Tax Morale: Framing and Fairness

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Highlights

- Framing in tax morale questionnaires significantly influences responses.
- Financial and tax literacy enhances the effect of fairness on tax morale.
- Factor analysis is complimented by an ordered logit estimation of the scaled proxy for tax morale.
- Important academic and policy implications regarding qualitative and quantitative research design.
- Double dividends from raising literacy regarding tax morale and magnified impact of fairness.

Tax Morale: Framing and Fairness

Abstract

Tax morale has been a focus of academics and policy makers for some time. The measurement of individuals' tax morale is subjective, and various proxies have been employed in qualitative and quantitative research. The framing of these measures has been considered in some research with respect to equivalency or goal framing, but the underlying implication of emphasis framing in commonly used proxies has yet to be considered. Further, although fairness and financial literacy have been considered determinants of tax morale, no one has yet considered whether financial and tax literacy (FTL) has a moderating effect on fairness and tax morale.

This research addresses these gaps in the literature. The findings suggest that questions and scenarios posed by academics and policy makers should consider positive, negative, and emphasis framing, as well as the moderating effect of the respondents' FTL to measure individuals' tax morale effectively. The findings also suggest that raising levels of FTL could have a double dividend: not only will improved FTL have a positive impact on tax morale, but it might be magnified through the impact of fairness. These findings hold only when morale is determined by negatively framed scenarios. In particular, the perceived fairness of the tax system enhances tax morale when FTL is high, whereas the perception of fairness has no effect on tax morale for respondents with lower levels of FTL.

1. Introduction

Tax morale is an area of considerable interest among policy makers, as research consistently points to a significant correlation between tax morale and tax compliance (see, e.g., Cummings et al., 2009; Daude et al., 2013; Song & Yarbrough, 1978; Torgler & Schneider, 2007). Governments worldwide have made a concerted effort to address perceived low levels of tax morale as nation-states address their respective tax gaps (OECD, 2015).

Social value orientation (SVO)[1] and the motivation to act prosocially (e.g., being compliant in tax reporting and payment) is recognized as a complex question. To add to the complexity, SVO can be manipulated by subtle interventions such as framing. The literature shows that tax compliance may be "framed as a public good dilemma, and that prosocial value orientation promotes cooperation in such dilemmas" (Brizi et al., 2015, 24). This research contributes to the tax morale literature by showing the significance of the framing of tax morale questions. Specifically, we consider the impact of emphasis framing of the proxies used to determine tax morale, which is discussed in Section 2.2. This is of particular importance in policy design to ensure the greatest impact on target audiences.

The perception of fairness in a tax system is found to be an important factor in tax morale (McKerchar et al., 2013; Roberts et al., 1994; Torgler, 2007). Despite the extensive studies that establish a relationship between fairness and tax morale, some authors suggest that such a relationship is likely to be moderated; however, this has yet to be well investigated in the literature (Hofmann et al., 2008). Our research examines the relationship between the perception of tax fairness and tax morale conditional on the level of financial and tax literacy (FTL).

FTL is measured in this research through five questions (three general and two specific to taxes). We define FTL as knowledge of rules and the ability to apply the rules in a given financial or tax scenario. Niemirowski et al. (2002) argue that low levels of tax knowledge are associated with negative attitudes toward tax, and the tendency is the opposite when respondents have better knowledge. Further consideration of the literature on FTL is in Section 2.4. This research draws a distinction between knowledge and literacy, in which the latter is

[1] Defined by Brizi et al. (2015, 23) as "the preference about the allocation of resources between self and others," originating in Kelley and Thibaut's (1978) theory of interdependence.

demonstrated through application. A deeper understanding of the relationship between FTL and tax morale is important in the ability to develop the right interventions so as to raise the tax morale of taxpayers.

This research focuses on the United States and the United Kingdom because of similarities and differences in their tax systems and outreach initiatives. First, both countries operate self-assessment income tax systems, but with fundamental differences in the levels of personal tax awareness in the US and the UK. Both administer self-assessment tax systems, however, a significant majority of UK taxpayers need not complete and submit individual tax returns. The pay-as-you-earn (PAYE) system in the UK is known to be the "most sophisticated withholding system in the world" (Gauke, 2011). In 2016, 45 million people were covered by the PAYE system, of whom only 7 million were required to complete a tax return (HMRC, 2017, 36). Second, the governments of both countries have introduced programs in the past decade with the goal of raising tax literacy but targeted different audiences. The US targeted the general population with the Taxpayers' "Bill of Rights" adopted by the Internal Revenue Service (IRS; 2014) in 2014, which followed Olson's (2009) ten-step approach to reducing the tax gap in the US. Step 7 proclaims that taxpayers' rights matter and that procedural justice and fairness are essential components of tax morale and affect taxpayer compliance. Raising taxpayers' awareness of the importance of tax revenue for the public good is essential, according to Olson (2009). In 2009, Kornhauser (2009) began to develop the Tax Literacy Project in the US, a nonpartisan effort to informally educate US citizens on tax matters. Since these initiatives, the IRS (2010) has offered taxpayer education over the years in various locations and adopted the seemingly friendly label "UncleFed's Tax Board." The UK targeted children with an initiative by HM Revenue and Customs (HMRC, 2015) to develop and disseminate its Tax Facts education program for teenagers. This was followed by Junior Tax Facts in 2016 for the benefit of primary schoolchildren (HMRC, 2016). Targeting young people is intended to inspire a

cultural change in attitudes toward personal taxation in the UK. However, the degree to which these tax education tools are included in the national curricula and their impact are still relatively unknown.

The US and the UK are not unusual in rolling out tax education programs and initiatives. *Building Tax Culture, Compliance and Citizenship* (OECD, 2015) offers initiatives for taxpayer education to 28 developing countries. There is a worldwide appetite for regulation (e.g., penalties and audits) to be accompanied by awareness campaigns as well as leveraging psychological and social factors to promote tax compliance effectively. This research will be useful in this vein.

An extensive literature considers various determinants of tax morale, from sociodemographic characteristics (e.g., age, gender, marital status, income, education, tenure) to social variables (e.g., government trust, fairness, political orientation). Despite the extensive research on the impact of individual perceptions of the fairness of tax systems on tax morale (see, e.g., Gilligan & Richardson, 2005; Song & Yarbrough, 1978; Torgler, 2003, 2006, 2007; Torgler & Werner, 2005; Wenzel, 2005), relatively little research has been done on the influence of FTL (the exceptions are Azwadi & Norsiah, 2014; Palil et al*.,* 2013; Wong & Lo, 2015), and no one has yet considered FTL as a moderator to fairness on tax morale. This research addresses that gap.

The influence of equivalency framing in tax academic and policy literature gathered momentum in the 1990s in terms of risk disposition (e.g., Kühberger, 1998; Levin et al., 2002) or goal orientation (e.g., Hasseldine & Hite, 2003). Emphasis framing is recognized in politics, psychology, and health research, but rarely considered in tax research (other than Cullis et al., 2006; Roberts et al., 1994). Yet the questions and statements commonly posed to measure tax morale are so varied that the impact of emphasis framing should be considered.

The research is based on survey data of 627 US and UK public and private sector employees and was conducted by a research team (including the authors) in 2015 as a part of larger data collection. The researchers explored the tax compliance ethics of the respondents with three statements that portray their respective tax systems in a positive frame (in which there would not be a reason to cheat), and four statements that portray the tax systems in a negative frame (in which there might be some perceived justification for cheating). This is consistent with the approach taken by Wong and Lo (2015) in their factor analysis of the same questions. The researchers also explored the levels of FTL of the respondents with three questions on basic financial literacy and two specifically focused on tax literacy. The results show a systematic variation of the effect of perceived tax fairness conditional on the FTL. Further, the way in which questions are framed is found to be important.

This research makes two significant contributions to the existing tax literature by examining the moderating effect of FTL on fairness and tax morale, while simultaneously considering the impact of emphasis framing on the respondents. The findings suggest a double dividend could be achieved by raising FTL because improved FTL has a positive impact on tax morale and can be magnified by the impact of fairness. The findings also suggest that, to measure individuals' tax morale effectively, questions and scenarios posed by academics and policy makers should consider positive, negative, and emphasis framing, as well as the moderating effect of the respondents' FTL.

The remainder of this paper is structured as follows: Section 2 reviews the relevant academic literature on tax morale, the framing phenomenon, fairness and tax morale, and other determinants of tax morale. Section 3 gives details on the research data and methodologies; Section 4 discusses the findings; and Section 5 offers our conclusions.

2. Review of the Literature

2.1 Tax Morale

Although tax morale was first conceptualized in the 1960s by the "Cologne school of tax psychology" (Schmölders, 1970), the usual starting point of a literature review on tax morale begins with criticism of Allingham and Sandmo's (1972) seminal work on motivational factors for taxpayer compliance. Theirs was a straightforward economic model, adapting Becker's (1968) model of crime to tax evasion, in which self-interested taxpayers decide how much income to declare based on a cost-benefit analysis of (non)compliance. Allingham and Sandmo's (1972) model was widely criticized as insufficient for fully explaining taxpayer's compliance with given likelihoods of detection (e.g., Alm, 1991, 1992; Barone & Mocetti, 2011; Brink & Porcano, 2016; Feld & Frey, 2002; Torgler, 2007; Torgler et al., 2010; McKerchar, Bloomquist, & Pope, 2013).

Research into tax morale thus began to grow. Tax morale is simply defined as the intrinsic motivations for individuals to pay taxes (Alm & Torgler, 2006; Frey & Torgler, 2007; Gordon, 1989). It is "conceived as a social norm linked to the perception of normative behaviours related to tax payments" (Brizi et al., 2015, 23). Research into tax morale and tax compliance consistently find a significant correlation between the two (e.g., Cummings et al., 2009; Daude et al., 2013; Song & Yarbrough, 1978; Torgler & Schneider, 2007), which is why tax compliance attitudes are often used as proxies for measuring of tax morale. "The question about tax morale has more to do with why people do not cheat rather than why they do" (Torgler, 2002, 658).

Togler, Schaffner, and MacIntyre (2007) reviewed the early literature that considered various theoretical considerations, including an altruistic approach (e.g., Chung, 1976), the Kantian morality approach (see Laffont, 1975; Sugden, 1984), and social customs (Akerlof, 1980; Gordon, 1989; Myles & Naylor 1996; Naylor, 1989). Kornhauser (2007) provided a review of

the next wave of literature (2000-2007), which further developed the theories and concepts established in the earlier literature. Her review considered the tax morale research in three major areas: cognitive and affective processes (see, e.g., Cullis et al., 2006; Hansen, 2003; Kahan & Braman, 2005), social norms and personal values/norms (see, e.g., Fehr & Fischbacher, 2004; Kolstad, 2007; Mazar & Ariely, 2006), and demographic factors (see, e.g., Hasseldine & Hite, 2003; McGee & Tyler, 2006; Togler, 2003, 2006). Horodnic (2018) provided a systematic review of tax morale literature using an institutionalist lens, recognizing the explored determinants (with the exception of socioeconomic characteristics) of tax morale can be characterized as belonging to either formal (e.g., authorities) or informal (e.g., social norms) institutions. Trust has been found to be the most salient factor, especially with regard to horizontal (peer) and vertical (authorities) trust (Horodnic, 2018).

In sum, the evolving tax compliance literature focus on identifying the determinants of tax morale, exploring trust and equity in various forms, religiosity, and culture. Individual sociodemographic characteristics (e.g., age, gender, marital status, employment status, income, and political affiliation) are often control variables in tax morale research. Previous studies have found that those who are more likely to have lower tax morale are younger people, male, unemployed, low income, or in informal employment. Horodnic (2018) and others suggest that they might represent target groups for policy measures related to awareness campaigns or target those with suitable tax education to seek to address their otherwise suboptimal tax compliance behavior from the perspective of the wider society.

Tax morale remains salient as national policy makers and supranational organizations address tax gaps. The 2015 OECD Report, *Building Tax Culture*, recognizes that global society is "witnessing a transformation of state-citizen relations and a cultural shift in tax administration" (OECD, 2015, 17). Resources directed at improving taxpayer education and facilitating greater appreciation for individual contributions to countries are deemed to be cost effective for

improving taxpayer compliance. Tax authorities, once reliant on a fear culture (e.g., fear of being caught and penalized), recognize citizens as allies, rather than mere "obligation holders." That said, cultural shifts are slow, and the public perception of tax authorities in many countries will take time to move from one of coercion and repression to one of partnership and alliance (OECD, 2015).

The proxies used to measure tax morale in research, whether through surveys or experiments, are responses to one or more questions, statements, or scenarios regarding the degree to which tax evasion might be justified. Many researchers (e.g., Alm & Torgler, 2006; McGee & Tyler, 2006; Torgler, 2003; Torgler & Schneider, 2007) have used data from the World Values (WV) and European Values (EV) surveys in considering the key determinants of tax morale. The question posed in WV and EV surveys that is commonly used in academic literature for determining tax morale is:

> Please tell me for the following statement whether you think it can always be justified, never be justified, or something in between. Cheating on taxes if you have the chance (10 – never, 1 – always).

The question is neutral in the way in which it is stated, in that it is not positively or negatively framed, and it is simple and straightforward, in that it does not ask the respondent to consider different frames of personal circumstances or tax system features. Other questions have been constructed and posed by researchers to explore the potential for differing responses. They pose different circumstances or scenarios in which the respondent is then asked to consider the justification for cheating on taxes. The questions frame the tax systems or the extenuating societal or individual circumstances in specific terms for the respondents' further consideration. Torgler establishes a set of ten questions in his doctoral research that are included in his subsequent work (Frey & Torgler, 2007). McGee and Tylor (2006) establish a

set of 18 questions in which three theories were explored in their research. Although it has been recognized that responses to multiple questions on tax morale improve the validity of the measure (Frey & Torgler, 2007; Lewis et al., 2009; Torgler et al., 2007), prior research did not consider the impact of emphasis framing on their respondents.

2.2 Framing Phenomenon

Tversky and Kahneman (1981, 453) defined decision framing as "the decision-maker's conception of the acts, outcomes, and contingencies associated with a particular choice," thus establishing decision theory in their seminal work. [2] It has since attracted a significant amount of interest in research and policy making, particularly after Kahneman (with Smith) was awarded the Nobel Memorial Prize in economic science for research in behavioral economics. Relevant literature crosses disciplines, from organizational behavior (Levin et al., 1998), to psychology (Lewis, 1982), to economics (Kahneman & Tversky, 1979).

Framing can be used in a "strict or loose" sense, whereas semantic manipulation is simply used in the former, and other contextual features are the latter. Research suggests that, although the questions or scenarios are identical in the strict sense or similar in the loose sense and should therefore not reflect any systematic preference, there is a general tendency of risk aversion for positively framed problems and risk seeking for negatively framed problems (Kühberger, 1998). This has been explored by some researchers (Levin et al., 2002) in tax compliance experiments that consider the effects of variations of audit probabilities and fines.

Druckman (2001) provided a framework for considering framing effects. First, he surmised that there were either frames in communication or frames in thought. Frames in communication

[2] Before Tversky and Kahneman, framing effects were first considered by Laswell, Berelson, Lazarsfeld, and McPhee in the 1940s (see Berelson et al., 1954).

are the "words, images, phrases and presentation styles" used to convey information (Druckman, 2001, 227). Frames of thought go beyond basic communication to harness the individual's situational perception. Such framing "reveals what an individual sees as relevant to understanding a situation" (Druckman, 2001, 228). The framing effect is a process in which frames in communication influence frames in thought, according to Druckman (2001).

Druckman (2001) goes on to distinguish between equivalency framing effects and emphasis (or issue) framing effects. The former is what Levin et al. (1998) surmised as strict framing, in which logically equivalent but semantically different statements are made. They are also referred to in the literature as valence framing effects when the positive or, alternatively, the negative aspects of the same situation are presented. Levin et al. (1998) distinguished three types of valence-framing effects: (1) risky choice, (2) attributes, and (3) goal framing.

The other type of framing effect discussed by Druckman (2001) is emphasis framing or issue framing. This is when an individual's focus is directed to certain aspects or characterizations of an issue or problem, rather than others. Unlike communication framing, emphasis framing is not logically identical ways of making the same statement (Druckman, 2001). This type of framing therefore falls under the loose sense of framing by Levin et al. (1998).

Two aspects of emphasis framing are found in the literature. First, the opinions of respondents can be influenced by different considerations. An example of this is research by Kinder and Sanders (1990) on the opinions of Caucasian people on affirmative action, that presents an underserved advantage frame or a reverse discrimination frame. The focus is on racial considerations or the respondent's direct interest under the respective frames. Second, researchers have observed that opinions can change under different frames with less attention paid to the underlying considerations. One example is in the research by Sniderman and Theriaults (1999) in which individuals' support varies if government spending for the poor is

framed as enhancing the chance that poor people can get ahead as opposed to resulting in higher taxes (Druckman, 2001).

Hasseldine and Hite (2003), recognizing that most of the tax compliance research on framing relates to risky choices, employed a goal framing methodology in their research. Until then, goal framing was "confined to the health persuasion and consumer judgement literatures" (Hasseldine & Hite, 2003). Regardless of typology, researchers typically rely on prospect theory[3] to explain the results of the framing phenomenon in the tax compliance literature.

Research on framing conducted by Roberts et al. (1994) and Cullis et al. (2006) are illustrative of what has been termed "emphasis" or "loose-sense" framing in that the scenarios are not identical, and the respondents' focus is directed to alternative scenarios. In the research by Roberts et al. (1994), the focus is on abstract versus concrete examples of tax progressivity. In the research by Cullis et al. (2006), the focus is on the magnitude of tax payments versus potential tax refunds.

Table 1 summarizes the methodological differences in framing with references to relevant non-tax and tax literature.

Table 1. Summary of Methodological Differences in Framing

Frame type	**What is manipulated?**	**Framing aspects (examples in literature)**	**Examples in tax literature of positivity and negativity in framing**
Equivalence (strict)	communication; semantics manipulation	Risky choice (sometimes known as decision outcome framing) (Asian disease problem; Tversky & Kanhneman, 1981)	Same tax obligations but variations in levels of penalties and/or risk of audit (e.g., Kirchler and Maciejovsky, 2001)
		Attribute (quality of ground beef (Levin et al., 1998)	Focus on the potential to benefit or gain (positive) or avoid a loss

[3] A cognitive psychology theory that describes the way in which people choose between alternatives that involve risk, in which the outcome probabilities are uncertain. See Kahneman and Tversky (1979).

		Goal (benefits or consequences of breast self-examination; Meyerowitz and Chaiken, 1987)	(negative) (Hasseldine & Hite, 2003)
Emphasis (loose)	thought; cognitive process	Different considerations (affirmative action; Kinder & Sanders, 1990) Less attention on underlying considerations	concrete versus abstract scenarios describing progressive and proportional tax systems (Roberts et al., 1994) Cullis et al. (2006) social welfare (positive) and taxes (negative) (Sniderman & Theriaults, 1999)

In this research, the framing of tax morale questions is also shown to be significant, and the framing methodology adopted is loose-sense, emphasis framing. Although we conceptualize that the tax systems are presented in frames that are either positive (in which there is no reason to cheat) or negative (in which there may be a reason to cheat), equivalence framing is not relevant. As the questions are not identical, and the respondent's focus is directed to particular aspects or characteristics of the issue, emphasis framing is the relevant typology. We are interested in the impact of emphasis framing, given the underlying importance of the various proxies used for measuring tax morale. This research clearly demonstrates that positivity and negativity in framing are not confined to the realm of equivalence framing. This research therefore builds on Roberts et al. (1994), Cullis et al. (2006), and Sniderman and Theriaults (1999), as reflected in Table 1, in the tax literature on emphasis (loose) framing.

2.3 Fairness and Tax Morale

The perception of fairness in a tax system is found to be an important factor in tax morale (McKerchar et al., 2013; Roberts et al., 1994; Torgler, 2007). The literature is divided, with some research demonstrating correlations between fairness and self-interest (Tyler, 1986) and

some finding little to no such influence (Sears & Funk, 1991a, 1991b). The one area in which support for economic self-interest has been found is personal tax burdens (Sears & Funk, 1991a).

However, the "postulate of narrow self-interest," which presumes that individuals have no interest in the outcomes of other people while they try to maximize their own outcome, "often fails to account for, or even roughly approximate, real [decision maker's] choice behaviour" (Murphy & Ackermann, 2014, 36). So, although (non)compliance with tax systems can be considered through the lens of self-interested economic impact, as first postulated by Allingham and Sandmo (1972), individual considerations of wider societal gains or losses are also recognized in tax morale literature (e.g., Alm, 1991; Eriksen & Fallan, 1996; Gilligan & Richardson, 2005; McGee & Tyler, 2006; Song & Yarbrough, 1978; Torgler, 2003; Torgler & Schneider, 2007). Murphy and Ackermann (2014), in their theoretical and methodological accounting of SVO,[4] recognized the motivation to act prosocially as a complex question, fostering active research across disciplines. Brizi et al. (2015, 24) reflect on prior literature that shows how tax compliance can be "framed as a public good dilemma, and that prosocial value orientation promotes cooperation in such dilemmas." Grosch and Rau (2017) and D'Attoma et al. (2020) are recent contributors to tax compliance literature in which SVO is a key determinant.

In his research on tax morale, Wenzel (2002) distinguished between perceptions of procedural justices and distributive justice. Wenzel (2002) found that justice was concerned with identity processes and referred to social identity theory (Tyler et al., 1997) on procedural justice and self-categorization theory (Turner et al., 1987) on distributive justice. Social identification

[4] Defined as "the preference about the allocation of resources between self and others" by Brizi et al. (2015, 23), originating in Kelley and Thibaut's (1978) theory of interdependence.

allows for a process of internalizing social norms as personal norms. According to Wenzel (2004, 2005), personal norms then mediate the impact of social norms on tax compliance. Wenzel (2002) concludes that perceptions of fairness play a role in some, not all, forms of taxpayer compliance. Only when respondents identify closely with the group is their behavior affected by these perceptions. Wenzel justified improvements in tax authorities' treatment of taxpayers to strengthen this identification of inclusion. This entails treatment with respect and dignity, wide and equal consultation, and demonstration of intentions of fairness and justice for the collective benefit (Wenzel, 2002).

Gilligan and Richardson (2005) surveyed postgraduate business students at three universities in Hong Kong and Australia. Their survey posed several questions on perceived tax fairness and tax noncompliance behavior. Cultural tax system and structural differences were hypothesized as explaining variations in correlation coefficients between the two places. D'Attoma et al. (2020) find that these variations affect the level of prosociability among the participants in the five countries in their study. In contrast, Torgler (2007) downplays the role of cultural differences (McKerchar et al., 2013).

The impact of the perceived fairness of the tax system on tax morale was considered in several papers (e.g., Alm, 1991; Eriksen & Fallan, 1996; Gilligan a&nd Richardson, 2005; Song & Yarbrough, 1978; Torgler, 2003; Torgler & Schneider, 2007). Torgler and Werner (2005) considered Germany's fiscal autonomy and tax morale in 2005. Many of Torgler's subsequent publications, which use the WV and EV surveys, consider the various aspects and key determinants of tax morale, one of which is perceived fairness. These surveys simplified tax morale into one question that was stated in a neutral way (i.e., not positively or negatively framed).

Despite the extensive set of studies that establish the relationship between fairness and tax morale, some authors suggest that the relationship is likely to be moderated, but it has yet to be well investigated in the literature (Hofmann et al., 2008). Social and national identity (Wenzel, 2002) and levels of education (Rodriguez-Justicia & Theilen, 2018) are investigated in the empirical literature as potential moderators of the relationship between perceived fairness and tax behavior.

2.4 Financial and/or Tax Literacy and Tax Morale

Education, in general, has been considered in many papers on tax morale, but relatively few consider the influence of FTL, specifically. Song and Yarbrough (1978) may have been the first when they considered influences on tax ethics and the impact of greater fiscal knowledge, concluding that great fiscal knowledge results in higher tax ethics. Torgler (2007) writes that tax knowledge is an important factor that increases compliance and Niemirowski et al. (2002) claim that it increases trust.

In a more recent study of trust and tax compliance among Malaysian working young people, Azwadi and Norsiah (2014) find that although increased tax knowledge does not necessarily have a significant effect on the level of trust in the tax system and the tax authorities, it might nevertheless increase tax morale.

The two other noteworthy studies in this area (Palil et al., 2013; Wong & Lo, 2015) are based entirely on student respondents. The main limitation of these studies is that students are not representative of the wider population. Our research surveyed public and private sector employees, which adds to the robustness of our findings.

In research conducted by Palil et al. (2013) in which religiosity was considered as a moderator between tax education and tax knowledge and tax compliance, the first hypothesis posed was

that there was a "relationship between awareness on tax education and tax compliance". The researchers did not find a significant relationship from their sample of 70 Malaysian MBA students.

Wong and Lo (2015) considered the impact of general and specific tax tuition provided to undergraduate and postgraduate students in a Hong Kong University on their tax compliance behavior. In their research, attention was paid to framing effects of their questions through factor analysis. Two ethics factors were identified: if (1) there was an excuse for tax evasion (e.g. the framing of the tax system is negative) and (2) if there was no good excuse for tax evasion (e.g. the framing of the tax system is positive). They concluded that different types of tax education affected the tax compliance decisions of the students.

In addition to the relatively little research done in the area of FTL and tax morale, there is an apparent gap in the literature in which FTL is considered as a moderator between perceived fairness of a tax system and tax morale. Yet previous discussions indicate that FTL might be an important channel through which tax morale is influenced, the focus has been on the joint effect of tax fairness and FTL on tax morale.

Hofmann et al. (2008) called for further research into possible moderator variables between fairness and tax behavior, reflecting on the contribution made by Kim (2002) on distributive justice. Social and national identify have also been tested empirically as possible moderator variables by Wenzel (2002). Where taxpayers identify socially or nationally, and if procedural and distributive justices to be high, tax compliance increases (Wenzel, 2002). By extension, we would expect distributive justice has a higher relevance for taxpayers who are more financially and/or tax literate.

We expect people who are more FT literate to be better aware of public finance and the arguably fair distribution of the tax burden through progressive taxation. We therefore expect

FTL to have a positive impact on the relationship between fairness and tax morale. This is in line with Niemirowski et al. (2002), who argue that low tax knowledge is associated with a negative attitude toward taxes, whereas the tendency is the opposite when respondents have better knowledge.

2.5 Other Determinants of Tax Morale

The relationship between tax morale and sociodemographic and economic factors (e.g., age, gender, education, marital status, income level) is well established in the literature (Rodriguez-Justicia & Theilen, 2018). In particular, women, people who are married, and the elderly have higher tax morale (Alm & Torgler, 2006; Torgler, 2005; Torgler & Murphy, 2004). Grosch and Rau (2017) found that women, on average, have higher SVO angles than men and surmised that individual SVO angles explain the gender effect. However, D'Attoma et al. (2020) consider gender-based behavioral differences across five countries and find that, despite differences in SVO overall, large gender differences still exist in tax compliance. Further, although SVO varies by gender in some countries, it does not vary between genders in all countries (D'Attoma et al., 2020).

The effect of the income level on tax morale is ambiguous. Some studies find a positive effect (Konrad & Qari, 2012), and others report a negative effect of income on tax morale (Alm & Torgler, 2006: Doerrenberg & Peichl, 2013). Likewise, the estimated effect of education on tax morale is unclear (for a review, see Rodriguez-Justicia & Theilen, 2018).

Psychology studies also imply that other variables—such as trust in government, political orientation, perceived norms on cheating, and personal and social norms—determines tax behavior (Hofmann et al., 2008; Kirchler, 2007; Wenzel, 2005). In Austria, trust in government social values, such as trust and pride, were found to influence tax morale (Torgler & Schneider, 2005). These aspects were then considered in a multicultural study in which responses to three

waves of WV surveys in the US and fifteen European countries were analyzed (Alm & Torgler, 2006). In this study, trust in parliament and trust in the legal system were the two trust variables, both of which yielded significantly positive effects on tax morale. This was replicated in research on three European countries by Schneider (2005).

In experimental tax research, Wahl et al. (2010) recognized the issue of using only students: that most of the participants are not familiar with paying taxes. This opens such research to criticism for using an artificial setting. They addressed this shortcoming by including self-employed taxpayers as a second sample in a replicated experiment. Their lab and online experiments considered the "slippery-slope framework," focusing on interactions between trust in government, the power of the tax authority, and tax compliance. Their conclusion called for improved treatment of taxpayers by the authorities, out of the desire to build trust and maximize compliance.

Personal norms, such as altruistic behavior and civic duty, enhance tax morale and compliance (Braithwait et al., 2003). In a study conducted in Sweden, social democrats were found to be more compliant than those who support liberalism (Wahlund, 1992). Taxpayer behavior also depends on perceived levels of evasion in society (see Frey & Torgler, 2007). The positive and significant effect of happiness on tax morale is well documented in empirical research (Torgler, 2004, 2005).

3. Data and Methodology

3.1 Data

The researchers surveyed 630 US and UK public and private sector employees. The data collection took place in 2015 as part of a larger data collection in which the research team had

the opportunity to feed in items for the constructs discussed in this paper. The data were collected using a panel service provider (i.e., Qualtrics) according to the specifications given by the research team. The sample requirements included gender balance, public/private sector balance, and equal distribution between British and American respondents. Furthermore, the survey included attention checks in order to screen out inattentive respondents. The final sample consists of 627 usable responses.

The tax morale of the respondents was determined by seven statements on tax evasion, three in which the tax systems were positively framed, and four in which the tax systems were negatively framed. The respondents were asked for their level of agreement or disagreement regarding justifiable cheating on a seven-point Likert scale. The statements and scales were taken from the literature (McGee et al., 2005). The researchers also explored the respondents' perceptions of fairness of the respective tax systems through three statements with a five-point Likert scale based on Gilligan and Richardson's research in 2005. The respondents' trust in government was considered on a scale from 1 (strong distrust) to 10 (strong trust), similar to that of other researchers, including Torgler and Schneider (2007). The respondents were also asked specifically about their trust in tax compliance by others with five varying ranges of noncompliance (e.g., 1%-20%, 21%-40%). The three financial literacy questions were taken from Rooij et al. (2011), and one of the two tax literacy questions was provided by Chen and Volpe (1998). The second tax literacy question on average and marginal tax rates in a proportional tax system is original to this research.

The demographics considered were gender, age, education, nationality, employment, tenure, marital status, the presence and number of children, income, and political affiliation. Other aspects explored in the survey were social and class perceptions, social and political engagement, and altruism, each with a basis in the literature.

3.2 Factor Analysis

The researchers adopted from the literature (McGee et al., 2005) seven questions assessing the respondents' ethics of tax evasion (tax morale). McGee et al. (2005) designed eighteen questions to address three views: a duty to pay the state, an anarchist view, and evasion, both ethical and unethical under the circumstances. Their analysis provided only descriptive statistics, presenting the relative scores for each question in rank order, the range, and then comparing male and female respondents' scores. To provide further interesting qualitative data, two open questions were also posed.

Wong and Lo (2015) use similar questions in their survey and employ factor analysis, identifying two ethics factors if (1) there was an excuse for tax evasion (e.g., the framing of the tax system is negative) and (2) if there was no good excuse for tax evasion (e.g., the framing of the tax system is positive). We extracted a subset (seven) of McGee's questions, which frames the tax system as distinctly positive (i.e., there is no good excuse for cheating on taxes) or negative (i.e., there is an excuse for cheating on taxes). Our analysis shows relatively large correlations among the questions, especially within the two groups, which incentivized the use of factor analysis to construct an index for a set of common factors.

Frey and Torgler (2007) suggest that a composite index of different items has advantages over the use of single questions. They believe that tax morale is multidimensional, and, as in psychometric studies, it needs to be measured with multidimensional tools. They argue that a composite index is more reliable because there is a lower probability that it will be adversely influenced by random errors than a single measure, which might not satisfactorily capture many facets of tax morale. Compared to a single-item measure, a multi-item index likely provides better score reliability by pooling information that the items have in common. A multi-item tool also increases validity by providing a more representative sample of information about the

underlying concept, and it increases precision by decreasing score variability (Torgler et al., 2007).

The first step is to perform an analysis on all seven tax morale questions. Both Kaiser and scree tests suggest that all the indicators (with factor loadings of more than 0.6) are loaded on two distinct factors: the first, which reflects the tax system in a positive manner (three questions), and the second, which reflects the tax system in a negative manner (four questions). Table 2 presents the rotated factor loading using a varimax routine.

Table 2. Factor analysis: Ethics of tax evasion questions

Question description *For each of the following statements, please tell me whether you think cheating on taxes is justifiable even if…*	Factor loadings Factor 1 (negative)	 Factor 2 (positive)
… most of the money collected is spent wisely.		0.9277
… a large portion of the money collected is spent on projects that do benefit me.		0.8532
... a large portion of the money collected is spent on worthy projects.		0.9236
… a large portion of the money collected is spent on projects that do not benefit me.	0.8358	
… a large portion of the money collected is spent on projects that I morally disapprove of.	0.7815	
… some of the proceeds go to support a war that I consider to be unjust.	0.8081	
... a large portion of the money collected is wasted.	0.8745	
% of variance explained	61.31%	20.10%

The two factors explained 81.4 percent of the variance in the data. Another approach is the application of principal component analysis (PCA) with correlated variables. This yields very similar results, with the correlation coefficient between the principal component and factors score of around 0.9.

Along with our preferred measured based on factor analysis, we measured both dimensions of tax morale with individual seven-point Likert scaled questions. The level of tax morale when the tax system is portrayed in a positive manner is assessed based on the question:

> *For each of the following statements, please tell me whether you think cheating on taxes is justifiable even if most of the money collected is spent wisely.*

The level of tax morale when the tax system is portrayed in a negative manner is assessed based on the question:

> *For each of the following statements, please tell me whether you think cheating on taxes is justifiable if money collected is spent on projects that do not benefit me.*

Answers range from 1 (strongly disagree) to 7 (strongly agree). We take the same approach as Torgler (2007) and convert a seven-point scale into a five-point scale, with values 5-7 observed together as category 0, as it does not show significant variations among respondents.

The survey also considered the respondents' perceptions of the fairness of the income tax system, as adopted from Gerbing (1988) and used extensively in the literature (e.g., Christiansen et al., 1994; Gillian & Richardson, 2005). Although these studies identify many dimensions on fairness (i.e., general fairness, exchange with government, special provisions, tax-rate structure, and self-interest), we focused only on the general fairness dimension to establish the moderating effect of FTL. For that purpose, we use three five-point Likert-style questions (i.e., very fair to vary unfair) to establish a modified version of the general tax fairness perception scale. The Cronbach's alpha score of 0.92 reflects the reliability of the indicators (exceeding the minimum acceptable level of 0.7-0.8; Nunnally, 1978; Vaske, 2008).

In order to measure financial literacy, we used a set of basic financial literacy questions similar to those in Rooij et al. (2011) to assess the numeracy (i.e., calculation of interest rates), the

effect of inflation, and the relationship between bonds and the interest rate. The concepts are the basis of basic financial transactions, financial planning, and day-to-day financial decision making. They were coupled with two questions on general tax literacy. One question was taken from Chen and Volpe (1998), in which the distinction between tax credits and tax deductions was considered. The other tax literacy question was an original one posed by the researchers, to explore whether the respondents' understand the tax structure as well as the distinction between marginal and average tax rates.

The study considered a wide range of sociodemographic characteristics of respondents, including age, marital status (dummy for married, separated/divorced, widowed), gender (dummy variable that takes a value of 1 if the respondent is a female and otherwise 0), nationality (dummy variable that takes a value of value 1 for UK and 0 for US), level of education (bachelor's degree, attended university-no degree, university degree, postgraduate, and other in comparison to certificate or diploma in higher education) and tenure (number of years of work).

The study also considered social variables as proxies for the level of identification of the respondents with the government and society. They are measures of trust in government, perceived norms of cheating by the other members of society, political orientation, and membership in community organizations. We followed Swank (2002) and coded political orientation in the UK and US as the following four groups: left and libertarian left (Green Party, Labour and Sinn Fein in the UK), right (Conservatives and Ulster Unionist in the UK and Republicans in the US), and secular centrist (Liberals, Social Democrats, and Scottish Nationals in the UK and Democrats in the US), none and others. We also control for personal and social norms, such as well-being and self-sacrifice.

Table 3 describes the variables and descriptive statistics. For Likert-type data and other ordinals, the median and/or frequency distribution is reported. For continuous and dummy variables, we report the mean and standard deviation.

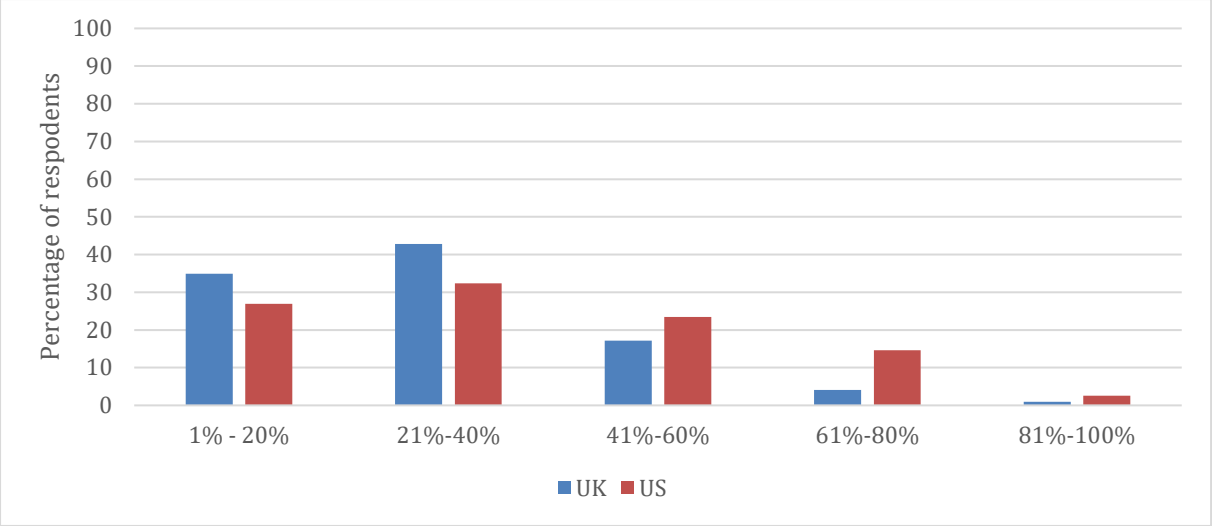
Table 3. Variable description and summary statistics.

Variables	Definition	Mean (standard deviation)	Median	Min	Max
	Dependent variable				
Tax morale					
Tax morale: positive	Composite index based on 3 positively framed questions on tax morale	1.467 (1)	1.703	-1.808	3.276
Tax morale: negative	Composite index based on 4 negatively framed questions on tax morale	0.847 (1)	0.940	-2.109	2.956
Tax morale: positive (categorical)	Individual perception tax ethics (justifiable cheating if money is spent wisely) on a scale from 1 (strongly disagree) to 7 (strongly agree). 5-7 observed as 0.	1.862 (1.112)	2	0	5
Tax morale: negative (categorical)	Individual perception tax ethics (justifiable cheating if money is on project that do not benefit me) on a scale from 1 (strongly disagree) to 7 (strongly agree). 5-7 observed as 0.	2.828 (1.859)	2	0	5
Variables of interest					
Perception of tax fairness	Individual perception of fairness of income tax on a scale 1 (very strong distrust) to 11 (very strong trust)	2.85 (1.11)	2.93	1	7
Financial and tax literacy	Number of correct answers to five financial and tax questions	1.87 (1.24)	2	0	5
Control variables					
Respondent age	Respondent's age	45.02 (14.10)	45		
Female	DV = 1 if a respondent is female; zero otherwise	0.500 (0.500)	0	0	1
Marital status	Married, separated/divorced/widowed in comparison to single (reference)				
Number of children	DV = 1 if a respondent has children; zero otherwise	2.31 (1.6)	2	0	1
Public sector	DV = 1 if a respondent is employed in the public sector; zero otherwise	0.498 (0.5)	0	0	1
UK	DV = 1 if a respondent is UK citizen; zero if a US citizen	0.5 (0.5)	1	0	1
Perceived norm of cheating	Response to question about the percentage of taxpayers who pay less tax than they legally owe. 1: 1-20%; 2: 21%-40%; 3: 41%-60%; 4: 61%-80%; 5: 81%-100%	2.13 (1.04)	2	1	5
Happiness	Scale that indicates how happy a person felt yesterday; higher value means happier.	7.76 (2.65)	8	0	11
Community organization	DV = 1 if a respondent is or was a member of a community organization; zero otherwise	0.543 (0.498)	1	0	1
Self-sacrifice	Response to the statement "I am prepared to make sacrifices for the good of society." Higher value means higher degree of agreement.	3.295 (0.956)	3	1	5

Control variables (continued)	Freq.	Percent
Level of education		
Certificate or diploma from an institute of higher education	182	28.89
Bachelor's degree	215	34.13
Attended university, but no degree	89	14.13
Postgraduate degree	90	14.29
Other	54	8.57
Gender		
Male	315	50.00
Female	315	50.00
Marital status		
Single	235	37.3
Married	298	47.3
Separated	97	15.4
Nationality		
UK	316	50.08
US	315	49.92
Sector		
Private and nonprofit	317	50.24
Public	314	49.76
Income groups		
1 Annual salary $0-$9,225 in the US and £0–£10,600 in the UK	81	12.84
2 Annual salary $9,226-$37,450 in the US and £10,601-£31,785 in the UK	259	41.05
3 Annual salary $9,226-$37,450 in the US and £31,786-£42,385 in the UK	188	29.79
4 Annual salary more than $90,751 in the US and £42,386 in the UK	103	16.32
Political orientation		
Right	189	29.95
Left and libertarian left	109	17.27
Secular centrist	147	23.30
None and others	186	29.48

The responses received to questions about the percentage of noncompliance by taxpayers in their specific country was astonishing. The country-specific results are illustrated in Figure 1. The majority of respondents in both countries (i.e., 65% in the UK and 77% in the US) believe that a significant number of taxpayers (e.g., at least 21%) cheat on their taxes.

Figure 1. Perceived norms of cheating by country



The researchers found that the perceived norm of cheating has a significant impact on tax morale, as shown in Table 4. Kocher et al. (2015) refer to social risk and natural risk in their research on contributions to a public good. They reflect on decision uncertainty and find that trust and cooperation are highly correlated.

Furthermore, we examine the correlation between variables, in Appendix Table A1. The matrix shows no clear pattern of correlation among the variables in the model, as correlations are generally weak (less than 0.4) or very weak (less than 0.2).

3.3 The Model

As previous studies assume that the effect of fairness on tax morale is not conditional on the level of FTL, we begin our analysis by testing this proposition on our data and first estimate model (1):

$$Tax\ morale_i = \beta_0 + \beta_1 Literacy_i + \beta_2 Fairness_i + \beta_3 Age_i + \beta_4 Female_i + \beta_5 UK_i +$$

$$\beta_6 Marital\ status_i + \beta_7 Income_i + \beta_8 Education_i + \beta_9 Public_i + \beta_{10} Children_i +$$

$\beta_{11}Tenure_i + \beta_{12}Trust_i + \beta_{13}Political_i + \beta_{14}Evasion\_perc_i + \beta_{15}Happines_i +$

$\beta_{16}Community\_org_i + \beta_{17}Self\_sacrifice_i + \varepsilon_{i,t}$ (1)

Further, to test our hypothesis that the influence of perceived fairness of the tax system on tax morale depends on the level of tax literacy, we estimate model (2):

$Tax\ morale_i = \beta_0 + \beta_1 Literacy_i + \beta_2 Fairness_i\ + \beta_3(Literacy_i * Fairness_i) +$

$\beta_4 Age_i\ + \beta_5 Female_i\ + \beta_6 UK_i + \beta_7 Marital\ status_i + \beta_8 Income_i + \beta_9 Education_i +$

$\beta_{10}Public_i + \beta_{11}Children_i + \beta_{12}Tenure_i + \beta_{13}Trust_i + \beta_{14}Political_i +$

$\beta_{15}Evasion\_perc_i + \beta_{16}Happines_i + \beta_{16}Community\_org_i + \beta_{17}Self\_sacrifice_i +$

$\varepsilon_{i,t}$ (2)

The dependent variable ($Tax\ morale_i$) is the indicator of tax morale for respondent i. The first set of independent variables comprises the main variables of interest: $Literacy_i$, which corresponds to financial and tax literacy; and $Fairness_i$, referring to the perception of fairness in the tax system and their interaction ($Literacy_i * Fairness_i$). In this case, β_3 reflects the effect of fairness when literacy is zero ($Literacy_i$ = 0) and the sum $\beta_1 + \beta_3 * (Literacy_i)$ reflects the effect of fairness at different levels of $Literacy_i$. Further, the model includes the sociodemographic characteristics of the respondents: age, gender, citizenship, marital status, economic status, level of education, employment sector (public or private), number of children, and tenure. Finally, we control for social and well-being factors, such as trust in government, political affiliation, the perceived norm of cheating, subjective well-being, community service, and self-sacrifice.

4. Results, Discussion, and Robustness Checks

4.1 Results and Discussion

The results summarized in Table 4 reflect tax morale as determined in model (1), in which the effect of fairness is not contingent on FTL, and model (2), in which it is; and for two factors: positively and negatively framed questions on tax morale. We measure FTL by the total number of correct answers on the three financial literacy and two tax questions (Table 4) and report the results based on the correct answers to individual questions (Appendix Table A1).

Table 4. Estimation results of models (1) and (2)

Method	(1-p)	(2-p)	(1-n)	(2-n)	(3-p)	(4-n)	(3-n)	(4-n)
	Ordinary least squares				Ordered logit			
Dependent variable	Tax morale (positive framing)	Tax morale (positive framing)	Tax morale (negative framing)	Tax morale (negative framing)	Tax morale (positive framing)		Tax morale (negative framing)	
Variables	Coeff	Coeff	Coeff	Coeff	Coeff.	Marginal	Coeff.	Marginal
Literacy	0.0801**	0.027	0.002	-0.2103**	-0.116	0.034**	-0.355**	0.025*
	(0.033)	(0.087)	(0.035)	(0.094)	(0.192)	(0.017)	(0.173)	(0.015)
Fairness	-0.069	-0.104	0.059	-0.082	-0.29085*	-0.029	-0.20693	0.023
	(0.043)	(0.075)	(0.044)	(0.075)	(0.150)	(0.021)	(0.138)	(0.019)
Literacy x Fairness		0.019		0.076***	0.090		0.166***	
		(0.030)		(0.031)	(0.064)		(0.059)	
Age range								
25-35	0.01327	0.00948	-0.21325	-0.22847	-0.08636	-0.01762	-0.36126	-0.07468
	(0.188)	(0.188)	(0.181)	(0.181)	(0.368)	(0.076)	(0.345)	(0.075)
35-45	0.25108	0.24354	-0.13866	-0.16892	0.37466	0.08329	-0.03500	-0.00771
	(0.200)	(0.201)	(0.193)	(0.194)	(0.377)	(0.081)	(0.374)	(0.083)
45-55	0.527***	0.526***	-0.05704	-0.062	0.914**	0.216***	0.259	0.059
	(0.201)	(0.201)	(0.198)	(0.198)	(0.386)	(0.084)	(0.386)	(0.087)
>55	0.49110**	0.486**	-0.120	-0.142	0.720*	0.16726*	-0.119	-0.026
	(0.207)	(0.208)	(0.202)	(0.201)	(0.397)	(0.086)	(0.391)	(0.086)
Female	0.176**	0.179**	0.046	0.061	0.203	0.048	0.235	0.051
	(0.088)	(0.089)	(0.084)	(0.083)	(0.176)	(0.042)	(0.177)	(0.038)
UK citizen	-0.118	-0.123	-0.001	-0.023	-0.347*	-0.083*	-0.145	-0.031
	(0.100)	(0.100)	(0.101)	(0.101)	(0.209)	(0.050)	(0.211)	(0.046)
Married	-0.405***	-0.407***	-0.028	-0.037	-0.614***	-0.146***	-0.370*	-0.079*
	(0.101)	(0.101)	(0.102)	(0.101)	(0.208)	(0.049)	(0.201)	(0.044)
Separated	-0.06669	-0.07196	0.08124	0.06010	-0.01175	-0.00293	0.16119	0.03754
	(0.130)	(0.131)	(0.137)	(0.138)	(0.278)	(0.069)	(0.255)	(0.060)
Income	-0.03935	-0.03864	0.03117	0.03401	-0.11688	-0.02798	-0.03952	-0.00856
	(0.047)	(0.047)	(0.045)	(0.044)	(0.093)	(0.022)	(0.091)	(0.020)
Education level								
Attended university,	0.092	0.096	0.431***	0.448***	0.471**	0.108**	0.960***	0.194***
no degree	(0.107)	(0.107)	(0.104)	(0.103)	(0.202)	(0.046)	(0.198)	(0.039)
Bachelor's degree	0.130	0.128	0.364***	0.356***	0.318	0.071	0.838***	0.165***
	(0.139)	(0.139)	(0.129)	(0.129)	(0.282)	(0.065)	(0.252)	(0.052)
Postgrad	0.256*	0.253*	0.522***	0.509***	0.758***	0.179***	1.012***	0.206***
	(0.132)	(0.132)	(0.125)	(0.124)	(0.273)	(0.065)	(0.252)	(0.054)
Other	0.343**	0.347**	0.169	0.186	0.932***	0.222***	0.546	0.101
	(0.151)	(0.152)	(0.167)	(0.169)	(0.317)	(0.077)	(0.368)	(0.075)

Public	-0.016	-0.018	0.010	0.003	-0.079	-0.019	-0.004	-0.001
	(0.080)	(0.080)	(0.079)	(0.079)	(0.162)	(0.039)	(0.160)	(0.035)
Number of children	-0.052*	-0.051*	-0.002	0.002	-0.116**	-0.028**	-0.013	-0.003
	(0.030)	(0.030)	(0.026)	(0.026)	(0.059)	(0.014)	(0.051)	(0.011)
Tenure	0.019	0.021	0.0021	0.006	0.014	0.003	0.049	0.011
	(0.031)	(0.031)	(0.030)	(0.030)	(0.066)	(0.016)	(0.063)	(0.014)
Government trust	-0.015	-0.015	0.073***	0.074***	0.005	0.001	0.087**	0.018**
	(0.020)	(0.020)	(0.021)	(0.021)	(0.041)	(0.010)	(0.044)	(0.009)
Political orientation								
Left and lib. left	0.022	0.019	-0.029	-0.037	-0.083	-0.019	-0.243	-0.051
Libertarian	(0.128)	(0.128)	(0.121)	(0.120)	(0.248)	(0.058)	(0.247)	(0.051)
Secular centrist	0.090	0.091	-0.027	-0.024	0.063	0.015	0.12904	0.029
	(0.115)	(0.115)	(0.107)	(0.107)	(0.237)	(0.057)	(0.226)	(0.051)
None and others	0.082	0.082	-0.016	-0.014	0.095	0.023	-0.088	-0.019
	(0.100)	(0.100)	(0.105)	(0.103)	(0.201)	(0.048)	(0.212)	(0.046)
Perceived norm of cheating	-0.113***	-0.113***	-0.224***	-0.224***	-0.281***	-0.067***	-0.430***	-0.093***
	(0.038)	(0.038)	(0.043)	(0.042)	(0.077)	(0.018)	(0.080)	(0.077)
Happiness	-0.013	-0.014	0.021	0.018	0.00005	0.00001	0.017	0.004
	(0.017)	(0.017)	(0.017)	(0.016)	(0.034)	(0.008)	(0.031)	(0.007)
Community_org.	-0.09458	-0.09220	-0.15875	-0.14920	-0.14595	-0.03494	-0.21923	-0.04750
	(0.097)	(0.097)	(0.097)	(0.096)	(0.209)	(0.050)	(0.201)	(0.044)
Self-sacrifice	-0.04251	-0.04092	-0.03783	-0.03145	-0.05398	-0.01292	-0.09305	-0.02016
	(0.046)	(0.046)	(0.044)	(0.044)	(0.091)	(0.022)	(0.092)	(0.020)
Constant	2.009***	2.105***	0.328	0.713*	2.009***	2.105***	0.328	0.713*
	(0.339)	(0.365)	(0.347)	(0.386)	(0.339)	(0.365)	(0.347)	(0.386)
Observations	627	627	627	627	627	627	627	627
R-squared	0.15	0.15	0.15	0.16				
Prob (LM statistic)					0.000	0.000	0.000	0.000

Notes: The reference group consists of man, US citizen, single, certificate or diploma from an institute of higher education, private sector, right political orientation; marginal effect (marginal) = highest tax morale score (4). Robust standard errors in parentheses; *** $p<0.01$, ** $p<0.05$, * $p<0.10$

Table 4 lists the results of the ordinary least squares (OLS) estimation of model (1) for the tax morale indices when tax morale is measured by positively and negatively framed questions. Considering that we have the same number of respondents in the US and the UK, we did not need to adjust data to reflect national population.

In addition to the aggregate fairness indicator in the factor analysis, we report fairness with an individual question that comprises the aggregate index. The results in Appendix Table A2 report the results from the individual questions.

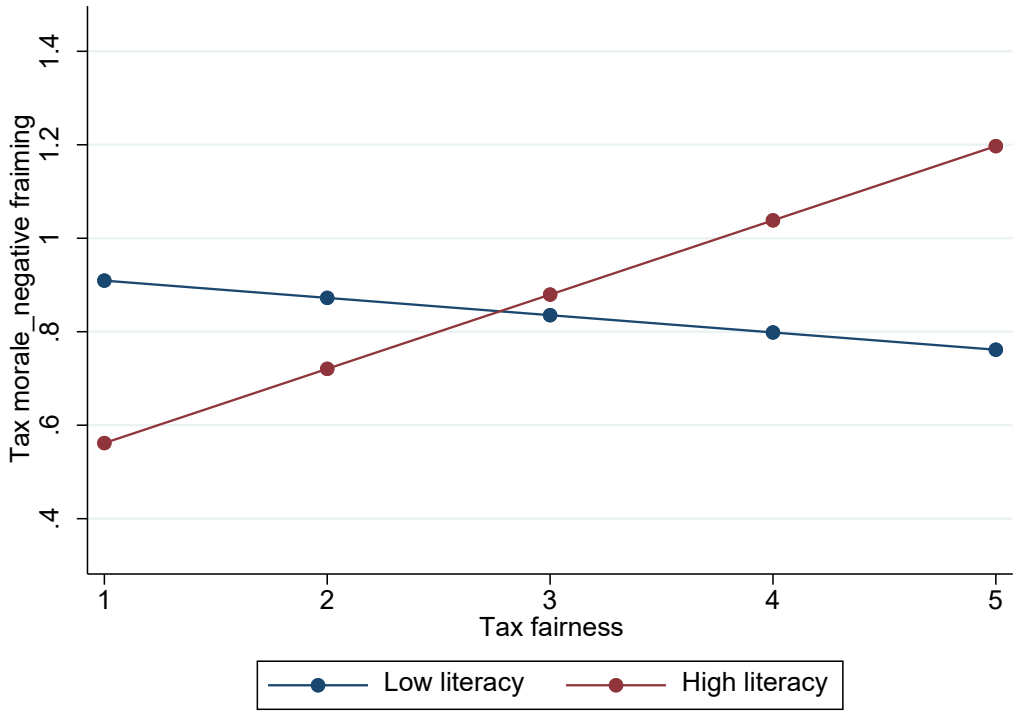
The analysis is complemented by ordered logit estimation of the scaled proxy for tax morale. With respect to the difficulty in interpreting the parameters of ordered logit (e.g., it only allows

interpretation of the sign of the estimated coefficient), we present the marginal effects to enhance understanding of the results. Marginal coefficients estimate the change in probability of belonging to a specific tax morale rank for a one-percentage-point increase in the independent variable. For the sake of simplicity, we report marginal effects for the highest value of the tax morale indicator.

Because of similarity in the OLS and ordered logit estimates, only the OLS estimates are discussed. For the positively framed tax morale questions, the interaction effect was not significant, but the main effects of literacy and tax fairness were. As expected, higher FTL increases tax morale. The positive and significant coefficient on the aggregate indicator of FTL indicates that higher literacy (as measured by the number of correct answers) results in higher tax morale, but the effect is significant only when questions are positively framed. However, the findings on the effect of fairness are unexpected: when the estimated results are significant (and that is the case when tax morale questions are positively framed), they show that tax morale is negatively influenced by an increased level of perceived fairness in the tax system.

Conversely, in the specification with the negatively framed tax morale questions, the interaction effect is significant, indicating that the effect of fairness on morale is conditional on the level of individual FTL. A simple slope analyses for a -1 and +1 standard deviation of FTL (Aiken & West, 1991) shows that fairness does not affect tax morale for people with less FT literacy ($\beta = -0.034$, ns), but fairness significantly increases the tax morale of those who are more FT literate ($\beta = 0.155$, $p = 0.007$; see Figure 1). The effect of fairness on tax morale at different values of FTL is plotted in Figure 1.

Figure 2. Simple slopes for the effects of tax fairness on "negative" tax morale at low versus high levels of FT literacy



The estimated coefficients in Table 4 indicate that the effect of fairness on tax morale increases as the literacy increases. Figure 2 shows that the higher a person's FT literacy is, the greater the effect of perceived fairness on tax morale. The perception of fairness on tax morale for respondents with very low levels of FTL is negative but insignificant, whereas fairness has a positive and highly significant effect for respondents with higher FT literacy.

We identify that influence of tax fairness on tax morale and FTL depending on the frame: whereas fairness does not have a statistically significant effect on positively framed tax morale, in case of negatively framed tax morale, perceived fairness increases morale but only for those who are more FT literate.

Tax morale increases with age and education, confirming findings in the literature (Andreoni et al., 1998; Konrad & Qari, 2012; Slemrod, 2007). However, the effect is significant only when questions are positively framed. Similarly, tax morale, as measured by positively slanted questions, is also affected by the gender, marital status, and the number of children. In particular, older respondents and women are more likely to have higher tax morale, whereas

tax morale is lower among married respondents than single respondents. These findings reinforce some of the previous findings in literature (e.g., Cummings et al., 2009). Although other empirical findings on the effects of marriage on tax compliance are ambiguous, our findings are in line with Andreoni et al. (1998) and Slemrod (2007), who also find that married people have lower tax compliance than the unmarried. Females report higher levels when tax morale question are positively framed, but the gender of respondents does not make a difference for negatively framed tax morale. This reiterates the findings from studies that do not look into framing effects, regardless of whether they use experimental (Alm & Jacobson, 2007) or survey data (Konrad & Qari, 2012; Torgler, 2006). Also, it is consistent with others that research framing effects. In particular, Hasseldine and Hite (2003) conduct an experiment with gain-/loss-framed questions on income declaration and find that women respond better to positively framed questions, whereas men exhibited better compliance when posed with negatively framed questions.

Regardless of framing, education and the perceived norm of cheating are significant in all specifications. Specifically, tax morale generally increases with higher education, whereas tax morale drops when more respondents believe that other members of society cheat. This is in line with earlier literature, which hypothesizes that tax morale decreases when we perceive that evasion is widespread (Frey & Torgler, 2007). Social variables, such as trust in government, seem to be important only when the tax morale questions are negatively framed; greater trust in government results in higher tax morale.

Framing does not make a difference in the effect of the perceived norm of cheating; it is unambiguously negative and highly statistically significant. Finally, more trust in government results in higher tax morale, and the effect is significant only for tax morale as measured by negatively framed questions. Other studies (Torgler & Murphy, 2004) find that trust in government supports morale, but they did not consider the framing of tax morale questions.

Several relevant results emerge from this study: (1) the framing of questions influences the responses used to determine tax morale; and (2) the effect of fairness on tax morale depends on the level of FTL but only when tax morale is determined by negatively framed scenarios. In particular, the perceived fairness of the tax system enhances tax morale when FTL is high, but the perception of fairness has no effect on tax morale for respondents with lower FT literacy.

The study shows that the two variables of interest (FTL and fairness) as well as the control variables have different effects on individual tax morale, depending on whether morale is determined by negatively or positively framed questions. In particular:

1. An individual's perception of the fairness of the tax system influences tax morale but that influence differs depending on the framing of tax morale questions and is conditional on the level of FTL. FT literacy enhances the effect of fairness on tax morale. However, the statistical significance of the effect of fairness depends on the way in which tax morale is measured. In the case of the positively framed tax morale questions, fairness has no statistically significant effect. When tax morale questions are negatively framed, tax morale is enhanced when an individual perceives the tax system to be fair, but the effect is statistically significant only for more financially and tax-literate respondents. In particular, the perception of fairness increases tax morale when FT literacy is high, whereas fairness has no effect on tax morale among less literate respondents.
2. Financial and tax literacy is expected to increase tax morale when it is measured by positively framed questions, regardless of the fairness of the system as perceived by the respondent. However, FTL raises tax morale as measured by negatively framed questions only for those who perceive relative fairness in the tax system.
3. Most of the control variables have plausible and expected signs. Sectors of employment (public or private), respondents' nationality (UK or US), the number of children, tenure, political orientation, membership in community organizations, self-sacrifice, and

respondents' perceived sense of well-being are not significant in either of the specifications (e.g., with or without interactions and positively or negatively framed in this study).

4.2 Robustness Checks

To isolate which area of literacy matters and check the sensitivity of our findings, we also analyzed the effect of literacy as measured by the individual questions (Appendix Table A2). Primarily, we wanted to check whether the composite literacy measure reflects only individual components (questions) or it is an overall measure of the aspects of financial literacy. For positively framed questions, the estimated results suggest that the effect is statistically significant only for those who answer numeracy question correctly. However, for negatively framed questions, the effect is statistically significant for all individual FL questions.

In addition to the aggregate fairness indicator in our factor analysis, we also report fairness by individual questions on fairness that comprise the aggregate index. The results from the individual questions are reported in Appendix Table A3. The overall reading of these results seems to suggest the absence of sharp differences across individual tax fairness questions as well as in comparison to the main results. For positively framed questions, the interaction is statistically significant when the fairness of the tax system for an average taxpayer is assessed, but for negatively framed questions, the effect of fairness perceived either as personal fairness for the respondent or general fairness seems to be conditional on FTL.

Following another stream of empirical literature (Alm & Torgler, 2006; Doerrenberg & Peichl, 2013; Heinemann, 2011), a seven-point scale of tax morale is proxied as a dichotomous choice, making a distinction between respondents who "strongly disagree" with cheating on taxes and all the other answers. Hence, tax morale is a dummy variable that takes a value of 1 if respondent "strongly disagrees" with cheating on taxes and zero otherwise. Given the

dichotomous nature of the dependent variable, we estimate a logit model, but the estimates are not statistically significant (Appendix Table A4).

5. Conclusions

This research makes two significant contributions. First, the findings show that the framing of questions, statements, and scenarios used by academics and policy makers to determine tax morale should be considered when they investigate the determinants of tax morale. In particular, this study shows that the variables of interest (literacy and fairness) as well as control variables have different effects on individual levels of tax morale with respect to whether morale is measured with positively or negatively framed statements.

Second, the findings show that FTL enhances the effect of fairness on tax morale. However, the statistical significance of the effect depends on the frame in which tax morale is measured. When the tax morale questions in this study were positively framed, the effect of fairness is not conditional on FTL. When negatively framed, tax morale was enhanced when the individual perceived the tax system to be fair on average and individually, but the effect was statistically significant only for more financially and tax-literate respondents.

Overall, the results show that perceived tax fairness has an effect on tax morale: it has no significant effect when tax morale questions are positively framed, but the effect is moderated by the level of FTL. When tax morale is measured with positive statements, a higher perception of tax fairness unusually tends to reduce tax morale among less FT-literate respondents, though fairness does not significantly influence the tax morale of more FT-literate respondents. However, when morale is measured with negative statements, perceived tax fairness increases tax morale among FT-literate respondents and has no effect on the tax morale of less FT-literate respondents.

These findings have further academic and policy implications. When academics and policy makers employ qualitative or quantitative methods for determining tax morale, the framing of the questions, statements, or scenarios must be considered. This can be extended to surmise that promotional literature produced for tax authorities should also consider the influence of framing to achieve the greatest impact. Although the tax authorities might not emphasize negativity in their tax systems deliberately, the framing has a significant impact on tax morale. Tax compliance could be improved by paying closer attention to the framing of such promotional material, as it could be instrumental in raising the tax morale of taxpayers.

Raising the levels of FTL could yield a double dividend. Not only does improved FTL have positively impact on tax morale, as shown in this and previous research, but it could be magnified through the impact of fairness.

This research focuses on the US and the UK because of the similarities and differences in their tax systems and outreach initiatives. Further research on the impact of recent education campaigns aimed at taxpayers in the US and young people in the UK is warranted. As the US and the UK are not alone in rolling out tax education programs, multinational research could make a significant contribution, complimenting work published by the OECD in 2015. There is a worldwide appetite for complementing regulations (e.g., penalties and audits) with awareness campaigns as well as leveraging psychological and social factors to promote tax compliance effectively.

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Appendix Table A1. Correlation matrix

	Age	Female	UK	Marital	Income	Education	Public	Children
Age	-							
Female	-0.1766***							
UK	-0.0054	-0.0048						
Marital	0.4512***	-0.0092	0.0000	-				
Income	0.1264***	-0.3393***	-0.1608***	0.1136***	-			
Education	0.0211	-0.0935	0.0123	-0.0052	0.0717	-		
Public	-0.0428	0.2044***	-0.0016	-0.0148	-0.1016*	0.0134	-	
Children	-0.1182***	0.0378	-0.0919**	-0.3969***	-0.1720***	0.0155	-0.0014	-
Gov_trust	0.0018	0.0174	-0.0052	0.0456	0.1225	-0.049	0.0496***	-0.0941
Tenure	0.4013***	-0.2068***	-0.0409	0.2313***	0.2193***	0.0232	0.0216	-0.1212
Polit.org	0.1227***	0.0565	-0.3654***	-0.0851**	-0.0457	0.0461	0.0126	0.0572
Perc.norm	0.0322	0.0815**	-0.1974***	0.0711*	0.0640	0.0759	0.0599	-0.0488
Happiness	0.1485***	-0.0359	-0.1641***	0.1877***	0.1749***	-0.0617	0.0002	-0.2122***
Self-sacrifice	-0.1348***	-0.1020*	-0.0922	0.0881	0.0240	0.0990	0.0997	-0.0259
Community org.	-0.0758	-0.0396**	-0.1067**	-0.0896	0.0307	-0.0171	-0.0158	0.0921**
FTL	0.2419***	-0.2419***	-0.0804**	0.0799**	0.2287***	-0.0102	-0.1603***	0.0563
Fairness	-0.1090***	-0.0283	0.2684***	-0.0192	0.0442	-0.095	0.0459	-0.1564***

	Gov_trust	Tenure	Polit.org	Perc.norm	Happiness	Self-sacrifice	Community.org.	FTL	Fairness
Age									
Female									
UK									
Marital									
Income									
Education									
Public									
Children									
Gov_trust	-								
Tenure	0.0038	-							
Polit.org	-0.0952	-0.0511	-						
Perc.norm	-0.1024	0.0467	0.0495	-					
Happiness	0.2806***	0.1236***	-0.0014	0.0277	-				
Self-sacrifice	0.1778***	-0.0579	0.0500***	-0.1025***	0.1911***	-			
Community org.	0.1599***	-0.0736*	-0.0620	-0.0365	0.1016*	0.2857***	-		
LFT	0.0651	0.2404***	-0.1159***	-9.0288	0.1221***	0.0318	0.1719***	-	
Fairness	0.3993***	0.0366	-0.1374***	-0.1500***	0.1134***	0.1407***	0.0818**	0.0025	

Appendix Table A2. Tax literacy assessed by individual questions; ordinary least squares estimates of model (1)

Variables	(1-p)	(2-p)	(3-p)	(4-p)	(5-p)	(1-n)	(2-n)	(3-n)	(4-n)	(5-n)
	Tax morale (positive framing)					Tax morale (negative framing)				
Fin_Lit_Numeracy	0.424*					-0.556**				
	(0.224)					(0.243)				
Fairness	-0.049	-0.132*	-0.066	-0.063	-0.091*	-0.034	-0.044	0.027	0.059	0.075
	(0.062)	(0.076)	(0.048)	(0.045)	(0.049)	(0.060)	(0.077)	(0.047)	(0.045)	(0.053)
Fin_Lit_Numeracy#Fariness	-0.035					0.182**				
	(0.077)					(0.077)				
Inflation		-0.065					-0.293			
		(0.256)					(0.278)			

Inflation#Fariness		0.107					0.176**			
		(0.085)					(0.089)			
Fin_Lit_Investment			0.005					-0.621**		
			(0.253)					(0.271)		
Fin_Lit_Investment			0.001					0.168*		
#Fairness			(0.091)					(0.093)		
Tax_literacy_1				-0.113					-0.508	
				(0.378)					(0.410)	
Tax_literacy_1				0.002					0.121	
#Fairness				(0.113)					(0.119)	
Tax_literacy_2					-0.251					0.091
					(0.251)					(0.245)
Tax_literacy_2					0.076					-0.024
#Fairness					(0.084)					(0.078)
Age range										
25-35	0.092	-0.006	0.032	0.036	0.028	-0.190	-0.239	-0.178	-0.180	-0.189
	(0.187)	(0.188)	(0.189)	(0.188)	(0.188)	(0.183)	(0.187)	(0.182)	(0.182)	(0.183)
35-45	0.324	0.20261	0.256	0.252	0.25370	-0.129	-0.168	-0.118	-0.109	-0.106
	(0.200)	(0.202)	(0.202)	(0.202)	(0.201)	(0.197)	(0.200)	(0.194)	(0.194)	(0.195)
45-55	0.561***	0.458**	0.525***	0.527***	0.528***	-0.031	-0.111	-0.029	-0.031	-0.039
	(0.197)	(0.204)	(0.202)	(0.202)	(0.201)	(0.201)	(0.205)	(0.199)	(0.199)	(0.200)
>55	0.503**	0.380*	0.48219**	0.482**	0.484**	-0.109	-0.229	-0.105	-0.119	-0.123
	(0.203)	(0.208)	(0.206)	(0.206)	(0.205)	(0.202)	(0.208)	(0.200)	(0.200)	(0.201)
Female	0.170**	0.182**	0.152*	0.147*	0.150*	0.062	0.083	0.043	0.049	0.052
	(0.086)	(0.087)	(0.088)	(0.087)	(0.086)	(0.083)	(0.082)	(0.082)	(0.083)	(0.083)
UK	-0.120	-0.133	-0.107	-0.111	-0.116	-0.002	-0.024	0.0007	0.0001	0.013
	(0.099)	(0.099)	(0.100)	(0.100)	(0.100)	(0.100)	(0.099)	(0.099)	(0.100)	(0.101)
Married	-0.374***	-0.344***	-0.357***	-0.356***	-0.361***	0.058	0.080	0.064	0.061	0.064
	(0.108)	(0.110)	(0.112)	(0.111)	(0.111)	(0.109)	(0.110)	(0.109)	(0.109)	(0.110)
Separated	-0.055	-0.045	-0.049	-0.049	-0.054	0.137	0.161	0.142	0.152	0.157
	(0.132)	(0.128)	(0.130)	(0.130)	(0.130)	(0.139)	(0.137)	(0.137)	(0.137)	(0.138)
Income	-0.036	-0.029	-0.030	-0.029	-0.030	0.040	0.039	0.043	0.0401	0.038
Education level										
Attended university,	0.065	0.111	0.136	0.141	0.139	0.446***	0.414***	0.445***	0.433***	0.428***
no degree	(0.106)	(0.107)	(0.104)	(0.105)	(0.104)	(0.105)	(0.102)	(0.102)	(0.103)	(0.103)
Bachelor's degree	0.162	0.139	0.150	0.153	0.146	0.365***	0.363***	0.383***	0.369***	0.372***
	(0.137)	(0.138)	(0.139)	(0.140)	(0.139)	(0.129)	(0.128)	(0.130)	(0.130)	(0.130)
Postgrad	0.252*	0.250*	0.287**	0.294**	0.284**	0.529***	0.484***	0.521***	0.518***	0.520***
	(0.130)	(0.130)	(0.131)	(0.132)	(0.130)	(0.125)	(0.124)	(0.125)	(0.124)	(0.124)
Other	0.324**	0.337**	0.317**	0.313**	0.312**	0.182	0.199	0.169	0.163	0.171
	(0.151)	(0.149)	(0.149)	(0.148)	(0.149)	(0.167)	(0.167)	(0.166)	(0.168)	(0.166)
Public	-0.016	-0.025	-0.039	-0.045	-0.042	0.006	0.017	0.004	-0.0002	0.012
	(0.079)	(0.079)	(0.080)	(0.080)	(0.080)	(0.078)	(0.079)	(0.079)	(0.078)	(0.079)
Number of children	0.111**	0.117**	0.129**	0.130**	0.129**	0.095*	0.086	0.101*	0.096*	0.096*
	(0.054)	(0.056)	(0.056)	(0.056)	(0.056)	(0.053)	(0.053)	(0.053)	(0.053)	(0.053)
Tenure	0.016	0.023	0.033	0.034	0.035	0.0007	-0.007	0.005	0.00223	-0.00108
	(0.031)	(0.031)	(0.031)	(0.031)	(0.031)	(0.030)	(0.030)	(0.030)	(0.030)	(0.030)
Government trust	-0.013	-0.018	-0.014	-0.014	-0.014	0.077***	0.069***	0.073***	0.073***	0.072***
	(0.019)	(0.019)	(0.019)	(0.019)	(0.020)	(0.021)	(0.021)	(0.021)	(0.021)	(0.021)
Political orientation										
Left and lib. left	0.064	0.040	0.023	0.022	0.023	-0.012	-0.006	-0.036	-0.023	-0.019
Libertarian	(0.130)	(0.128)	(0.129)	(0.128)	(0.128)	(0.122)	(0.119)	(0.120)	(0.120)	(0.122)
Secular centrist	0.077	0.101	0.081	0.073	0.078	-0.041	-0.007	-0.032	-0.043	-0.026
	(0.113)	(0.114)	(0.114)	(0.114)	(0.114)	(0.106)	(0.107)	(0.106)	(0.107)	(0.107)
None and others	0.090	0.089	0.071	0.065	0.069	-0.004	0.012	-0.023	-0.017	-0.006
	(0.099)	(0.099)	(0.101)	(0.101)	(0.100)	(0.103)	(0.102)	(0.103)	(0.105)	(0.105)
Perceived norm of	-0.113***	-0.106***	-0.111***	-0.109***	-0.111***	-0.219***	-0.215***	-0.219***	-0.219***	-0.219***
cheating	(0.037)	(0.038)	(0.038)	(0.038)	(0.038)	(0.043)	(0.042)	(0.043)	(0.042)	(0.043)
Happiness	-0.011	-0.009	-0.009	-0.009	-0.009	0.024	0.024	0.025	0.024	0.025
	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)
Community_org.	-0.091	-0.095	-0.080	-0.077	-0.074	-0.177*	-0.176*	-0.136	-0.156	-0.165*
	(0.096)	(0.096)	(0.098)	(0.098)	(0.097)	(0.097)	(0.096)	(0.097)	(0.096)	(0.098)
Self-sacrifice	-0.042	-0.037	-0.042	-0.040	-0.039	-0.033	-0.032	-0.036	-0.034	-0.039
	(0.045)	(0.047)	(0.047)	(0.047)	(0.047)	(0.044)	(0.044)	(0.044)	(0.044)	(0.044)
Constant	1.472***	1.761***	1.626***	1.622***	1.706***	0.242	0.247	0.081	0.011	-0.054
	(0.406)	(0.413)	(0.400)	(0.398)	(0.391)	(0.394)	(0.428)	(0.386)	(0.386)	(0.403)
Observations	626	626	626	626	626	626	626	626	626	626
R-squared	0.17	0.16	0.15	0.15	0.15	0.16	0.17	0.16	0.15	0.15

Notes: In the reference group are man, US citizen, single, certificate or diploma from an institute of higher education, private sector, right political orientation; robust standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.10$.

Appendix Table A3. Tax fairness assessed by individual questions; ordinary least squares estimates of model (1)

	(1-p)	(2-p)	(3-p)	(1-n)	(2-n)	(3-)
Dependent variable	Tax morale (positive framing)			Tax morale (negative framing)		
FT Literacy	0.137	0.107	0.185*	0.219**	0.235**	0.138
	(0.102)	(0.097)	(0.100)	(0.097)	(0.095)	(0.099)
TF_average	-0.098			-0.049		
	(0.071)			(0.069)		
FT Literacy #.TF_average	0.017			0.070**		
	(0.029)			(0.029)		
TF_personal		-0.047			-0.093	
		(0.069)			(0.068)	
FT Literacy#.TF_personal		0.009			0.076***	
		(0.028)			(0.029)	
TF_general			-0.135**			-0.060
			(0.066)			(0.068)
FT Literacy#.TF_general			0.033			0.042
			(0.027)			(0.028)
Age range						
25-35	0.029	0.035	0.008	-0.216	-0.193	-0.201
	(0.188)	(0.189)	(0.189)	(0.183)	(0.184)	(0.183)
35-45	0.253	0.266	0.234	-0.145	-0.126	-0.131
	(0.201)	(0.201)	(0.202)	(0.196)	(0.196)	(0.195)
45-55	0.512**	0.531***	0.490**	-0.045	-0.041	-0.057
	(0.200)	(0.200)	(0.201)	(0.199)	(0.200)	(0.199)
>55	0.441**	0.460**	0.413**	-0.146	-0.129	-0.149
	(0.205)	(0.206)	(0.206)	(0.201)	(0.201)	(0.201)
Female	0.179**	0.178**	0.176**	0.069	0.066	0.048
	(0.088)	(0.088)	(0.088)	(0.083)	(0.083)	(0.084)
UK citizen	-0.107	-0.127	-0.106	-0.021	-0.015	0.040
	(0.098)	(0.100)	(0.098)	(0.099)	(0.101)	(0.099)
Married	-0.364***	-0.365***	-0.369***	0.052	0.054	0.060
	(0.110)	(0.111)	(0.111)	(0.108)	(0.108)	(0.110)
Separated	-0.049	-0.044	-0.062	0.147	0.129	0.137
	(0.129)	(0.130)	(0.130)	(0.137)	(0.137)	(0.138)
Income	-0.03	-0.035	-0.035	0.042	0.042	0.037
	(0.048)	(0.048)	(0.048)	(0.043)	(0.043)	(0.044)
Education level						
Attended university,	0.109	0.105	0.113	0.447***	0.437***	0.445***
no degree	(0.106)	(0.107)	(0.107)	(0.103)	(0.104)	(0.105)
Bachelor's degree	0.136	0.141	0.129	0.365***	0.356***	0.370***
	(0.139)	(0.139)	(0.138)	(0.130)	(0.129)	(0.130)
Postgrad	0.262**	0.251*	0.264**	0.513***	0.503***	0.517***
	(0.131)	(0.131)	(0.131)	(0.124)	(0.124)	(0.124)
Other	0.337**	0.337**	0.339**	0.189	0.182	0.166
	(0.151)	(0.150)	(0.152)	(0.166)	(0.168)	(0.170)
Public	-0.016	-0.022	-0.016	-0.003	0.002	0.012
	(0.079)	(0.080)	(0.080)	(0.079)	(0.079)	(0.079)
Number of children	0.116**	0.121**	0.109*	0.095*	0.089*	0.089*
	(0.056)	(0.056)	(0.056)	(0.052)	(0.052)	(0.053)
Tenure	0.023	0.019	0.026	0.003	0.005	0.006
	(0.031)	(0.031)	(0.031)	(0.030)	(0.030)	(0.030)
Government trust	-0.016	-0.022	-0.015	0.071***	0.078***	0.081***
	(0.019)	(0.019)	(0.019)	(0.020)	(0.020)	(0.021)
Political orientation						
Left and liberal left	0.03343	0.04269	0.01920	-0.03267	-0.02659	-0.03021
Libertarian	(0.129)	(0.129)	(0.130)	(0.119)	(0.120)	(0.122)

Secular centrist	0.10846	0.10162	0.10517	-0.03616	-0.03147	-0.01633
	(0.114)	(0.115)	(0.114)	(0.106)	(0.106)	(0.108)
None and others	0.09593	0.09538	0.08979	-0.00992	-0.01053	-0.00728
	(0.099)	(0.099)	(0.099)	(0.103)	(0.103)	(0.104)
Perceived norm of	-0.112***	-0.107***	-0.110***	-0.219***	-0.223***	-0.220***
cheating	(0.038)	(0.038)	(0.038)	(0.042)	(0.042)	(0.043)
Happines	-0.012	-0.011	-0.009	0.023	0.021	0.025
	(0.017)	(0.017)	(0.017)	(0.016)	(0.016)	(0.017)
Community_org.	-0.094	-0.101	-0.095	-0.158	-0.143	-0.152
	(0.097)	(0.097)	(0.096)	(0.097)	(0.096)	(0.096)
Self-sacrifice	-0.041	-0.044	-0.044	-0.028	-0.034	-0.033
	(0.047)	(0.046)	(0.046)	(0.044)	(0.044)	(0.044)
Constant	1.064**	1.269***	0.958**	0.023	-0.121	-0.099
	(0.465)	(0.454)	(0.452)	(0.444)	(0.443)	(0.450)
Observations	626	626	626	626	626	626
R-squared	0.16	0.15	0.16	0.16	0.16	0.15

Notes: In the reference group are man, US citizen, single, certificate or diploma from an institute of higher education, private sector, right political orientation; robust standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.10$.

Appendix Table A4. Logit estimates of model (1)

	(1-p)	(2-p)	(1-n)	(2-n)
Dependent variable	Tax morale (positive framing)		Tax morale (negative framing)	
Variables	Coeff.	Marginal	Coeff.	Marginal
Literacy	-0.214	0.018	-0.141	0.019
	(0.187)	(0.018)	(0.202)	(0.018)
Fairness	-0.182	0.002	-0.031	0.026
	(0.146)	(0.022)	(0.157)	(0.021)
Literacy x fairness	0.101*		0.081	
	(0.061)		(0.064)	
Age_range				
25-35	-0.027	-0.006	-0.400	-0.080
	(0.378)	(0.086)	(0.433)	(0.091)
35-45	0.191	0.045	0.225	0.051
	(0.395)	(0.092)	(0.441)	(0.097)
45-55	0.549	0.133	0.331	0.076
	(0.405)	(0.095)	(0.458)	(0.102)
>55	0.266	0.063	-0.053	-0.011
	(0.411)	(0.095)	(0.450)	(0.097)
Female	0.176	0.043	0.142	0.031
	(0.191)	(0.046)	(0.206)	(0.045)
UK citizen	-0.386*	-0.093*	-0.067	-0.015
	(0.233)	(0.056)	(0.256)	(0.056)
Married	-0.482*	-0.116*	-0.261	-0.057
	(0.247)	(0.059)	(0.261)	(0.057)
Separated	0.023	0.006	0.043	0.009
	(0.310)	(0.077)	(0.316)	(0.072)
Income	-0.125	-0.030	-0.019	-0.004
	(0.105)	(0.025)	(0.103)	(0.023)
Education level				
Attended university,	0.564**	0.131**	1.063***	0.212***
no degree	(0.237)	(0.054)	(0.255)	(0.048)
Bachelor's degree	0.441	0.101	0.819**	0.155**
	(0.299)	(0.069)	(0.323)	(0.065)
Postgrad	0.779**	0.184**	1.129***	0.228***
	(0.313)	(0.074)	(0.314)	(0.065)

Other	0.970***	0.232***	1.104***	0.222***
	(0.339)	(0.081)	(0.366)	(0.081)
Public	-0.103	-0.025	0.013	0.003
	(0.182)	(0.044)	(0.191)	(0.042)
Number of children	0.213*	0.051*	0.114	0.025
	(0.124)	(0.030)	(0.133)	(0.029)
Tenure	0.004	0.001	-0.009	-0.002
	(0.070)	(0.017)	(0.074)	(0.016)
Government trust	-0.017	-0.004	0.048	0.011
	(0.035)	(0.009)	(0.036)	(0.008)
Political orientation				
Left and liberal left	-0.061	-0.015	-0.341	-0.071
Libertarian	(0.298)	(0.071)	(0.313)	(0.063)
Secular centrist	0.061	0.015	0.229	0.053
	(0.250)	(0.061)	(0.256)	(0.059)
None and others	-0.009	-0.002	-0.099	-0.022
	(0.238)	(0.057)	(0.256)	(0.056)
Perceived norm of	0.037	0.009	0.052	0.011
cheating	(0.037)	(0.009)	(0.039)	(0.009)
Happiness	-0.193**	-0.046**	-0.360***	-0.079***
	(0.090)	(0.022)	(0.100)	(0.022)
Community_org	0.026	0.006	0.036	0.008
	(0.218)	(0.053)	(0.218)	(0.048)
Self-sacrifice	0.031	0.007	-0.135	-0.029
	(0.091)	(0.022)	(0.095)	(0.021)
Constant	-0.321		-1.111	
	(0.879)		(0.966)	
Observations	626	626	626	626
Prob(LM statistic)	0.0010	0.0010	0.0012	0.0012

Notes: In the reference group are man, US citizen, single, certificate or diploma from an institute of higher education, private sector, right political orientation; robust standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.10$.