is equal to 42.79% of what they earned. Among the evaders, 13.5% evaded 100%, 2.38% evaded 25%, and 11.90% evaded 75% (Figure 2). Males evade 48.9% of their endowment on average, while females are 38%.

[10] χ, $Pr = 0.000$
[11] χ, $Pr = 0.047$

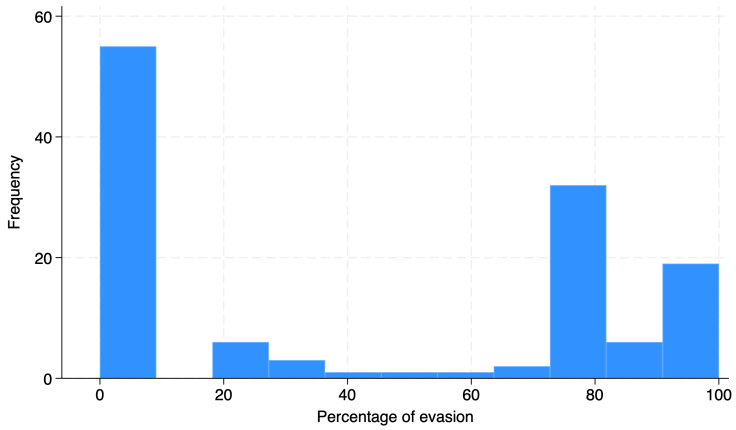
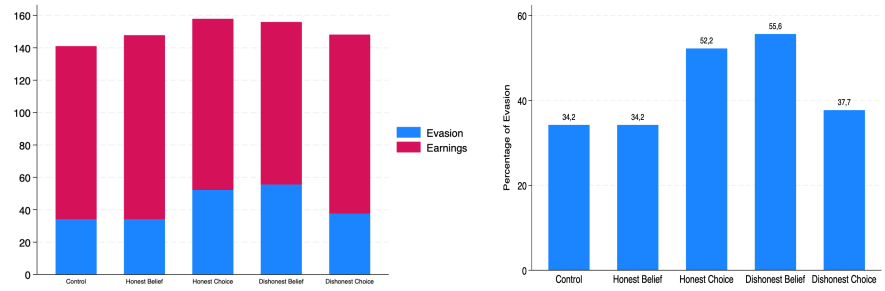


Fig. 3: Tax Evasion Distribution

As for the effect of the different norm messages, we see that in the control treatment, subjects evaded 34.2% of their earnings, compared to 34,23% in the HB treatment, 52.23% in the HC treatment, 55.63% in the DB treatment, and 37.70% in the DC treatment.



(a) Average tax evasion over earnings per treatment

(b) Average percentage of tax evasion per treatment

Fig. 4: Average Tax Evasion per Treatment

In Figure 4, we report both the actual amount evaded (Figure 3a) and the percentage with respect to the amount earned (Figure 3b) per treatment. As far as the role of honest belief and choices tested in H_{1a} ($PE_C > PE_{HB}$) and H_{1b} ($PE_C > PE_{HC}$) we see that:

- Result 1: The "honest belief" message is ineffective since PE_{HB} is not significantly different from PE_C.

- Result 2: The "honest choice" message is effective but not as predicted. PE_{HC} is, contrary to our hypothesis, significantly larger than PE_C.

Hypotheses H2a ($PE_C < PE_{DB}$) and H2b ($PE_C < PE_{DC}$) consider the effect of messages containing dishonest beliefs and choices. In this respect, our data show that:

- Result 3: The "dishonest belief" message effectively increases the percentage evaded. In fact, PE_{DB} is significantly larger than PE_C.
- Result 4: The "dishonest choice" message does not increase the percentage evaded. In fact, PE_{DC} is not significantly different from PE_C.

Hypothesis H_3 ($PE_{DB} > PE_{HB}$) focuses on the difference between messages containing dishonest and honest beliefs. Our data leads us to conclude that:

- Result 5: The "honest belief" message is effective but not as predicted. PE_{HB} is, in fact, contrary to our hypothesis, significantly larger than PE_{DB};

Hypothesis H_4 ($PE_{DC} > PE_{HC}$) investigates the effect of dishonest vs. honest choices. In this case, we can claim that:

- Result 6: The "dishonest choice" message does not increase the percentage evaded. In fact PE_{DC} is not significantly different from PE_{HC}

Hypothesis H_5 ($PE_{HC} > PE_{HB}$) focuses on the difference between messages containing honest choices and beliefs. Our data leads us to conclude that:

- Result 7: The "honest choice" message does not increase the percentage evaded. In fact PE_{HC} is not significantly different from PE_{HB}

Hypothesis H_6 ($PE_{DC} > PE_{DB}$) focuses on the difference between messages containing dishonest choices and beliefs. We can conclude that:

- Result 8: The "dishonest choice" message does not increase the percentage evaded. In fact, PE_{DC} is not significantly different from PE_{DB}

Hypothesis H_7 ($PE_{DC} > PE_{HB}$) focuses on the difference between messages containing dishonest choices and honest beliefs. We can conclude that:

- Result 9: The "dishonest choice" message does not increase the percentage evaded. In fact, PE_{DC} is not significantly different from PE_{HB}

Finally, if we look at the level of evasion in absolute terms, excluding those who correctly declared their earnings, we note a positive (0.3972) and statistically significant correlation between how much they earned and evasion and a statistically significant association ($\chi 2$, $Pr = 0.036$).

The percentage of evasion has a weak correlation with earnings (0.1565) and a non-significant association ($\chi 2$, $Pr > 0.05$), excluding those who correctly declared what they earned. The correlation increases focusing on the dishonest choice treatment (0.2657) but is still mildly weak. The average correlation increases for the last percentile of the tax evasion rate (0.4115), as shown by the graph above.

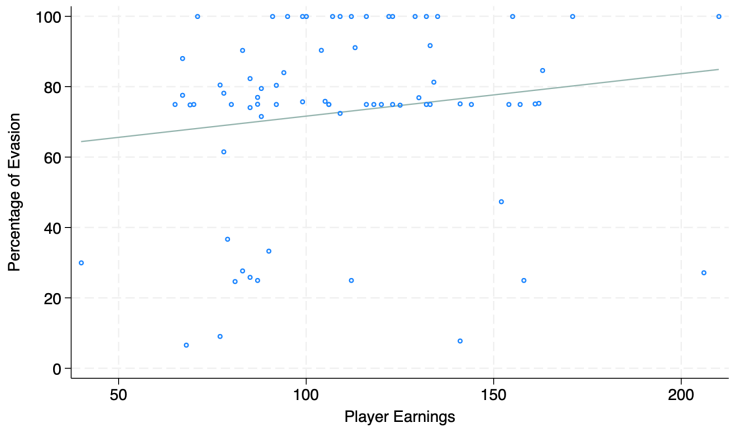


Fig. 5: Player Earnings over Percentage of Tax Evasion

	t-test	Spearman's	Mann–Whitney test	Kruskal–Wallis rank test
H1a : C vs HB	0.5000	0.9849	0.9841	0.984
H1b : C vs HC	0.0551 Ha: diff <0	0.1507	0.1498	0.1498
H2a : C vs DB	0.0301 Ha: diff <0	0.0662	0.0663	0.0663
H2b : C vs DC	0.3853	0.7553	0.7545	0.7545
H3 : DB >HB	0.0337 Ha: diff <0.0674 Ha: diff != 0	0.1035	0.1058	0.1031
H4 : DC >HC	0.1069 Ha: diff >0 0.2139	0.2802	0.2824	0.2779
H5 : HC >HB	0.0603 Ha: diff <0	0.2498	0.2518	0.2479
H6 : DC >DB	0.1265	0.1586	0.1603	0.1575
H7: DC >HB	0.7768	0.7563	0.7606	0.7551

Table 6: Parametric and non-parametric hypotheses test results

Power analysis confirms these results for statistically significant differences (see Appendix C).

4.3 Econometric Analysis

Following on from the pre-registration, we finally present the results of the regression analysis. Table 7 is a Tobit analysis using the Percentage of Evasion as a dependent variable. Table 8 is a Probit analysis using the Probability of Evasion as a dependent variable.
The independent variables used as controls are:

- *Treatment*: is a dummy variable where "1. Control" Treatment is the baseline variable
- *Norm Following Task* is the results of the Bucket Task as the average of the balls the subjects put in the yellow basket (the rule was to put the balls into the blue basket).
- *Player Earnings*: the earned endowment.
- *Country* is a dummy variable takes value 1 for Netherlands; 2 Poland; 3 Italy; 4 Germany and 0 everything else.

Variables, including risk, age, education, and training that either demonstrated little variance across treatment groups or no association with the variable of interest were removed from the independent variables. We explicitly state that the coefficients of control variables do not have a causal interpretation to avoid incorrect policy implications (Hünermund and Louw, 2023). The Tobit model allows us to confirm some of the previous findings. Honest Belief negatively impacts the percentage of evasion, suggesting that exposure to honest beliefs is associated with lower levels of evasion, but they are not statistically significant. Honest Choice significantly increases the percentage of evasion in certain models, confirming the presence of a boomerang effect detailed before. Dishonest Belief is positively and significantly correlated with higher evasion percentages. Dishonest Choice shows variability in its impact but is never statistically significant. Empirical expectations show a significant negative impact. This underscores the role of observed behaviors over normative beliefs in shaping evasion levels. Norm Following Task and Earnings are associated with variations in evasion percentages, with norm-following tasks showing a positive and significant effect in some models. This might indicate that adherence to norms, or the lack thereof, can influence how much one evades. From the probit output, we can confirm some of the evidence from the non-parametric test. Honest Belief has a negative coefficient across models, suggesting that when individuals are exposed to honest beliefs, the likelihood of evasion decreases, although the effect is not statistically significant. Honest Choice shows a positive and generally significant effect in models (1) and (4), indicating that exposure to honest choice increases the probability of evasion in these contexts. This might seem counter-intuitive at first glance, but as specified before, this can corroborate a boomerang effect. Dishonest Belief consistently shows a strong, positive, and statistically significant effect across several models, reinforcing that exposure to dishonest beliefs significantly increases the likelihood of evasion. Dishonest Choice has a positive coefficient but is not significantly different from zero in most models. Normative and Empirical Expectations are included in models (2) and (3), but only empirical expectations show a statistically significant negative small effect on evasion. Norm

Following Task and Earnings variables show mixed results with small coefficients, indicating that these factors have a less pronounced effect on the likelihood of evasion than beliefs and choices. Goodness-of-fit test results and Area under ROC curve values provide insights into the model's fit and predictive power, with the Area under the ROC curve values indicating moderate predictive ability. The results of these analyses are also robust in light of some robustness checks (see Appendix C).

Table 7: Tobit Regression Output

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Control	0	0	0	0	0	0	0
Honest Belief	-6.532	-7.868		-6.119	-13.47	-6.492	-14.42
	(-0.36)	(-0.41)		(-0.34)	(-0.74)	(-0.41)	(-0.89)
Honest Choice	37.54*		34.10*	38.77*	36.72	39.34	40.56
	(1.66)		(1.73)	(1.78)	(1.42)	(1.65)	(1.47)
Dishonest Belief	42.84***	39.48***		39.00***	47.50***	41.57***	41.36**
	(2.88)	(2.79)		(2.68)	(2.86)	(2.94)	(2.57)
Dishonest Choice	6.360		-12.84	2.891	9.980	9.825	11.42
	(0.21)		(-0.53)	(0.11)	(0.37)	(0.31)	(0.46)
Normative expectations		-0.399					
		(-1.32)					
Empirical expectations			-1.711***				
			(-4.44)				
Norm Following Task				2.592***			2.549**
				(3.35)			(2.06)
Player earnings					0.108		0.120
					(0.51)		(0.41)
Country						-12.70***	-11.61**
Constant	8.939	39.71*	119.6***	-14.84	-2.288	18.11	-18.03
	(0.47)	(1.70)	(4.00)	(-0.96)	(-0.09)	(0.97)	(-0.45)
/							
var(e.y)	6260.1***	6258.4***	6147.5***	5981.3***	6014.3***	6079.6***	5635.2***
	(11.11)	(6.22)	(4.85)	(9.89)	(6.39)	(11.59)	(7.36)
Observations	126	76	77	126	116	126	116
Pseudo R^2	0.009	0.012	0.038	0.017	0.012	0.014	0.023

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

Notes: The dependent variable is Percentage of Evasion.

Clustered standard errors at the session level. Censored lower-bound on 0 and upper-bound on 100.

Table 8: Probit Regression Output

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Control	0	0	0	0	0	0	0
Honest Belief	-0.105	-0.123		-0.0807	-0.160	-0.114	-0.153
	(-0.30)	(-0.54)		(-0.43)	(-0.64)	(-0.57)	(-0.66)
Honest Choice	0.582*		0.588	0.621*	0.562	0.661	0.680
	(1.65)		(1.54)	(1.67)	(1.48)	(1.59)	(1.54)
Dishonest Belief	0.859**	0.823***		0.859***	0.989***	0.873***	1.015***
	(2.27)	(2.80)		(3.45)	(3.40)	(3.09)	(3.74)
Dishonest Choice	0.101		-0.101	0.0701	0.110	0.175	0.197
	(0.28)		(-0.52)	(0.35)	(0.44)	(0.52)	(0.79)
Normative expectations		-0.00523					
		(-0.83)					
Empirical expectations			-0.0205***				
			(-3.07)				
Norm Following Task				0.0354***			0.0320*
				(3.57)			(1.87)
Earnings					-0.0000533		0.000633
					(-0.02)		(0.16)
Country						Yes	Yes
Constant	-0.0464	0.357	1.297***	-0.384*	-0.0445	0.150	-0.238
	(-0.19)	(0.88)	(3.45)	(-1.74)	(-0.13)	(0.71)	(-0.45)
Observations	126	76	77	126	116	126	116
Pseudo R^2	0.058	0.080	0.115	0.088	0.073	0.103	0.132
Goodness-of-fit test	//	0.7391	0.3227	0.8332	0.3181	0.4177	0.3035
Area under ROC curve	0.6522	0.6737	0.7149	0.6915	0.6700	0.7075	0.7420

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

Notes: The dependent variable is Percentage of Evasion. Clustered standard errors at the session level.

5 Discussion

What has been presented in the previous pages allows us to present interesting results. The most interesting result concerns the "honest choice" treatment. The difference between PE_{HC} and PE_C (H_{1b}) goes in the opposite direction with respect to our prediction; however, it is not new in the literature. Albeit rarely, it was found in previous studies; even if the expectations proposed are separate concepts, without normative expectations, detailing the average behavior of others (empirical expectations) may trigger a "boomerang effect" (Alm et al., 2019) subjects have no reason to distinguish between normative and empirical expectations in the presence of a single message (Bicchieri and Xiao, 2009). Some individuals may find that 60% is higher than what they originally thought (dishonest choice treatment), while others might discover it's lower than their initial perception (honest choice treatment). In the latter scenario, delivering a message emphasizing honest empirical expectations could lead to increased tax evasion.
Moreover, we confirm some previous findings from the literature because when normative expectations are presented in an approval frame, there is an increase in the amount of taxes paid (Alm et al., 2019) as in our case (H_3); and also that exposure to a good example does not increase the percentage of taxes paid (Lefebvre et al., 2015) but with parametric mildly statistical significance (H_4).
We have to reject both the fifth and sixth hypotheses.
From the results, it seems that while exposure to honest empirical expectation increases tax evasion compared to exposure to normative expectation because it overturns the individual's prior beliefs, exposure to dishonest empirical expectation compared to normative expectation reduces tax evasion because emphasizing dishonest empirical expectations changes the previous idea (60% is higher than what they originally thought) could lead to reduced tax evasion. However, the latter is a speculation as not statistically significant.
The regression results confirm the findings of the tests. The effect of the dishonest normative message treatment is always significant compared to the control treatment, while the positive empirical message treatment varies between controls. The sign of the coefficient associated with the honest normative message is negative, as expected, but is never significant. However, elements help to understand the evasion rate in line with the previous literature. Justification of evasion, perception of the fine severity, and the country are statistically significant in explaining tax evasion. Moreover, the Norm Following task, introduced as a control for the first time in an experiment on taxation, proved predictive and highly significant.

6 Conclusion

In this paper, we presented a tax evasion game to study the impact of social norms. To do this, we used a model of social norms never used before in similar experiments and supplemented the controls with a task to enrich knowledge concerning players' choices.
The results allow us to draw some conclusions that corroborate previous findings in

the literature and contribute to the existing research on social norms.
Given the paper's main objective, with the focus on social norms, and given the initial assumptions and hypotheses, we can say that contrary to previous results, subjects exposed to the "honest choice" message evaded, on average, the most compared to the control treatment. The group that evaded the least was the one that received the 'honest belief' message. The explanation for this phenomenon can be sought in the characteristics of the proposed messages. In the "honest choice" treatment, knowing that 60% of others have correctly declared their income may lead one to think that "only" 60% has declared while as many as 40% have evaded, triggering a boomerang effect of the information. The literature has pointed out that the empirical norms that describe the typical behavior of others, in particular, might have a "boomerang effect" in the absence of a normative standard, and this kind of undesirable effect can be prevented when communication combines an empirical norm with a normative standard (Alm et al., 2019). On the contrary, exposure to the dishonest belief treatment reduced tax evasion relative to control by hinting at a reverse boomerang effect of crowding out subjects' prior beliefs.
However, an experiment with the subjects exposed to both norms would be required to explore this point. We found that exposure to the "honest belief" message reduced the evasion rate both on the probability of untruthful declaration and on the amount evaded, while exposure to the "dishonest belief" message led to increased tax evasion. Our findings support results from previous studies as far as the other determinants of evasion. Risk aversion, for example, seems to (increase/decrease) evasion only for those who evaded under the evasion median. Furthermore, introducing the norm-following task as a control to measure the propensity to follow a norm improves the predictiveness of the model. The effect of other factors, such as age, gender, and country, proved weak or insignificant. The belief about the justifiably of tax evasion also proved to be predictive.
This paper may constitute a starting point for further research on the topic. A definite case for study would be to present subjects with conflicting empirical and normative expectations information. It would also be interesting to investigate the effect of normative expectations with sanctions (point (b') of the social norm definition), considering that for many, the possibility of sanctions is a "necessary condition for compliance" (Bicchieri, 2005). It would also be interesting to compare the results when the audit is endogenous (or strategic) under a progressive tax regime.

Acknowledgments. Thanks to the Tilburg School of Economics and Management (TiSEM) for the invaluable assistance and for allowing us to use the laboratory (CentERlab). Thanks to Professor Dr. Jan Potters's guidance and support throughout the project. His expertise and dedication have been invaluable to our research. We thank numerous seminar and conference audiences, especially Luca Corazzini, Boris van Leeuwen and Sigrid Suetens, Gabriele Ballicu, Marco Nieddu, and Claudio Deiana, for their valuable suggestions.

Declarations

Competing interests The authors declare no competing interests.
Data availability Protocol was approved after review by the TiSEM Institutional Review Board (IRB). Data are currently available on request.

Appendix A Instructions

General Instructions

Part 1

Please, write the number of your workstation.
Thank you for agreeing to participate in this study about individual decision-making. Throughout the experiment, we require your undivided attention. As a result, we ask that you carefully follow these instructions.
Note that deception is NOT allowed in economics experiments. You will be compensated for your participation at the end of the experiment. The amount you receive is based on the choices you make during the experiment. If you have any questions during the experiment, please raise your hand, and someone will come to assist you.
You are not permitted to use other apps on your computer, speak with other students, or indulge in distracting activities such as using smartphones or headphones or other activities. Participants who break the guidelines on purpose may be asked to quit the experiment and may not be paid. The entire experiment will be conducted using computer terminals, and all communication will be conducted via computer terminals.

Part 2

There are five activities in this experiment.

1. The first activity is a Real Effort Task, where you will have a chance to earn based on the effort you decide to put in.
2. The second task is a lottery where you will have to choose from several options the ones you prefer.
3. The third task is the Bucket Task, where you will be asked to do a specific activity.
4. Finally, you will be given a questionnaire about yourself and your preferences. Before each activity, we will give you the detailed information.

Choices in one task do not affect the results and payoffs of the other tasks.
Payment
A show-up fee of six euros will be paid for your participation. You may also be eligible for additional money based on your decisions and partially by chance. Everyone will be paid privately, and you do not need to inform others of your earnings.
ECU is the currency in which you will be paid during the experiment. The amount you earn in EURO is calculated by multiplying your ECU earnings by a conversion rate. The conversion rate in this experiment will vary between the tasks.

Activity	Conversion Rate
Real Effort Task	0,12
Lottery	0,03
Bucket Task	2,5

For the final payment, your results in tasks 1, 2, and 3 will be randomized, and one

of them will be chosen for payment. The different conversion rates allow us to keep the payoffs constant between activities.
Now we will ask you some questions to check if you understand. Click on the Next button to proceed.

Tax evasion game instructions

Welcome to the second part of the first task.

Declaration
On how much you earned in the previous task you have to pay taxes.
The tax rate on your income will be 25%. This means that for every 10 ECU you earn, you must pay 2.5 ECU in tax.

Audit
Once you complete your tax form, the tax authority may choose to audit it. The computer randomly audits the declared amount of money with a probability of 10%. If you are NOT selected for a tax audit. The earnings you have declared minus the taxes will be your final earnings for the task. If you ARE selected for tax audit:

- Nothing happens if you honestly declare your income.
- If found to have declared less income than earned, you must pay the additional tax owed to the authority plus a fine

The collected taxes will be used to finance the Economics and Management CentERlab.
When you have finished reading these instructions, we will proceed to the subsequent activities.

Lottery Instructions

Welcome to the second part of the experiment. Please imagine the following situation. You can choose between a sure payment of a particular amount of money, or a draw, where you would have an equal chance of getting the amount x or getting nothing. We will present to you five different situations. What would you prefer: a draw with a 50% chance of receiving the amount x, and the same 50% chance of receiving nothing, or the amount of y as a sure payment?
After completing all 5 choices, one of the choices will be randomly picked to determine your payoff. If you choose the lottery, a random draw will determine whether the high or low outcome will constitute your payoff. Otherwise, the sure payment will include your payoff.

Bucket Task Instructions

You will now decide how to allocate 20 balls between two buckets. Your task is to put each of the balls, one by one, into one of the two buckets: the blue bucket or the yellow bucket. The balls will appear in the center of your screen, and you can allocate each ball by clicking and dragging it to the bucket of your choice. For each ball you put in the blue bucket, you will receive 0.1€, and for each ball you put in the yellow bucket, you will receive 0.15€.

The rule of the experiment is to put the balls into the blue bucket.

Your payment from the third task will be based on your decisions: it is the sum of payments from the blue and yellow buckets. After you have completed the task, a "Next" button will be displayed at the bottom of the page.

Appendix B Sample Characteristics

Demographics

The subjects in the sample are, on average, 21.55 years old (sd. 3.09) and with an economics bachelor's (46.92%) and master's (39.23%) students. There are 43.65% men and 56.35% women[12]. 19.05% are Dutch, 8.73% are Polish, 7.94% are from Italy, and 5.56% are from Germany, Romania, and Spain, respectively. The remaining 49% of the subjects are of 31 different nationalities. The pool has been randomly assigned to the different treatments as follows:

Treatment	Subjects
Control	27
Honest Belief (FB)	25
Honest Choice (FC)	27
Dishonest belief (SB)	24
Dishonest Choice (SC)	23
Total	126
Audited	13

Table B1: Number of subjects per each treatment

Employment	**Freq.**	**Percent**	**Cum.**
Unemployed	8	6.15	6.15
Part-Time	19	14.62	20.77
Full-Time	4	3.08	23.85
Student	99	76.15	100.00
Total	130	100.00	

Table B2: Employment Status Distribution

Education	**Freq.**	**Percent**	**Cum.**
Elementary/Middle	1	0.77	0.77
High School Diploma	61	46.92	47.69
Bachelor's Degree	51	39.23	86.92
Master's Degree	16	12.31	99.23
PhD	1	0.77	100.00
Total	130	100.00	

Table B3: Education Distribution

[12]The four subjects who indicated 'non-binary' in the gender question generally reported very different mean values than males and females for both tax evasion and risk measures tut there are too few of them to do a subgroup analysis so they are dropped.

Age	Freq.	Percent	Cum.
18	12	9.23	9.23
19	23	17.69	26.92
20	25	19.23	46.15
21	23	17.69	63.85
22	10	7.69	71.54
23	10	7.69	79.23
24	5	3.85	83.08
25	7	5.38	88.46
26	5	3.85	92.31
27	3	2.31	94.62
28	3	2.31	96.92
29	1	0.77	97.69
31	2	1.54	99.23
35	1	0.77	100.00
Total	130	100.00	

Table B4: Age Distribution

Country	Frequency
Netherlands	24
Poland	12
Italy	10
Germany, Romania, Spain	7
India, Turkey, Vietnam	5
Bulgaria, Hungary, Indonesia	4
China, Colombia, Mexico	3
Brazil, Greece, Lithuania, Portugal, Serbia, Slovakia, United States	2
Albania, Angola, Belarus, Belgium, France, Iran, Kasakhstan Lebanon, Malta, Pakistan, Russia, South Korea, Sweden	1

Table B5: Country Distribution

Treatments and Session Balance

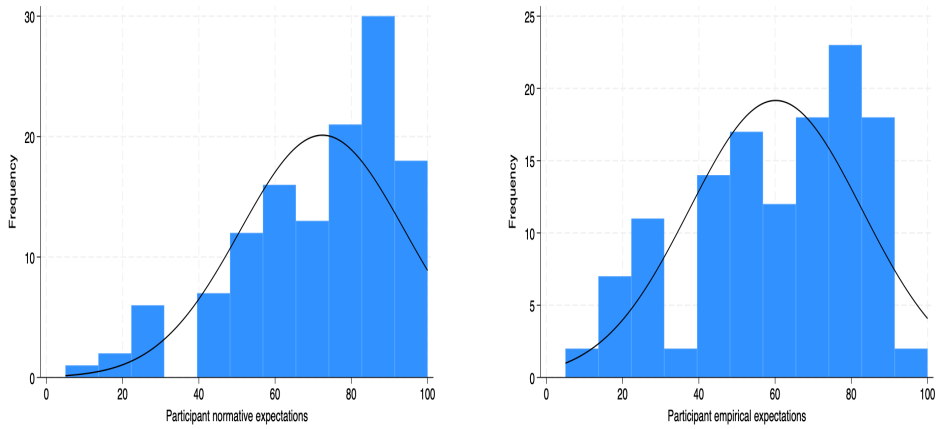
	Control	**Honest Belief**	**Honest Choice**	**Dishoenst Belief**	**Dishoenst Choice**
Sample	27	25	27	24	23
Age	21	20.88	21.29	23.04	21.74
Gender	48.15% female	56% female	62.96% female	66.67% female	47.83% female
Previous experience	88.89%	92%	100%	95.83%	95.65%

Table B6: Treatments Balance Check

Sessions	**Age**	**Gender**	**Employment**	**Education**
1	20.71	.65	2.82	1.59
2	21.19	.68	2.45	1.65
3	21.64	.60	2.88	1.72
4	21.90	.35	2.30	1.65
5	21.56	.52	2.27	1.67

Table B7: Session Balance Check

Expectations



(a) Normative Expectations (b) Empirical Expectations

Fig. B1: Average of normative and Empirical Expectations

Subjects answered a series of questions after the income declaration.

- To the question "Do you think that subjects should declare the correct amount of money?" 20.7% answered "no" while 79.3% answered "yes". We will call this financial honesty.
- To the question "Which behavior do you think other subjects in this room believed you WOULD show?" 46.2% answered "to not declare", while 53.8% answered "to declare". This is social expectations.
- To the question "Which behavior do you think other subjects believed you SHOULD show?" 13.1% answered "to not declare" while 86.9% answered "to declare". These are, in general, norms.

These results are, on average, stable across sessions but very different between treatments. On average, the subjects thought that half of the other participants thought they would evade taxes but also believed that the other participants thought they should not. The answers to these questions did not correlate with treatments (χ^2, $Pr > 0.05$), while the questions on Financial honesty and Norms are correlated with the evasion rate (χ^2, $Pr = 0.041$ and $Pr = 0.043$, respectively).

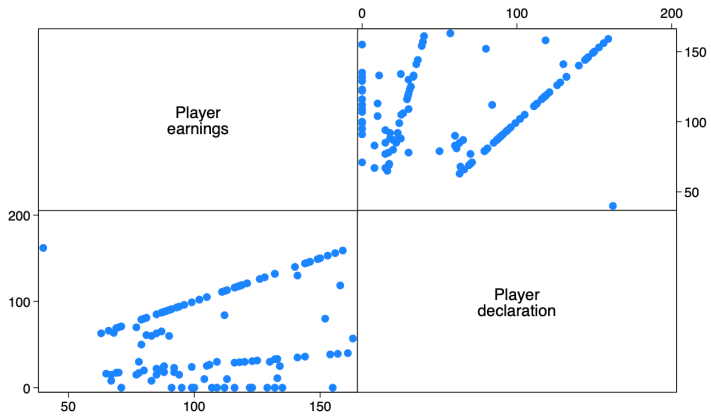


Fig. B2: Scatter-plot matrix for the relationship between what is earned and what is declared.

Sessions	Mean
1	51.68
2	31.89
3	41.30
4	39.15
5	51.82

Table B8: Percentage of evasion on what was earned in the different sessions

Norm Following Task

In this task, subjects are asked to allocate 20 balls between a yellow basket and a blue basket. Each ball in the blue bucket will receive 0.1€, and each ball in the yellow one will receive 0.15€. Furthermore, the experimenters declare that there is a (not biding) rule that states to put the balls in the blue basket even though for each ball in the yellow basket, they earn 0.05 more.

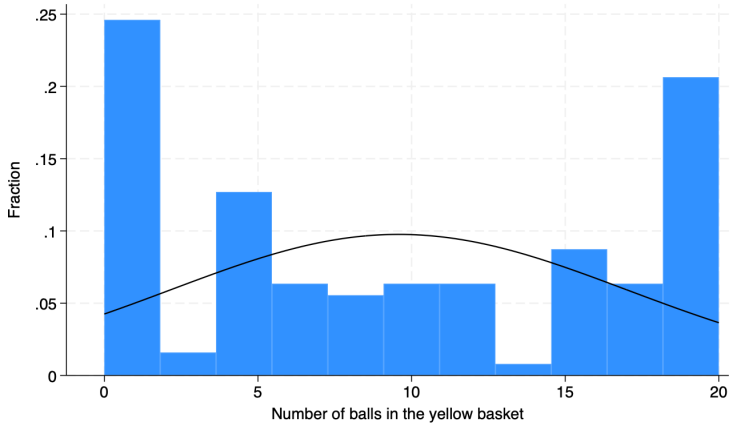


Fig. B3: Norm Following Task Results

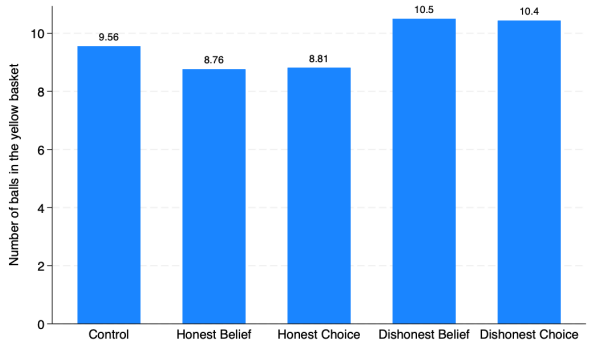


Fig. B4: Norm Following Task Results per treatment

Risk Aversion

Question. An initial assessment of risk aversion has been made by analyzing the answers to the question, *"Please tell me, in general, how willing or unwilling you are to take risks. Please use a scale from 0 to 10, where 0 means "completely unwilling to take risks and a 10 means you are "very willing to take risks".*
As can be noted from the graph below, the responses are spread, and the average is 5.9 (sd. 1.98); 6.4 for males and 5.67 for females

Lottery. Risk aversion was measured using the method of Falk et al. (2018).
Subjects also completed the "lottery" task inspired by the staircase risk task of Falk et al. (2018). From the subjects' choices, assigning them a score from 1 to 32 was possible, indicating their willingness to take a risk.
The average is 12.98 (sd. 5.55); 13.7 for males, 12.70 for females and 7.75 for non-binary subjects.
Options included a fixed lottery where the winner might receive x or 0 or a variable guaranteed payment, y. *Please imagine the following situation. You can choose between a sure payment of a particular amount of money, or a draw, where you would have an equal chance of getting amount x or getting nothing. We will present to you five different situations. What would you prefer: a draw with a 50% chance of receiving amount x, and the same 50% chance of receiving nothing, or the amount of y as a sure payment?* The next question's sure amount increased when the lottery was selected, and vice versa, allowing the question to focus in on the person's certainty equivalent. This variable does not appear to be associated with the choice to evade ($\chi^2, Pr > 0.05$) and, of course, has a positive correlation (0.2200) with the question about willingness to take a risk. This result is in line with previous literature (Alm & Malézieux, 2020).

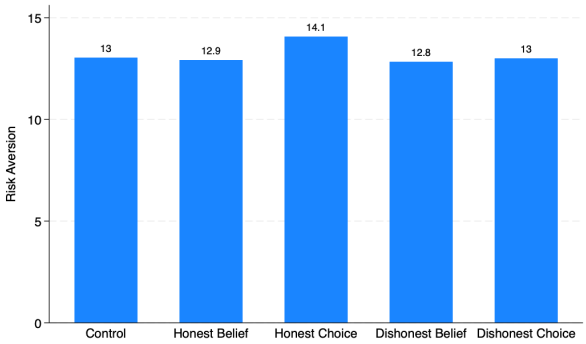


Fig. B5: Risk staircase Task Results per treatment

Other control questions

- When asked *"How well were you compensated for your time and effort in this experiment?"* 25.38% answered 5 (well compensated), and 36.15% answered 4. On a scale of 1 (Poorly compensated) to 5 (well compensated).
- When asked *"How well do you feel you understood the instructions for the experiment?"* 47.69% answered 5 and 38.46% answered 4. On a scale of 1 (poorly understood) to 5 (well understood).
- When asked *"The probability of detection of tax evasion in the experiment was high"* 51.5% of subjects answered between 5 and 7 while 23.8% answered between 2 and 3. On a scale of 1 (Not at all agree) to 9 (Totally agree)
- When asked *"When I paid my taxes in the experiment honestly, I did so because the fines for evasion were very severe"* 55.4% indicated between 4 and 7. On a scale of 1 (Not at all agree) to 9 (Totally agree)
- When asked *"When I paid my taxes in the experiment as required, I did so because to me it is obvious that this is what you do"* 56.1% indicated between 7 and 9. On a scale of 1 (Not at all agree) to 9 (Totally agree)
- 94.62% of the subjects have previously participated in a paid economics experiment.
- Subjects were asked *"Generally speaking, is cheating on tax never justified, always justified, or something in between?"* on a scale from 1(Never justified) to 9 (Always justified).
  The mean was 4.24 (sd. 1.89). These results are correlated with the evasion rate ($\chi^2, Pr = 0.03$).
  There is no correlation with treatments ($\chi^2, Pr = 0.542$); however, there is a negative correlation with empirical expectations ($\chi^2, Pr = 0.03$).

Appendix C Robustness Check

C.1 Checking for Treatment Effect

Considering that the control tasks in this experiment were not randomized, it is good to verify the absence of a treatment effect.
Both analyses on differences in means (using a t-test) and regression analyses (table 5) revealed no effect of different treatments on control tasks: risk aversion, justification for tax evasion, or norm-following task. Therefore, we can consider these measures as valid controls as they are not affected by the different treatments.
However, it is good to point out that the choices in the norm following tasks ($P > |t| = 0.041$) and when asked about the justification for evasion ($P > |t| = 0.003$), the percentage of taxes evaded plays a role (table C10) although with fairly negligible effects. For each extra percentage point of tax evasion 0.032 balls in the wrong basket and 0.0120 extra point in the justification of tax evasion (Likert scale of 1 to 9).

	(Not) Norm-Following	Just of evasion	Risk Aversion	Lottery
Control	0	0	0	0
	(.)	(.)	(.)	(.)
Honest Choice	-0.796	-0.253	0.487	0.0459
	(-0.38)	(-0.44)	(0.86)	(0.03)
Honest Belief	-0.741	0.407	0.926	0.889
	(-0.37)	(0.73)	(1.72)	(0.55)
Dishonest Belief	1.324	0.147	-0.313	-0.834
	(0.62)	(0.27)	(-0.55)	(-0.50)
Dishonest Choice	0.944	-0.756	0.561	-0.651
	(0.43)	(-1.43)	(0.95)	(-0.47)
_cons	9.556***	4.333***	5.593***	13.07***
	(6.40)	(10.14)	(13.16)	(11.50)
N	130	130	130	130

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table C9: Treatment Effect

	(Not) Norm-Following	Just of evasion	Risk Aversion	Lottery
Percentage of Evasion	0.0329*	0.0120**	0.000946	0.000101
	(2.07)	(2.99)	(0.22)	(0.01)
_cons	8.304***	3.739***	5.891***	12.97***
	(8.64)	(15.78)	(25.56)	(19.16)
N	130	130	130	130

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table C10: Choice to evade checking on control task

C.2 Post-Hoc Power Analysis

To confirm these results, consistent with the best practices of experimental economics, we test the power analysis of tests conducted on treatments and their effect size on evasion. In particular, as seen before, treatment 3 (honest choice) and treatment 4 (dishonest belief) have a statistically significant effect in increasing tax evasion. Considering the tests used to test for statistical significance (t-test and Mann-Withney), the results of the power analysis for the two indicated treatments are shown in the table below[13].

Effect size	μ	**n**	**sd**	**Test**	**Power (two means, onesided)**
T3-T1	T1 = 34.2260 T3 = 52.2364	54	T1 = 41.7769 T3 = 39.6620	ttest	0.4834
T4-T1	T1 = 34.2260 T4 = 53.4077	52	T1 = 41.7769 T4 = 37.9833	ttest	0.5254

Clearly, these values are far from the gold standard of $\pi = 0.8$ but confirm the tests' goodness. To reach $\pi = 0.8$, a sample of 64 subjects per group would be needed for treatment three and treatment one, and a sample of 55 per group for the difference between treatment four and treatment one.

[13] The power of tests without statistical significance is not investigated.

3.3 Robustness Check

3.3.1 Non-Parametric

	Control	Honest Belief	Honest Choice	Dishonest Choice
Honest Belief	-0.082194 (1.0000)			
Honest Choice	-1.390565 (0.8218)	-1.281368 (1.0000)		
Dishonest Choice	-1.818066 (0.3453)	-1.704951 (0.441)	-0.469019 (1.0000)	
Dishonest Belief	-0.307802 (1.0000)	-0.223332 (1.0000)	1.025981 (1.0000)	1.448628 (0.7372)

Table C11: Dunn's Pairwise Comparison of Percentage of Tax Evasion by Treatments (Bonferroni)

	Control	Honest Belief	Honest Choice	Dishonest Choice
Honest Belief	0.302362 (1.0000)			
Honest Choice	-1.651875 (0.4928)	-1.922158 (0.2729)		
Dishonest Choice	-2.236898 (0.1265)	-2.489611 (0.0639)	-0.634344 (1.0000)	
Dishonest Belief	-0.287033 (1.0000)	-0.572356 (1.0000)	1.297390 (0.9725)	1.871503 (0.3064)

Table C12: Dunn's Pairwise Comparison of Probability of Tax Evasion by Treatments (Bonferroni)

3.3.2 Regression Controls

	(1)	(2)	(3)	(4)	(5)	(6)
Control	0	0	0	0	0	0
Honest Belief	-6.532	-8.379	-6.522	-7.202	-5.114	-7.766
Honest Choice	37.54*	38.35*	37.59*	37.48	42.46**	37.78*
Dishonest Belief	42.84***	46.18***	42.78***	47.98***	49.55***	41.82***
Dishonest Choice	6.360	6.334	6.316	8.286	5.256	5.095
Risk Aversion question		18.77				
Willingness to risk			-0.0993			
Age				-2.530		
Gender					-34.78	
Employment						-4.279
Constant	8.939	-19.12	10.26	62.30	26.46	20.33
/ var(e.y)	6260.1***	6191.2***	6257.6***	6152.5***	6028.6***	6247.2***
Observations	126	126	126	126	126	126
Pseudo R^2	0.009	0.011	0.009	0.010	0.015	0.009

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

Table C13: Tobit Analysis with control variables

	(1)	(2)	(3)	(4)	(5)	(6)
Control	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)
Honest Belief	-0.105 (-0.49)	-0.121 (-0.54)	-0.105 (-0.49)	-0.110 (-0.53)	-0.0879 (-0.40)	-0.125 (-0.54)
Honest Choice	0.582 (1.63)	0.601* (1.76)	0.586* (1.72)	0.601* (1.67)	0.615* (1.94)	0.593* (1.79)
Dishonest Belief	0.859*** (3.13)	0.894*** (3.15)	0.860*** (3.18)	0.931*** (3.00)	0.904*** (2.70)	0.846*** (3.32)
Dishonest Choice	0.101 (0.38)	0.109 (0.43)	0.101 (0.38)	0.130 (0.49)	0.101 (0.44)	0.0832 (0.28)
Risk Aversion question		0.192 (1.31)				
Willingness to risk			-0.00347 (-0.15)			
Age				-0.0362 (-1.25)		
Gender					-0.240 (-0.53)	
Employment						-0.0769 (-0.48)
Constant	-0.0464 (-0.21)	-0.337*** (-2.62)	-0.00112 (-0.00)	0.713 (1.17)	0.0690 (0.19)	0.156 (0.26)
Observations	126	126	126	126	126	126
Pseudo R^2	0.058	0.062	0.058	0.063	0.064	0.060

t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table C14: Probit Analysis with control variables

3.3.3 OLS

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Control	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)
Honest Belief	-0.000625 (-0.00)	-0.523 (-0.06)		0.813 (0.10)	-2.278 (-0.30)	-0.0893 (-0.01)	-1.820 (-0.27)	-0.618 (-0.07)	-0.0301 (-0.00)	-0.208 (-0.03)	1.082 (0.15)	-0.483 (-0.05)
Honest Choice	18.01 (1.62)		16.04 (1.93)	18.77 (1.88)	18.89 (1.59)	18.75 (1.73)	20.87 (1.59)	18.57 (1.89)	18.27 (1.86)	18.52 (1.73)	20.05* (2.45)	18.21 (1.89)
Dishonest Belief	21.41* (1.94)	20.18* (2.54)		20.44* (2.78)	24.66** (2.82)	20.85** (2.90)	22.89* (2.52)	22.81** (3.12)	21.36** (2.92)	24.94** (3.15)	23.96** (2.79)	21.03** (3.11)
Dishonest Choice	3.478 (0.29)		-3.614 (-0.34)	2.579 (0.22)	6.295 (0.53)	4.586 (0.33)	7.209 (0.65)	3.783 (0.30)	3.468 (0.26)	4.756 (0.35)	3.433 (0.30)	3.051 (0.22)
Normative expectations		-0.156 (-1.54)										
Empirical expectations			-0.672*** (-5.80)									
Norm Following Task				1.023** (2.79)			1.013 (1.77)					
Player earnings					0.0598 (0.59)		0.0712 (0.51)					
Country						-4.986** (-2.82)	-4.700 (-1.67)					
Risk Aversion question								7.582 (1.42)				
Willingness to risk									-0.252 (-0.37)			
Age										-1.730 (-1.25)		
Gender											-13.79 (-1.00)	
Employment												-1.789 (-0.44)
Constant	34.23*** (4.25)	46.23*** (4.75)	78.14*** (7.33)	24.45** (3.03)	27.21* (2.40)	38.10** (4.43)	19.98 (1.06)	22.71* (2.55)	37.51** (3.04)	70.56* (2.70)	40.87** (2.97)	38.93* (2.15)
Observations	126	76	77	126	116	126	116	126	126	126	126	126

t statistics in parentheses

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

3.3.4 Romano-Wolf Test

	Model p-value	Resample p-value	Romano-Wolf p-value
Honest Belief	0.7652	0.7879	0.9960
Honest Choice	0.0984	0.1152	0.5071
Dishonest Belief	0.0231	0.0141	0.2141
Dishonest Choice	0.7775	0.7778	0.9980
Model 2			
Treatments	0.0181	0.0222	0.2000
Normative Expectations	0.4570	0.5010	0.9657
Model 3			
Treatments	0.9055	0.9030	0.9980
Empirical Expectations	0.0051	0.0061	0.0727
Model 4			
Honest Belief	0.8211	0.8404	0.9980
Honest Choice	0.0870	0.0970	0.4727
Dishonest Belief	0.0258	0.0222	0.2283
Dishonest Choice	0.8480	0.8687	0.9980
Norm Following Task	0.0332	0.0364	0.2768
Model 5			
Honest Belief	0.6579	0.6808	0.9960
Honest Choice	0.1321	0.1596	0.5838
Dishonest Belief	0.0127	0.0101	0.1576
Dishonest Choice	0.7680	0.7515	0.9960
Earnings	0.9904	0.9879	0.9980
Model 6			
Honest Belief	0.7470	0.7556	0.9960
Honest Choice	0.0654	0.0707	0.4323
Dishonest Belief	0.0217	0.0222	0.2000
Dishonest Choice	0.6313	0.6263	0.9919
Country	0.0075	0.0121	0.1091
Model 7			
Honest Belief	0.6752	0.6788	0.9960
Honest Choice	0.0844	0.0990	0.4687
Dishonest Belief	0.0097	0.0101	0.1212
Dishonest Choice	0.6143	0.6121	0.9879
Earnings	0.8901	0.9030	0.9980
Norm Following Task	0.0710	0.0768	0.4586
Country	0.0177	0.0364	0.2000

Table C15: Probit Regression Analysis (robust standard errors) Romano-Wolf step-down adjusted p-values. Bootstrap replications (500)

	Model p-value	Resample p-value	Romano-Wolf p-value
Honest Belief	0.7172	0.7246	0.9681
Honest Choice	0.0992	0.0778	0.501
Dishonest Belief	0.0048	0.0279	0.2036
Dishonest Choice	0.8316	0.7745	0.9681
Model 2			
Treatments	0.0038	0.0319	0.1896
Normative Expectations	0.2272	0.2555	0.7226
Model 3			
Treatments	0.667	0.6148	0.9681
Empirical Expectations	0.0001	0.004	0.0798
Model 4			
Honest Belief	0.7343	0.7405	0.9681
Honest Choice	0.0774	0.0878	0.4471
Dishonest Belief	0.0083	0.0439	0.2355
Dishonest Choice	0.9105	0.8762	0.9681
Norm Following Task	0.0011	0.018	0.1477
Model 5			
Honest Belief	0.4633	0.4571	0.8862
Honest Choice	0.157	0.1198	0.6248
Dishonest Belief	0.005	0.02	0.2056
Dishonest Choice	0.713	0.6507	0.9681
Earnings	0.6119	0.5808	0.9681
Model 6			
Honest Belief	0.6836	0.7166	0.9681
Honest Choice	0.102	0.0778	0.503
Dishonest Belief	0.004	0.0299	0.1936
Dishonest Choice	0.7608	0.6467	0.9681
Country	0.0001	0.014	0.0998
Model 7			
Honest Belief	0.374	0.3932	0.8144
Honest Choice	0.1436	0.1178	0.6228
Dishonest Belief	0.0114	0.0439	0.2914
Dishonest Choice	0.6463	0.6168	0.98
Earnings	0.042	0.0359	0.4311
Norm Following Task	0.6817	0.6267	0.98
Country	0.0454	0.0838	0.4331

Table C16: Tobit Regression Analysis (cluster session standard errors) Romano-Wolf step-down adjusted p-values. Bootstrap replications (500)

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