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Revisiting tax morale: evaluating the acceptability of business- and individual-level non-compliance on participation in undeclared work

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Revisiting tax morale: evaluating the acceptability of business- and individual-level non-compliance on participation in undeclared work

Abstract

Purpose - The aim of this paper is to evaluate whether the acceptability of different types of business- and individual-level non-compliance has different impacts on the likelihood of participation in undeclared work.

Design/methodology/approach - To evaluate this, data is reported on the EU27 and the UK from the special Eurobarometer survey no. 498, using a novel statistical methodology that deals with two potential sources of bias: sample selection error (avoidance to answer to the question about participation to undeclared work) and misclassification in the response variable (false statements about engagement in undeclared work).

Findings - This reveals the association between tax morale and participation in undeclared work. It shows that citizens find far more unacceptable undeclared work conducted by firms than individuals, but both are significantly associated with participation in undeclared work although the greatest effect is clearly exerted by individual-level tax morale.

Originality/value - This paper uses a methodology which accounts for the potential bias related to sample selection error and misclassification in the response variable of participation in undeclared work and sheds light on different components of tax morale.

Key words: tax morale, undeclared work, informal economy, Europe, selection-bias, measurement error in the dependent variable.

Paper type Research paper

1. Introduction

For half a century, tax non-compliance was theorised using the neoclassical approach of Allingham and Sandmo (1972) which explains this as a rational economic decision when the benefits of non-compliance outweigh the costs. The response was to increase the perceived and/or the real costs of non-compliance by raising the sanctions and risk of detection (Williams, 2014; Williams and Horodnic, 2015a, 2017a). However, the recognition that many are compliant even when the benefits of non-compliance outweigh the costs, has resulted in the emergence of an alternative social actor or tax morale theorisation (Horodnic, 2018; Leonardo, 2011; Webb *et al.*, 2009, 2013; Williams and Horodnic, 2017a). This explains tax non-compliance as occurring when formal institutional failings result in citizens viewing non-compliance as acceptable behaviour (Cummings *et al.*, 2009; Kirchler, 2007; Murphy, 2008; Torgler, 2007, 2012; Williams and Horodnic, 2015a,b, 2016a,b). In consequence, improvements in tax morale, defined as the intrinsic motivation to pay taxes, are sought to encourage voluntary compliance (Torgler, 2012; Torgler and Schneider, 2007).

Conventionally, tax morale has been measured by analysing the acceptability of different tax non-compliance behaviours by individuals and businesses and then aggregating these into a single index of tax morale (Williams and Horodnic, 2016a,c). The aim of this paper is to evaluate whether the acceptability of these different types of business- and individual-level non-compliance has different impacts on the likelihood of citizens being compliant. We will focus on undeclared work, which is paid activities lawful in all respects besides the fact that they are hidden from, or unreported to, the state to circumvent the tax, social security and/or labour laws (European Commission, 2007), and investigate how by examining their

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3 effects of the acceptability of business- and individual-level non-compliance on shape the
4 likelihood of participation in undeclared work. Reporting data from special Eurobarometer
5 survey no. 498 conducted in 2019, this will reveal that each has different impacts on
6 participation in undeclared work, and this has implications for the policy measures pursued to
7 address undeclared work.
8

9 This paper advances knowledge in three ways. Theoretically, it will reveal the need for
10 the emergent social actor model to move beyond an aggregate indicator of tax morale and to
11 differentiate between the acceptability of business and individual compliance as drivers of
12 participation in undeclared work. Empirically, meanwhile, it reveals how analyses of direct
13 surveys can deal with two key issues, namely: interviewees not responding (causing non
14 ignorable missingness) and telling lies (answering they are not involved in undeclared work
15 when they are) using an *ad hoc* estimation procedure to avoid inconsistency and a bias of
16 parameter estimates arising due to these issues. Third, and in policy terms, it reveals where
17 attention should focus in terms of improving tax morale.
18

19 To achieve this, the next section reviews the emergent tax morale approach to explain
20 non-compliance, identifies how few studies evaluate whether the acceptability of different
21 types of business- and individual-level non-compliance has different impacts on the likelihood
22 of citizens engaging in undeclared work, and formulates the research hypotheses. Section 3
23 then reports the data and the variables used and analytical methods to test these hypotheses,
24 followed in section 4 by the results and section 5 by a discussion of the implications for theory
25 and practice.
26
27

28 29 **2. Theoretical considerations**

30
31 For some five decades, tax noncompliance has been predominantly explained using a rational
32 economic actor approach. This has its roots in the seminal work of Allingham and Sandmo
33 (1972), according to which tax non-compliance arises when the benefits of non-compliance
34 outweigh the costs of being caught and punished. In consequence, non-compliant behaviour is
35 tackled using deterrents that increase the actual and/or the perceived sanctions and risk of
36 detection (Horodnic, 2018; ILO, 2017; Williams, 2014, 2018). However, despite the
37 dominance of this approach in enforcement authorities (Williams and Puts, 2017), there are no
38 clearcut conclusions on its effectiveness at reducing tax non-compliance.
39

40 Some studies conclude that increasing the penalties and improving the risk of detection
41 results reduces tax non-compliance (e.g., Feld and Frey 2002; Mas'ud *et al.*, 2015; Mazzolini
42 *et al.*, 2017), others find no significant relationship (Shaw *et al.*, 2008; Williams and Franic,
43 2015, 2016) and yet others that increasing the deterrents can lead to increased tax non-
44 compliance as the social contract between the state and its citizens is broken (Hofmann *et al.*,
45 2017; Kaplanoglou and Rapano, 2015; Murphy, 2005, 2008; Murphy and Harris, 2007).
46 However, the major shortcoming of this rational economic actor approach is that it fails to
47 explain why some remain compliant even when the benefits of non-compliance exceed the risk
48 of being detected and punished (Kirchler, 2007; Murphy, 2008; Murphy and Harris, 2007;
49 Williams and Krasniqi, 2017, 2018).
50

51 To explain this, an alternative social actor or tax morale approach has emerged. This
52 argues that tax non-compliance occurs when formal institutional failings result in people
53 viewing non-compliance as an acceptable behaviour and thus there is an asymmetry between
54 the formal rules of the game (the laws and regulations) and social norms, values and beliefs of
55 employers, businesses, workers and citizens (Cummings *et al.*, 2009; Kirchler, 2007; Murphy,
56 2008; Torgler, 2007, 2012; Williams and Horodnic, 2015a,b, 2016a,b). In consequence,
57 improvements in tax morale are sought, defined as the intrinsic motivation to pay taxes
58 (Torgler, 2012; Torgler and Schneider, 2007).
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Studies have found that lower levels of tax morale are significantly associated with a greater likelihood of tax non-compliance (Dell'Anno, 2009; Lima and Zaklan, 2008; Lisi, 2015; Ostapenko and Williams, 2016; Sumartaya and Hafidiah, 2014; Torgler, 2004; Torgler *et al.*, 2008; Williams and Horodnic, 2015a,b,c, 2016a,b, 2017e). This has also been confirmed at country level (Alm and Torgler, 2006) where, for example, the findings in post-socialist countries show that a one unit decrease in tax morale results in increasing tax non-compliance with 20 percentage points (Torgler, 2011). Examining a specific form of tax non-compliance, namely undeclared work, ~~which is paid activity no declared to the tax, labour and/or social security authorities when it should be declared (Williams, 2014)~~, which is the focus of this paper, numerous studies have revealed that lower tax morale is associated with a higher likelihood of participating in not only wholly undeclared work (Feld and Larsen, 2012; Williams and Horodnic, 2016a; Windebank and Horodnic, 2017) but also the under-reporting of official salaries (Williams and Horodnic, 2015a, 2017b). As such, we propose to test the following hypothesis:

H1: The likelihood of participation in undeclared work increases as tax morale decreases, ceteris paribus.

When measuring tax morale, most empirical studies measure tax morale by analysing the acceptability or justifiability of different tax non-compliance behaviours by individuals and businesses and then aggregate these into a single index of tax morale (Williams and Horodnic, 2016a,c). To do so, various datasets that evaluate whether various forms of tax non-compliant behaviour are acceptable or justifiable are analysed, such as the Eurobarometer Surveys on undeclared work, World Values Survey, European Values Survey, Latinobarómetro, or Palestinian Public Opinion Survey, or whether respondents agree with various statements related to citizens duty to pay taxes, such as the Bank of Italy Survey of Household Wealth and Income (Andriani, 2016; Alm and Torgler, 2004, 2006; Castañeda Rodríguez, 2015; D'Attoma, 2015; Frey and Torgler, 2007; Gerstenbluth *et al.*, 2012; Leonardo and Martinez-Vazquez, 2016; Trüdingen and Hildebrandt, 2013).

However, a few studies reveal that there are differences in the acceptability of these different types of business- and individual-level non-compliance these studies examine. The finding of Williams and Horodnic (2016c) is that the citizens in the European Union member states deem it more unacceptable for firms than for individuals to operate in the undeclared economy (except for claiming welfare payments without entitlement, which is found to be the most unacceptable form of tax non-compliant behaviour). Similar results regarding the different levels of acceptability of various forms of undeclared work were found in other studies focusing on countries such as Bulgaria (Williams *et al.*, 2014) or Romania (Williams and Horodnic, 2017a). This suggests that it might be useful to measure its different components separately, since each of them could exert distinct effects on non-compliant behaviours. As such, we propose to test the following hypotheses:

H2: Tax morale is a multidimensional concept and requires different dimensions to be measured.

H3: The likelihood of participation in undeclared work increases as each dimension of tax morale decreases, ceteris paribus:

H3a: The likelihood of participation in undeclared work increases as tax morale towards business-level undeclared work decreases, ceteris paribus.

H3b: The likelihood of participation in undeclared work increases as tax morale towards individual-level undeclared work decreases, ceteris paribus.

H4: The two dimensions of tax morale affect the likelihood of participation in undeclared work to different degrees.

In recent years, there has been discussion of whether the tax morale/social actor approach and rational economic actor could be combined when tackling undeclared work using both deterrent policy measures as well as policy measures to improve the tax morale of citizens (Horodnic and Williams, 2022). A small number of previous studies suggest that a greater risk of detection and higher penalties has different effects depending on the level of tax morale (Windebank and Horodnic, 2017; Williams and Horodnic, 2016a; 2017d; ~~Williams et al., 2016~~). Increasing the level of penalties and risk of detection has a negative effect on compliance when there is high tax morale because it breaks down the trust of citizens in government (Kirchler et al., 2007; Tyler et al., 2007). As such, we propose to test the following hypotheses in order to evaluate the effect of each component of tax morale:

H5: The effect of risk detection and of perceived penalties varies according to the levels of each dimension of tax morale:

H5a: The likelihood of participation in undeclared work varies according to the levels of risk detection and the different dimensions of tax morale.

H5b: The likelihood of participation in undeclared work varies according to the levels of expected sanctions and the different dimensions of tax morale.

3. Methodology

3.1. Data

For testing all the hypotheses, data from special Eurobarometer survey no. 498 conducted in 2019 was used. The survey involved 27,565 adults aged 15 years or older living in one of the EU27 countries and the UK. The questionnaires were either administered face-to-face or using CAPI (computer assisted personal interview). The sample sizes vary from a minimum of 505 in smaller countries such as Malta to a maximum of 1565 in larger countries as Germany.

Due to the sensitive nature of the topic, questions on undeclared work were asked gradually. Firstly, participants were asked about the perceived extensiveness of undeclared work in their country, the perceived risk of detection and the expected sanctions, then some attitudinal questions on the acceptability of various behaviours involving tax non-compliance. These questions were followed by questions on purchases from the informal economy and finally, the respondents were directly asked whether they had participated in undeclared work.

3.2. Variables

In the statistical models used, the dependent variable measures the participation in undeclared work, with a value of 1 attributed if the respondent answered yes to the question “Apart from a regular employment, have you yourself carried out any undeclared paid activities in the last 12 months?”, and 0 otherwise.

The independent variables were as follows. First, tax morale was measured as a single

dimension construct (to verify hypothesis H1) as well as a bi-dimensional indicator (to test H2). Based on previous evidence (e.g., Williams and Horodnic, 2017^{ea}), two dimensions of tax morale were considered, depending on the levels (and actors) to which the non-compliant behaviour refers: business level (fraudulent behaviours involving firms) and individual level (fraudulent behaviours involving private citizens).

Business-level tax morale (TM1) is the arithmetic mean of the scores to the following questions: “A firm is hired by a private household for work and it does not report the payment received in return to tax or social security institutions”, “A firm is hired by another firm for work and it does not report its activity to tax or social security institutions”, “A firm hires a private person and all or a part of the salary paid to him/her is not officially registered”. Individual-level tax morale (TM2) is computed from the questions: “A private person is hired by a private household for work and he/she does not report the payment received in return to tax or social security institutions although it should be reported” and “Someone evades taxes by not or only partially declaring income”. Each question was measured on a 10-point Likert scale, where 1 show that the non-compliant behaviour is found absolutely unacceptable and 10 absolutely acceptable. As such, each constructed dimension (component) of tax morale ranges from 1 to 10 where the lower values represent higher tax morale.

Six independent variables to evaluate the association between participation in undeclared work and the interaction with each of the two tax morale dimensions and the detection risk/expected sanctions (hypothesis H5a and H5b) have been also introduced. More precisely, for the interaction between tax morale and detection risk, a dummy variable was created with value 0 for a perceived risk of detection as very small or fairly small and value 1 if the risk of detection is perceived as being fairly high or very high. We then multiply it by each dimension of tax morale obtaining two variables that capture the combined effect of the component variables. Similarly, for the interaction between tax morale and the expected sanctions, we started by creating a dummy variable with value 1 for those expecting that the normal tax or social security contributions plus a fine would be applied for those undertaking undeclared work and 0 otherwise. We then multiplied the dummy by each dimension of tax morale.

Finally, a set of controls (socio-demographics, detection risk and expected sanction) were added based on previous relevant literature (Williams and Horodnic, 2015a,b). Table 1 summarizes the main characteristics of the data.

[INSERT TABLE 1 ABOUT HERE]

3.3. Analytical approach and methods

To measure the likelihood of participation in undeclared work of European citizens, a modified probit model has been used that simultaneously accounts for two issues in our data. The first is the presence of missing data in the dependent variable (which leads to a selection in the sample because the non-respondent are likely to have a higher probability of being engaged in undeclared activities) and the second is the plausible scenario that a respondent undertaking undeclared activities, responds no to this question hiding the truth about their involvement. In this case, we have a measurement error in the dependent variable. Both issues described produce serious consequences (biasness and inconsistency) in the estimates of the regression coefficients.

The two problems (the first known as *sample selection bias*, and the second as *misclassification of the dependent variable*) are well known in the statistical literature and many authors have offered solutions to improve the reliability of the estimates both in sample selection (Lee, 2003, and Vella, 1998, for a survey of relevant works) and in misclassification (Abrevaya and Hausman, 1999; Chua and Fuller, 1987; Hausman *et al.*, 1998; Poterba and Summers, 1995) contexts.

Arezzo and Guagnano (2019) proposed an estimation method that simultaneously corrects for this double source of bias. Here we briefly sketch the proposed model. In the probit model in its simplest form (no selection bias and no misclassification), the probability that the i -th individual is involved in undeclared activities is modelled as:

$$P(Y_i = 1 | X_{1i} = x_{1i}) = \Phi(x'_{1i}\beta) \quad (1)$$

where $X_{1i} = x_{1i}$ are the set of characteristics of individual i -th and Φ is the standard normal cumulative density function. To consider that the propensity to omit the response to the question on the involvement in undeclared activities (Y =missing) depends on the individual characteristics (that is, it occurs more often to individuals with specific features), we model the censoring mechanism explicitly as:

$$P(S_i = 1 | X_{2i} = x_{2i}) = \Phi(x'_{2i}\gamma) \quad (2)$$

where $S_i = 1$ means that the i -th response is observed. In other words, both equations (1) and (2) are part of our model. Equation (1), also called outcome equation, models the probability of being involved in undeclared activities and equation (2), named selection equation, describes the propensity to answer the question on self involvement in undeclared paid activities. Y_i is observed if and only if $S_i = 1$, otherwise it is missing. The selection equation includes a set of independent variables, X_2 , not necessarily overlapping with the ones in the outcome equations. In this paper the variables in X_2 are: age, female, tax morale, detection risk, country and respondent cooperation during the interview (a variable in four levels, 1 = excellent, 2= good, 3= fair, 4= bad).

In such situations, we must model the probability that the i -th individual participates in undeclared work *and* that we know it because the observation is available, that is:

$$P(Y_i = 1, S_i = 1 | X = x_i) = \Phi_2(x'_{1i}\beta; x'_{2i}\gamma; \rho) \quad (3)$$

where Φ_2 is the bivariate standard normal cumulative density function and ρ is the correlation between the propensity of being involved in undeclared activities and the propensity to respond. In our context, a further complication arises, because the respondent can hide his/her involvement in undeclared work. Also, the other way around (someone not involved who declares to be) is possible in principle, though unlikely. To avoid a priori assumptions about these hypotheses, we consider both possibilities in our model. In all situations where the dependent variable Y is affected by measurement error, what is modelled is the *observed* value of Y rather than the true one.

As explained in detail in Arezzo and Guagnano (2019), model (3) becomes:

$$P(Y_i^{obs} = 1, S_i = 1 | X = x_i) = \alpha_0 \Phi(x'_{2i}\gamma) + (1 - \alpha_0 - \alpha_1) \Phi_2(x'_{1i}\beta; x'_{2i}\gamma; \rho) \quad (4)$$

where α_0 is the probability that a true zero is misclassified as a one and α_1 is the probability that a true one is misclassified as a zero. Both the probabilities are unknown and estimated together with the other parameters of the model.

To test our research hypotheses, we estimated different models: the first and simplest contains tax morale as a unidimensional concept along with the whole set of control variables; the second contains the two dimensions of tax morale and the control variables; the last one contains the four interaction variables along with the control variables and the two dimensions of tax morale. To test H1, we checked if the effect of tax morale (measured as a single dimension index) is significant. The significance of the two dimensions is verified with hypothesis H2. Hypotheses H3a-H3c are evaluated by testing if the effect of each component of tax morale is statistically significant and positive. Then, to assess whether these effects significantly differ from each other (hypothesis H4), we estimated a restricted versions of the second model, where the two components of tax morale at a time are assumed as having the same effect on the response variable. That is, to test if TM1 affects the propensity to engage in undeclared work differently from TM2, we contrasted the hypothesis that the coefficient of TM1 is the same as TM2.

Finally, to evaluate if tax morale interacts with detection risk and expected sanctions (H5, H5a and H5b), it suffices to control the significance of the effects of the four interaction variables.

4. Results

Table 2 reports the results. To answer the research hypotheses, a step-by-step approach was adopted by fitting the three models listed above. Firstly, it is important to note that consistent with previous findings (e.g., Horodnic and Williams, 2002), the typical undeclared worker is a young male, unemployed, and having financial difficulties most of the time. The probability of participating in undeclared work also becomes smaller if the respondent lives in an urban area, their perception of risk of detection is higher and the expected sanction is greater including a fine as well as the payment of the whole amount hidden from the state authorities.

Turning to the hypotheses and keeping in mind that the lower the TM indices, the higher is the tax morale, the finding in the simplest model (the one where it is represented as an aggregate whole) suggest that TM is not significant in explaining the probability of working undeclared. On the other side, when it is disaggregated into business-level tax morale (TM1) and individual-level tax morale (TM2), the estimates are both significant meaning that the probability of participation in undeclared work decreases as the level of tax morale increases. The statistical significance of the parameter estimates corresponding to TM, TM1 and TM2 do not confirm hypotheses H1, but it confirms H3a and H3b. Furthermore, hypothesis H2 is validate that tax morale is a multidimensional concept because both dimensions exert a statistically significant effect on the probability of undertaking undeclared work.

Turning to H4 (the dimensions of tax morale affect the likelihood of participation in undeclared activities to different degrees), an appropriate statistical test was performed on the parameters of the two dimensions of tax morale (TM1 and TM2). The corresponding system of statistical hypotheses are:

$$\begin{cases} H_0: \beta_{TM1} = \beta_{TM2} \\ H_1: \beta_{TM1} \neq \beta_{TM2} \end{cases} \quad (5)$$

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3 Concluding in favour of the null hypothesis H_0 , implies that the two dimensions of tax morale
4 are not distinguishable, meaning tax morale is not multidimensional. The likelihood ratio tests
5 of the restricted versions of the model specification, were strongly significant (p -value < 0.001)
6 implying a rejection of the null hypotheses in (5).
7

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9 [INSERT TABLE 2 ABOUT HERE]
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11 To shed light on the association between TM1 and TM2 and the likelihood of engaging in
12 undeclared work (hypotheses H3a-H3b), the conditional expected probabilities were computed
13 of a representative European citizen undertaking undeclared activities for different values of
14 the two dimensions of their tax morale. The results are reported in Figure 1. The representative
15 citizen, identified by computing the mean/modal values of each independent variable, is an
16 employed woman of 51-52 years old who lives in a German town/city. She has never or almost
17 never problems in paying bills and believes that, if caught doing undeclared work, she will pay
18 the whole amount evaded plus a fine. However, she evaluates the risk of being detected as
19 being fairly small. For this average citizen, each tax morale dimension is allowed to vary one
20 at a time from 1 to 10 with a step of 0.1 setting the other at its average value. These mean values
21 are: $M(TM1) = 2.559$, $M(TM2) = 3.324$. The two components show different effects on the
22 response variable, namely engagement in undeclared work. These effects are not constant over
23 the values of two tax morale dimensions, TM1 and TM2. The greatest effect is clearly exerted
24 by the individual-level tax morale index (TM2). In the context where individuals believe that
25 behaviours connected with undeclared work are acceptable, the likelihood of engaging oneself
26 in undeclared work is larger.
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31 [INSERT FIGURE 1 ABOUT HERE]
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33 Turning to the issue of whether the tax morale and rational economic actor approaches could
34 be combined when tackling undeclared work using both deterrent policy measures as well as
35 policy measures to improve the tax morale of citizens, previous studies find that a greater risk
36 of detection and higher penalties has different effects depending on the level of tax morale
37 (Windebank and Horodnic, 2017; Williams and Horodnic, 2016a; 2017d; ~~Williams et al.,~~
38 ~~2016~~). Increasing the level of penalties and risk of detection has a negative effect on compliance
39 when there is high tax morale (Kirchler et al., 2007; Tyler et al., 2007). However, the finding
40 here is that the effect of the risk of detection and perceived penalties do not vary according to
41 TM1 and TM2 (refuting H5a and H5b). The parameter estimates corresponding to the
42 interaction variables are not statistically significant. The only exception is the interaction
43 between detection risk and TM2, but the evidence in favour of the significance of this
44 interaction is weak given that the p -value is 0.06. Table 3 summarizes the hypotheses that have
45 been confirmed and those not confirmed.
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49 [INSERT TABLE 3 ABOUT HERE]
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51 5. Discussions and conclusion

52 This paper used the data on the EU27 and the UK from special Eurobarometer survey no. 498
53 to better understand tax morale and its effect on decreasing participation to undeclared work.
54 In order to do so a novel methodology for the field of tax morale and undeclared work has been
55 used that minimizes two types of potential bias, namely: sample selection bias (i.e., missing
56 data in the dependent variable considering that those refusing to answer are very likely to have
57 high probability to engage in undeclared work) and misclassification of the dependent variable
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(i.e., the scenario where those answering not engaging in undeclared work to actually undertake undeclared work but to lie when answering about an illegal issue).

Theoretically, it has revealed the need for the emergent social actor model which asserts that undeclared work occurs when formal institutional failings result in people viewing non-compliance as an acceptable behaviour and thus there is an asymmetry between the formal rules of the game (the laws and regulations) and social norms, values and beliefs of employers, businesses, workers and citizens (Cummings *et al.*, 2009; Kirchler, 2007; Murphy, 2008; Torgler, 2007, 2012; Williams and Horodnic, 2015a,b, 2016a,b). This study has revealed the association between tax morale and participation in undeclared work. It has also differentiated between the acceptability of business and individual compliance as drivers of participation in undeclared work. It has revealed that citizens find far more unacceptable undeclared work conducted by firms, but both are significantly associated with participation in undeclared work although the magnitude of the effects of each differs. The greatest effect is clearly exerted by the individual-level tax morale index.

In terms of policy implications, the clear result is that for tackling undeclared work in a more effective manner, citizens tax morale should be improved. This requires measures aimed at nurturing trust. On the one hand, measures aimed at increasing trust in government are required such as reducing public sector corruption and improving the provision of public goods and services (Autio and Fu, 2015; Gangl *et al.*, 2013; Kirchgässner, 2010; Molero and Pujol, 2012). As individuals find far more unacceptable the undeclared work conducted by firms, for enhancing the trust in authorities, measures targeted at companies should be implemented and advertised. This could focus for instance on initiatives taken to stem avoidance by large or multinational companies who pay very low tax rates and erode the trust of citizens and lead them to engage in evasion. On the other hand, as individuals behave akin to their peers (Sønderskov and Dinesen, 2015), measures aimed at increasing their trust in other citizens to behave correctly are necessary. These could include information campaigns on how a large share of the population is compliant, and state authorities avoiding the advertisement of high figures of participation in non-compliant behaviour, which negatively affect individuals' tax morale (Horodnic and Williams, 2022; Williams and Horodnic, 2017d).

A shortcoming of the study is that the employment status is not included and needs to be added included as a control variable in future studies because a common assumption is that employment status is a determinant of undeclared work with the unemployed and under-employed being more likely to conduct undeclared work (although little evidence exists in the Eurobarometer surveys that this is the case).

In conclusion, if this paper stimulates researchers to re-evaluate how tax morale is measured (especially in terms of breaking it down into its sub-dimensions) and how to reduce the biases when analysing sensitive topics such as undeclared work, it will have fulfilled its main objective. If it also stimulates governments to implement measures aimed at nurturing trust to enhance citizens' tax morale, the paper will have fulfilled its broader objective.

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References

- Abrevaya, J. and Hausman, J.A. (1999), "Semiparametric Estimation with Mismeasured Dependent Variables: An Application to Duration Models for Unemployment Spells", *Annals of Economics and Statistics*, Vol. 55-56, pp.243-275, doi: 10.2307/20076198
- Allingham, M.G. and Sandmo, A. (1972), "Income Tax Evasion: A Theoretical Analysis", *Journal of Public Economics*, Vol. 1, pp.323-338, doi: 10.1016/0047-2727(72)90010-2
- Alm, J. and Torgler, B. (2004), "Estimating the determinants of tax morale", Proceedings: Annual Conference on Taxation and Minutes of the Annual Meeting of the National Tax Association, Vol. 97, pp.269-274.
- Alm, J. and Torgler, B. (2006), "Culture differences and tax morale in the United States and in Europe", *Journal of Economic Psychology*, Vol. 27 No. 2, pp.224-246, doi: 10.1016/j.joep.2005.09.002
- Andriani, L. (2016), "Tax morale and prosocial behaviour: evidence from a Palestinian survey", *Cambridge Journal of Economics*, Vol. 40 No. 3, pp.821-841, doi: 10.1093/cje/bev019
- Arezzo, M.F. and Guagnano, G. (2019), "Misclassification in Binary Choice Models with Sample Selection", *Econometrics*, Vol. 7 No. 3, 32, doi: 10.3390/econometrics7030032
- Autio, E. and Fu, K. (2015), "Economic and political institutions and entry into formal and informal entrepreneurship", *Asia-Pacific Journal of Management*, Vol. 32 No. 1, pp.67-94, doi: 10.1007/s10490-014-9381-0
- Castañeda Rodríguez, V.M. (2015), "La moral tributaria en América Latina y la corrupción como uno de sus determinantes", *Revista Mexicana de Ciencias Políticas y Sociales*, Vol. 224, pp.103-132, doi: 10.1016/S0185-1918(15)30005-2
- Chua, T.C. and Fuller, W.A. (1987), "A Model for Multinomial Response Error Applied to Labor Flows", *Journal of the American Statistical Association*, Vol. 82 No. 397, pp.46-51, doi: 10.2307/2289123
- Cummings, R.G., Martinez-Vazquez, J., McKee, M. and Torgler, B. (2009), "Tax morale affects tax compliance: evidence from surveys and an artefactual field experiment", *Journal of Economic Behavior & Organization*, Vol. 70 No. 3, pp.447-457, doi: 10.1016/j.jebo.2008.02.010
- D'Attoma, J. (2015), "A nation divided: assessing the regional effects of institutions, social capital, and civic culture on tax morale in Italy", dissertation thesis, University of Missouri-St. Louis, Missouri.
- Dell'Anno, R. (2009), "Tax evasion, tax morale and policy maker's effectiveness", *The Journal of Socio-Economics*, Vol. 38 No. 6, pp.988-997, doi: 10.1016/j.socec.2009.06.005
- [European Commission, \(2007\). Stepping up the fight against undeclared work COM\(2007\) 628 final. Brussels: European Commission.](#)
- Feld, L.P. and Frey, B.S. (2002). "Trust breeds trust: how taxpayers are treated", *Economics of Governance*, Vol. 3, pp.87-99, doi: 10.2139/ssrn.263351
- Feld, L.P. and Larsen, C. (2012), "Self-perceptions, government policies and tax compliance in Germany", *International Tax Public Finance*, Vol. 19 No. 1, pp78-103, doi: 10.1007/s10797-011-9196-6

- 1
2
3
4
5
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42
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44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
- Filippin, A., Fiorio, C.V. and Viviano, E. (2013), "The effect of tax enforcement on tax morale", *European Journal of Political Economy*, Vol. 32, pp.320-331, 10.1016/j.ejpoleco.2013.09.005
- Frey, B.S. and Torgler, B. (2007), "Tax morale and conditional cooperation", *Journal of Comparative Economics*, Vol. 35 No. 1, pp.136-159, 10.1016/j.jce.2006.10.006
- Gangl, K., Muehlbacher, S., de Groot, M., Goslinga, S., Hofmann, E., Kogler, C., Antonides, G. and Kirchler, E. (2013), "'How can I help you?': Perceived service orientation of tax authorities and tax compliance", *Public Finance Analysis*, Vol. 69 No. 4, pp.487-510, doi: 10.1628/001522113X675683
- Gerstenbluth, M., Melgar, N., Pagano, J.P. and Rossi, M. (2012), "How do inequality affect tax morale in Latin America and Caribbean?", *Revista de Economia del Rosario*, Vol. 15 No. 2, pp.123-135.
- Hausman, J., Abrevaya, J. and Scott-Morton, F. (1998), "Misclassification of the dependent variable in a discrete-response setting", *Journal of Econometrics*, Vol. 87, pp.239-269, doi: 10.1016/S0304-4076(98)00015-3
- Hofmann, E., Hartl, B., Gangl, K., Hartner-Tiefenthaler, M. and Kirchler, E. (2017), "Authorities' coercive and legitimate power: the impact on cognitions underlying cooperation", *Frontiers in Psychology*, Vol. 8 No. 5, pp.156-182, doi: 10.3389/fpsyg.2017.00005
- Horodnic, I.A. (2018), "Tax morale and institutional theory: a systematic review", *International Journal of Sociology and Social Policy*, Vol. 38 No. 9/10, pp.868-886, doi: 10.1108/IJSSP-03-2018-0039
- Horodnic, I.A. and Williams, C.C. (2022), "Tackling undeclared work in the European Union: beyond the rational economic actor approach", *Policy Studies*, Vol. 43 No. 1, pp.21-55, doi: 10.1080/01442872.2019.1649384
- ILO (2017), *ILO approach to strategic compliance for labour inspectorates*, ILO, Geneva.
- Kaplanoglou, G. and Rapanos, V.T. (2015), "Why do people evade taxes? New experimental evidence from Greece", *Journal of Behavioral and Experimental Economics*, Vol. 56 No. C, pp.21-32, doi: 10.1016/j.socec.2015.02.005
- Kirchgässner, G. (2010), "Tax morale, tax evasion, and the shadow economy", Discussion Paper no. 2010-17, University of St. Gallen, St. Gallen.
- Kirchler, E. (2007), *The Economic Psychology of Tax Behaviour*, Cambridge University Press, Cambridge.
- Kirchler, E., Muehlbacher, S., Kastlunger, B. and Wahl, I. (2007), "Why pay taxes? A review of tax compliance decisions", International Studies Program Working Paper No. 07-30, Andrew Young School of Policy Studies, Georgia State University, Atlanta.
- Lee, L.F. (2003), "Self-selection", Baltagi, B.H. (Ed.), *A Companion to Theoretical Econometrics*, Blackwell Publishing, Oxford, pp.383-409.
- Leonardo, G. and Martinez-Vazquez, J. (2016), "Politicians, Bureaucrats, and Tax Morale: What Shapes Tax Compliance Attitudes?", International Studies Program Working Paper 16-08, Georgia State University, Atlanta.
- Leonardo, G.M. (2011), "Politics and tax morale. The role of trust, values, and beliefs, in shaping individual attitudes towards tax compliance", dissertation thesis, Georgia Institute of Technology, Georgia State University, Atlanta.

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2
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42
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47
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51
52
53
54
55
56
57
58
59
60
- Lima, F.W.S. and Zaklan, G. (2008), "A multi-agent-based approach to tax morale", *International Journal of Modern Physics C*, Vol. 19 No. 12, pp.1797-1808, doi: 10.1142/S0129183108013357
- Lisi, G. (2015), "Tax morale, tax compliance and the optimal tax policy", *Economic Analysis and Policy*, Vol. 45, pp.27-32, doi: 10.1016/j.eap.2014.12.004
- Long, S. and Swingen, J. (1991), "The conduct of tax-evasion experiments: validation, analytical methods, and experimental Realism", in Webley, P., Robben, H., Elffers, H. and Hessing, D. (Eds), *Tax Evasion: An Experimental Approach*, Cambridge University Press, Cambridge, pp. 128-138.
- Mas'ud, A., Manaf, N.A.A. and Saad, N. (2015), "Testing assumptions of the "slippery slope framework" using cross-country data: evidence from sub-Saharan Africa", *International Journal of Business and Society*, Vol. 16 No. 3, pp.408-421, doi: 10.33736/ijbs.576.2015
- Mazzolini, G., Pagani, L. and Santoro, A. (2017), "The deterrence effect of real-world operational tax audits", Milan: DEMS Working Paper Series No. 359, University of Milan–Bicocca, Milano.
- Molero, J.C. and Pujol, F. (2012), "Walking inside the potential tax evader's mind: Tax morale does matter", *Journal of Business Ethics*, Vol. 105, pp.151-162, doi: 10.1007/s10551-011-0955-1
- Murphy, K. (2005), "Regulating more effectively: the relationship between procedural justice, legitimacy and tax non-compliance", *Journal of Law and Society*, Vol. 32 No. 4, pp.562-589, doi: 10.1111/j.1467-6478.2005.00338.x
- Murphy, K. (2008), "Enforcing tax compliance: to punish or persuade?" *Economic Analysis & Policy*, Vol. 38 No. 1, pp.113-135, 10.1016/S0313-5926(08)50009-9
- Murphy, K. and Harris, N. (2007), "Shaming, shame and recidivism: a test of reintegrative shaming theory in the white-collar crime context", *The British Journal of Criminology*, Vol. 47 No. 6, pp.900-917, doi: 10.1093/bjc/azm037
- Nardo, M., Saisana, M., Saltelli, A., Tarantola, S., Hoffman, A. and Giovannini, E. (2008), *Handbook on constructing composite indicators: Methodology and user guide*, OECD publishing, Paris.
- Ostapenko, N. and Williams, C.C. (2016), "Determinants of entrepreneurs' views on the acceptability of tax evasion and the informal economy in Slovakia and Ukraine: An institutional asymmetry approach", *International Journal of Entrepreneurship and Small Business*, Vol. 28 No. 2/3, pp.121-145, doi: 10.1504/IJESB.2016.076639
- Poterba, J. and Summers, L. (1995), "Unemployment Benefits and Labor Market Transitions: A Multinomial Logit Model with Errors in Classification", *The Review of Economics and Statistics*, Vol. 77, pp.207-216, doi: 10.2307/2109860
- Schmölders, G. (1970), "Survey research in public finance: a behavioural approach to fiscal theory", *Public Finance*, Vol. 25 No. 2, pp.300-306.
- Shaw, J., Slemrod, J. and Whiting, J. (2008), *Administration & Compliance*, Oxford University Press, Oxford.
- Sønderskov, K.M. and Dinesen P.T. (2016), "Trusting the state, trusting each other? The effect of institutional trust on social trust", *Political Behavior*, Vol. 38, pp.179-202, doi: 10.1007/s11109-015-9322-8

- 1
2
3 Strümpel, B. (1969), "The contribution of survey research to public finance", Peacock, A.T.
4 (Ed.), *Quantitative Analysis in Public Finance*, Praeger Publishers, New York, pp.14-
5 32.
6
- 7 Sumartaya, D. and Hafidiah, A. (2014), "The influence of taxpayer's awareness and tax morale
8 toward tax evasion", *International Journal of Business, Economics and Law*, Vol. 5 No.
9 1, pp.60-68.
10
- 11 Torgler, B. (2001), "What do we know about tax morale and tax compliance?", *International*
12 *Review of Economics and Business* (RISEC), Vol. 48 No. 3, pp.395-419.
13
- 14 Torgler, B. (2003), "Tax morale, rule-governed behaviour and trust", *Constitutional Political*
15 *Economy*, Vol. 14 No. 2, pp.119-140.
16
- 17 Torgler, B. (2004), "Cross-culture comparison of tax morale and tax compliance: evidence
18 from Costa Rica and Switzerland", *International Journal of Comparative Sociology*,
19 Vol. 45 No. 1-2, pp.17-43, doi: 10.1177/0020715204048309
20
- 21 Torgler, B. (2007), *Tax Compliance and Morale: A Theoretical and Empirical Analysis*,
22 Edward Elgar, Cheltenham.
23
- 24 Torgler, B. (2011), "Tax morale and compliance review of evidence and case studies for
25 Europe", Policy Research Working Paper No. 5922, The World Bank, Europe and
26 Central Asia Region.
27
- 28 Torgler, B. (2012), "Tax morale, Eastern Europe and European enlargement", *Communist and*
29 *Post-Communist Studies*, Vol. 45 No. 1-2, pp.11-25, doi:
30 10.1016/j.postcomstud.2012.02.005
31
- 32 Torgler, B. and Schneider, F. (2007), "What shapes attitudes toward paying taxes? Evidence
33 from multicultural European countries", *Social Science Quarterly*, Vol. 88 No. 2,
34 pp.443-470, doi: 10.1111/j.1540-6237.2007.00466.x
35
- 36 Torgler, B., Demir, I.C., Macintyre, A. and Schaffner, M. (2008), "Causes and consequences
37 of tax morale: an empirical investigation", *Economic Analysis and Policy*, Vol. 38 No.
38 2, pp.313-339, doi: 10.1016/S0313-5926(08)50023-3
39
- 40 Torgler, B., Garcia-Valiñas, M.A. and Macintyre, A. (2011), "Participation in environmental
41 organizations: An empirical analysis", *Environment and Development Economics*, Vol.
42 16 No. 5, pp.591-620, doi: 10.1017/S1355770X11000106
43
- 44 Trüdinger, E.-M. and Hildebrandt, A. (2013), "Causes and contexts of tax morale: rational
45 considerations, community orientations, and communist rule", *International Political*
46 *Science Review*, Vol. 34 No. 2, pp.191-209, doi: 10.1177/0192512112447117
47
- 48 Tyler, T.R., Sherman, L., Strang H, Barnes, G.C. and Woods, D. (2007), "Reintegrative
49 shaming, procedural justice and recidivism: The engagement of offenders'
50 psychological mechanisms in the Canberra RISE drinking and driving experiment",
51 *Law and Society Review*, Vol. 41, pp.533-586.
52
- 53 Vella, F. (1998), "Estimating models with sample selection bias: a survey", *The Journal of*
54 *Human Resources*, Vol. 271 No. 33, pp.127-169, doi: 10.1111/j.1540-
55 5893.2007.00314.x
56
- 57 Webb, J.W., Bruton, G.D., Tihanyi, L. and Ireland, R.D. (2013), "Research on entrepreneurship
58 in the informal economy: Framing a research agenda", *Journal of Business Venturing*,
59 Vol. 28 No. 5, pp.598-614, doi: 10.1016/j.jbusvent.2012.05.003
60

- 1
2
3 Webb, J.W., Tihanyi, L., Ireland, R.D. and Sirmon, D.G. (2009), "You say illegal, I say
4 legitimate. Entrepreneurship in the informal economy", *Academy of Management*
5 *Review*, Vol. 34 No. 3, pp.492-510, doi: 10.5465/amr.2009.40632826
6
7 Williams, C.C. (2014), *Confronting the Shadow Economy: Evaluating Tax Compliance and*
8 *Behaviour Policies*, Edward Elgar, Cheltenham.
9
10 Williams, C.C. (2018), *Entrepreneurship in the Informal Sector: An Institutional Perspective*,
11 Routledge, London.
12
13 ~~Williams, C.C. and Franic, J. (2015), "Tackling the Propensity towards Undeclared Work:~~
14 ~~Some Policy Lessons from Croatia", *South East European Journal of Economics and*~~
15 ~~*Business*, Vol. 10 No. 1, pp.18-31, doi: 10.1515/jeb-2015-0003~~
16
17 Williams, C.C. and Franic, J. (2016), "Beyond a deterrence approach towards the undeclared
18 economy: Some lessons from Bulgaria", *Journal of Balkan and Near Eastern Studies*,
19 18(1), pp. 90-106, doi: 10.1080/19448953.2015.1094269
20
21 Williams, C.C. and Horodnic, I.A. (2015a), "Explaining and tackling envelope wages in the
22 Baltic Sea region: an institutional perspective", *Baltic Journal of Management*, Vol. 10
23 No. 3, pp.295-312, doi: 10.1108/BJM-10-2014-0153
24
25 ~~Williams, C.C. and Horodnic, I.A. (2015b), "Explaining and tackling the shadow economy in~~
26 ~~Estonia, Latvia and Lithuania: a tax morale approach", *Baltic Journal of Economics,*~~
27 ~~Vol. 15 No. 2, pp.81-98, doi: 10.1080/1406099X.2015.1114714~~
28
29 ~~Williams, C.C. and Horodnic, I.A. (2015c), "Tackling the informal economy in Southeast~~
30 ~~Europe: an institutional approach", *Southeast European and Black Sea Studies*, Vol. 15~~
31 ~~No. 4, pp.519-539, doi: 10.1080/14683857.2015.1056980~~
32
33 Williams, C.C. and Horodnic, I.A. (2016a), "An institutional theory of the informal economy:
34 some lessons from the United Kingdom", *International Journal of Social Economics*,
35 Vol. 43 No. 7, pp.722-738, doi: 10.1108/IJSE-12-2014-0256
36
37 Williams, C.C. and Horodnic, I.A. (2016b), "Cross-country variations in the participation of
38 small businesses in the informal economy: an institutional asymmetry explanation",
39 *Journal of Small Business and Enterprise Development*, Vol. 23 No. 1, pp.3-24, doi:
40 10.1108/JSBED-02-2015-0021
41
42 Williams, C.C. and Horodnic, I.A. (2016c), "Tackling the undeclared economy in the European
43 Union: an evaluation of the tax morale approach", *Industrial Relations Journal*, Vol.
44 47 No. 4, pp.322-340, doi: 10.1111/irj.12142
45
46 Williams, C.C. and Horodnic, I.A. (2017a), "Explaining the informal economy in post-
47 communist societies: a study of the asymmetry between formal and informal
48 institutions in Romania", Polese, A., Williams, C.C., Horodnic, I.A. and Bejakovic, P.
49 (Eds.), *The Informal Economy in Global Perspective – Varieties of Governance*,
50 Palgrave Macmillan, Cham, pp. 117-140.
51
52 Williams, C.C. and Horodnic, I.A. (2017b), "Evaluating the illegal employer practice of under-
53 reporting employees' salaries", *British Journal of Industrial Relations*, Vol. 55 No. 1,
54 pp.83-111, 10.1111/bjir.12179
55
56 ~~Williams, C.C. and Horodnic, I.A. (2017c), "Tackling the informal sector in East-Central~~
57 ~~Europe", *Journal of Tax Administration*, Vol. 3 No. 2, pp.65-86.~~
58
59
60

- 1
2
3 ~~Williams, C.C. and Horodnic, I.A. (2017d), "Evaluating the policy approaches for tackling undeclared work in the European Union", *Environment and Planning C: Politics and Space*, Vol. 35 No. 5, pp.916-936, doi: 10.1177/0263774X16670665~~
- 4
5
6
7 ~~Williams, C.C. and Krasniqi, B. (2017), "Evaluating the individual and country level variations in tax morale: evidence from 35 Eurasian countries", *Journal of Economic Studies*, Vol. 44 No. 5, pp.816-832, doi: 10.1108/JES-09-2016-0182~~
- 8
9
10
11 Williams, C.C. and Krasniqi, B. (2018), "Explaining entrepreneurship in the informal economy: an institutionalist perspective", *Journal of Developmental Entrepreneurship*, Vol. 23 No. 2, 1850011, doi: 10.1142/S1084946718500115
- 12
13
14
15 Williams, C.C. and Puts, E. (2017), *Platform Survey Report: organisational characteristics of enforcement bodies, measures adopted to tackle undeclared work, and the use of databases and digital tools*, European Commission, Brussels.
- 16
17
18
19 Williams, C.C., Franic, J. and Dzhekova, R. (2014), "Explaining and tackling the undeclared economy in Bulgaria: an institutional asymmetry perspective", *The South-East European Journal of Economics and Business*, Vol. 9 No. 2, pp.33-45, doi: 10.2478/jeb-2014-0008
- 20
21
22
23
24 ~~Williams, C.C., Horodnic, I.A. and Burkinshaw, L. (2016), "Evaluating competing public policy approaches towards the informal economy", *International Journal of Public Sector Management*, Vol. 29 No. 4, pp.365-380, doi: 10.1108/IJPSM-01-2016-0005~~
- 25
26
27
28 Windebank, J. and Horodnic, I.A. (2017), "Explaining participation in undeclared work in France: lessons for policy evaluation", *International Journal of Sociology and Social Policy*, Vol. 37 No. 3-4, pp.203-217, doi: 10.1108/IJSSP-12-2015-0147
- 29
30
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32
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35
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Revisiting tax morale: evaluating the acceptability of business- and individual-level non-compliance on participation in undeclared work

Table 1. Variable in the models: definition and descriptive statistics

Variable	Definition	Mean/Mode	Missing (N=27,565)
Supply of undeclared work (dependent variable)	Dummy for participation in undeclared paid activities in the last 12 months	0.044	465
Female	Dummy for female	0.546	0
Age	Respondent age	51.52	0
TM	Tax morale (uni-dimensional)	2.481	1505
TM1	Tax morale (Business-level behaviour)	2.172	1308
TM2	Tax morale (Individual-level behaviour)	2.951	1293
Urban	Dummy for living in a town of any size	0.657	0
Occupation	Occupation of the respondent	Employed (43.69%)	0
Financial problems	Difficulty in paying bills	No financial problems (67.08%)	406
Detection risk:	Individual perception of detection risk	Fairly small detection risk (38.25%)	2838
Expected sanctions	Individual evaluation of sanctions if caught	Normal tax or social security contributions due, plus a fine (57.76%)	3010
Respondent cooperation	Interviewer evaluation of the respondent cooperation during the interview	1.51	0
Country			0

Table 2. Corrected probit estimates of the propensity to participate in undeclared work

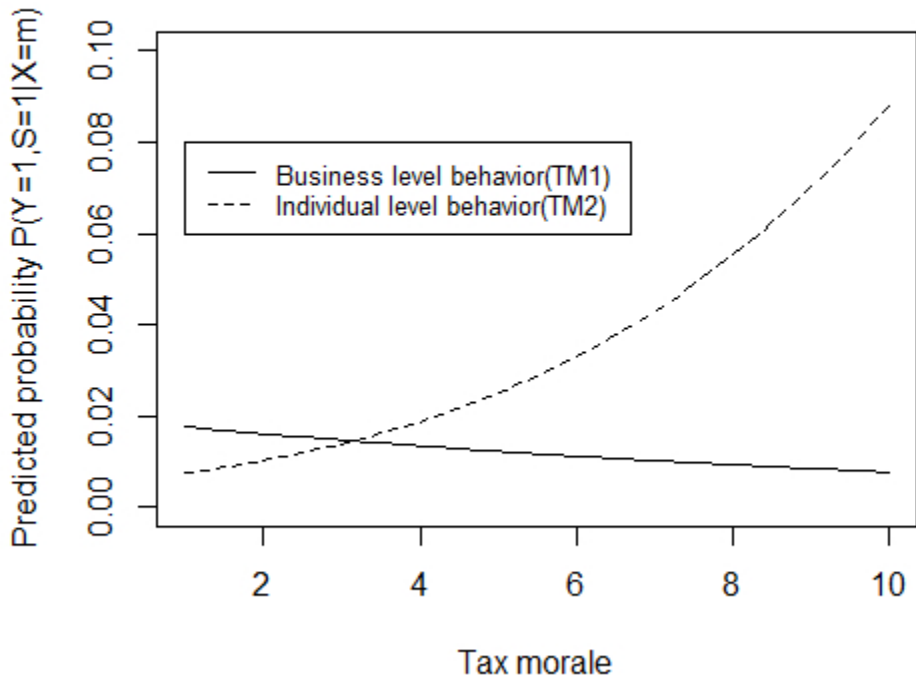
	Model 1			Model 2			Model 3		
	Estimate	Std. Error	Pr(> z)	Estimate	Std. Error	Pr(> z)	Estimate	Std. Error	Pr(> z)
(Intercept)	-0.586	0.159	0.000***	-0.529	0.208	0.011*	-0.532	0.181	0.003**
Female	-0.395	0.05	0.000***	-0.274	0.037	0.000***	-0.277	0.036	0.000***
Age	-0.017	0.002	0.000***	-0.013	0.002	0.000***	-0.012	0.001	0.000***
Tax morale (uni-dimensional)	0.055	0.049	0.259						
Tax morale 1 (Business-level behaviour)				-0.038	0.010	0.000***	-0.045	0.014	0.002**
Tax morale 2 (Individual-level behaviour)				0.127	0.012	0.000***	0.127	0.014	0.000***
Urban	-0.043	0.092	0.640	-0.006	0.036	0.878	-0.012	0.036	0.745
Occupation (Ref. Cat.: Unemployed)									
Self-employed	-0.377	0.074	0.000***	-0.064	0.075	0.396	-0.088	0.075	0.238
Employed	-0.407	0.088	0.000***	-0.363	0.064	0.000***	-0.369	0.062	0.000***
Inactive	-0.540	0.110	0.000**	-0.397	0.075	0.000***	-0.381	0.072	0.000***
Retired	-0.239	0.069	0.001**	-0.538	0.085	0.000***	-0.554	0.082	0.000***
Financial problems (Ref.Cat: Most of the time)									
From time to time	-0.456	0.069	0.000***	-0.280	0.059	0.000***	-0.282	0.057	0.000***
Almost never/never	0.026	0.138	0.848	-0.491	0.065	0.000***	-0.474	0.060	0.000***
Detection risk (Ref. Cat: Very small)									
Very high	-0.311	0.069	0.000***	-0.178	0.078	0.023*	-0.121	0.094	0.201
Fairly high	0.051	0.057	0.375	-0.293	0.059	0.000***	-0.216	0.082	0.009**
Fairly small	0.150	0.053	0.005**	-0.055	0.057	0.335	-0.039	0.060	0.510
Expected sanctions (Ref. Cat: Tax or social security contributions)									
Tax or social security contributions plus a fine	-0.154	0.131	0.239	-0.036	0.036	0.312	-0.139	0.061	0.023*
Prison	0.097	0.008	0.000***	-0.190	0.091	0.036*	-0.187	0.088	0.033*
Interactions:									
Very or fairly high detection risk * TM1							0.027	0.019	0.154
Very or fairly high detection risk * TM2							-0.034	0.018	0.059.
Tax or social security contributions + fine * TM1							0.007	0.017	0.668
Tax or social security contributions + fine * TM2							-0.017	0.016	0.293
AIC:			11788.41			11162.09			11162.09

^ Estimates for each country are not reported for the sake of brevity, but they are available upon request. Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Table 3. Summary results on testing the hypotheses

Hypothesis	Result
H1: The likelihood of participation in undeclared work increases as tax morale decreases, <i>ceteris paribus</i> .	Not confirmed
H2: Tax morale is a multidimensional concept and requires different dimensions to be properly measured.	Confirmed
H3: The likelihood of participation in undeclared work increases as each dimension of tax morale decreases, <i>ceteris paribus</i> :	Confirmed
H3a: The likelihood of participation in undeclared work increases as tax morale towards business-level undeclared work decreases, <i>ceteris paribus</i> .	Confirmed
H3b: The likelihood of participation in undeclared work increases as tax morale towards individual-level undeclared work decreases, <i>ceteris paribus</i> .	Confirmed
H4: The two dimensions of tax morale affect the likelihood of participation in undeclared activities with different magnitudes.	Confirmed
H5: The effect of risk detection and of perceived penalties varies according to the levels of each dimension of tax morale.	Partially confirmed
H5a: The likelihood of participation in undeclared work varies according to the levels of risk detection and the different dimensions of tax morale.	Partially confirmed
H5b: The likelihood of participation in undeclared work varies according to the levels of expected sanctions and the different dimensions of tax morale.	Not confirmed

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Predicted probability of a representative EU Citizen to participate in undeclared work by different tax morale dimensions

333x282mm (38 x 38 DPI)