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Social Norms and Tax Compliance: Framing the Decision to Pay Tax

John Cullis, Philip Jones and Antonio Savoia*

Abstract

Observed levels of tax compliance are higher than predicted levels (when predictions are based on Allingham and Sandmo's neoclassical model of tax evasion). They are higher if social norms recognise the importance of compliance. But *how* do social norms frame decisions to pay tax? Can prospect theory be applied to shed insight into the way that social norms exert their influence? An analysis of questionnaire responses (from Italy and from the UK) suggests that they exert their influence by changing the reference points that individuals use when they code changes as 'gains', or 'losses'. The evidence suggests that social norms frame the decision to pay tax by changing individuals' perceptions of their entitlement to income. This consideration is important when designing policy to deter evasion.

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1. Introduction

A growing empirical literature insists that tax compliance is far greater (and tax evasion far lower) than anticipated. A "... purely economic analysis of the evasion gamble implies that most individuals ...evade if they are rational because it is unlikely that cheaters will be caught and penalized" (Alm et al 1992: 21). Andreoni et al (1998) noted that, in 1995, the audit rate in the United States for individual tax return was 1.7% and the civil penalty for underpayment of taxes was 20% of the underpayment. Very large values for risk aversion are required to predict actual values of tax compliance when evasion is predicted with reference to Allingham and Sandmo's (1972) neoclassical model.

International comparisons of tax compliance suggest that one explanation for differences in compliance might be differences in social norms (e.g. Torgler 2003:292 concludes that "...compliance is greater in societies with a stronger sense of social cohesion"). Studies that focus on behavioural experiments also indicate that individuals behave as if they will experience psychic costs if they fail to conform to social norms (e.g. Spicer 1986; Baldry 1986). Social norms are "...shared understandings about actions that are obligatory, permitted or forbidden" (Crawford and Ostrom 1995, quoted in Ostrom 2000: 143-4). But if social norms are important, *how* do they influence the decision to comply with tax?

This paper sets out to explore the way social norms frame the decision to pay tax. When prospect theory is used to predict behaviour (Kahneman and Tversky 1979) 'framing' is analysed with reference to 'loss aversion'. Citizens are more inclined to under-report income if tax is framed as a 'loss' and more likely to respond honestly if tax is framed as a 'gain' (see, for example: Chang and Schultz 1990; Robben et al 1990; Schepanski and Kelsey 1990 and White et al 1993). Here the objective is to

question whether prospect theory might also shed insight into the way social norms frame the decision to pay tax.

Section two of the paper applies Kahneman and Tversky's (1979) analysis to consider whether social norms influence the slope and the position of the value function (that stands at the heart of prospect theory). Section three describes the empirical model used to investigate the influence exerted by social norms. Section four discusses the data and the results. Conclusions and policy implications are discussed in the final section of the paper.

2. Social Norms and the Decision to Pay Tax

How are social norms mediated? Torgler (2003:292) shows that "...individuals who comply tend to view tax evasion as immoral..." and that "...individuals with tax evaders among their friends are more likely to be evaders...". This suggests social norms can be mediated in at least two ways. One is 'internally' (with reference to intrinsic value derived by being 'true to oneself') and 'externally' (with reference to intrinsic value derived by conforming to the behaviour of others). Ratto, Thomas and Ulph (2005) capture both of these influences when they argue that a taxpayer's welfare depends on:

- (i) $y(1-t)$, where y is income and t is the tax rate;
- (ii) wg , where wg is a 'warm glow' effect from acting honestly;

- (iii) $b(1 - m)$, where m is the proportion of the population that evades and b is the weight given to the social norm of tax compliance (i.e. dependent on $1-m$, the proportion of tax compliers).¹

In Allingham and Sandmo's (1972) 'classic' model of tax evasion as a choice under uncertainty $wg = 0$, but empirical studies suggest that both wg and $b(1-m)$ are likely to be positive (e.g. Frey and Torgler 2007).

Kahneman and Tversky (1979) argue that an individual's assessment of an uncertain action (V) can be described as:

$$V = \sum_{i=1}^n w(p_i)v(x_i) \quad (1)$$

where p is the perceived possibility of outcome x , $w(p)$ is the probability-weighting function and $v(x)$ is the value function. The probability-weighting function is not a linear function of probability; decision weights are not the same as probabilities, i.e. they are non-linear transformations of p .² The value function is defined over changes in income or wealth from a reference point usually represented by the origin. It has a particular shape, increasing at a decreasing rate in the +ve, +ve quadrant and decreasing at a decreasing rate in the -ve, -ve quadrant i.e. concave in gains and convex in losses. However, the curve is not symmetrical about the x-axis, being much steeper in the -ve, -ve quadrant. (If this was a conventional utility function it would indicate risk aversion for gains and (greater) risk-loving for losses.) In this

¹ The wider utility function employed is reminiscent of Kuran's (1990) account of multifaceted individuals with three sources of utility that broadly correspond to actors that inhabit the disciplines within social sciences. Income relates to the economic actor, the 'warm glow' reflects decision autonomy and the psychological actor and compliance with a social norm a sociological actor.

² Experiments suggest that individuals may overweight, or ignore very low levels of probability and exaggerate, or overweight, differences between high probabilities and certainty.

paper the objective is to accept this general ‘shape’ but to explore the impact that social norms may exert on the slope (‘swivelling’) and position (‘shifting’) of the value function, $v(x_i)$ and willingness to tax comply.

(i) *Social norms and the slope of the value function:*

Figure 1 illustrates two conventionally shaped value functions (for two ‘representative’ individuals who in order to connect with the empirical work reported below are labelled B for Britain and I for Italy). It is hypothesised that individual B lives in a community that displays a greater shared understanding that the public sector ‘should’ be supported than does individual I (a rationale for this hypothesis is provided below). As such, the values of wg and $b(1-m)$ are higher for B than for individual I . B derives higher intrinsic value (when complying with tax). B is more sensitive to the action of others (b is high) and as B is ‘representative’ s/he also believes that a large proportion of citizens comply with tax ($(1-m)$ is higher for B than for I). In summary, compared to I individual B believes that s/he lives in a society where there is a high prevalence of a norm for tax compliance (individuals think they ought to tax comply) and there is great strength to the norm (individuals do comply so m is high) and s/he gains a great deal of utility from this belief (b is high).³

As a result of these beliefs the value function for B is ‘swivelled’ around the origin in a clockwise direction compared to that of I . How does this affect predictions about comparative tax compliance?

³ These beliefs are based on ‘support for the public sector’. The impact on value functions depends on how much individuals are asked to support the public sector. Other beliefs can have a different impact (e.g. the belief that it is ‘right to abide by the law’ irrespective of the amount of tax that is to be paid). Here the first objective in this section is to focus on beliefs that change the slope of the value function and to test the predictions that are based on these beliefs.

FIGURE 1 [about here]

When each individual believes that tax is a 'loss' represented as distance $0-t_i$, the focus of attention falls on the south-west (-ve, -ve) quadrant of Figure 1 with 0 indicating the reference income, namely gross income. The loss is far greater for I than for B , because B derives greater 'psychic benefit' ($wg + b(1-m)$) when complying with a social norm. The value of the loss t_i is distance $t_i-4 = 0-v_i(B)$ for B . But the value of the same financial loss for I is distance $t_i-3 = 0-v_i(I)$. Both would prefer to avoid the loss (the value function is convex for both individuals) but I is more risk-seeking than B . Other things equal, B is more likely to comply with tax.

In contrast, if advance tax payments are made the reference point becomes the difference between gross income and advance tax payments made (see for example Shepanski and Shearer 1995). If taxes are over-withheld then each individual believes that tax is a 'gain' and the focus falls on the north-east (+ve, +ve) quadrant. In this case, both taxpayers experience a 'gain' because a withholding tax has been excessive and now both expect to experience a tax rebate. In the north-east quadrant of Figure 1, B and I consider a tax gain of $0-t_g$. The value of the gain t_g is distance $t_g-1 = 0-v_g(B)$ for B . The value of the same financial gain is greater for I being distance $t_g-2 = 0-v_g(I)$. Differences in the value of the gain are the inverse of differences in the loss experienced when making a tax payment. For B , the value of the financial gain is lower than the gain for I (because B also derives greater intrinsic value when supporting the public sector). The value of the financial gain to B is the monetary refund less the value that B imputes from the act of paying the tax. Both taxpayers are risk averse (as both value functions are concave in this quadrant) but individual I is more risk averse than individual B .

In summary, when the slopes of the value function are allowed to differ whilst individuals are risk-seeking in losses and risk-averse in gains, one individual is more risk-seeking in losses and more risk-averse in gains suggesting differentially more and less attempted evasion.

(ii) *Social norms and the intercept of the value functions:*

In Figure 2 attention focuses on the position of the value function. In Figure 1 'losses' and 'gains' are coded with reference to the *status quo* - gross income or income less advance tax payments (i.e. point O the reference income has a different interpretation depending on the tax system in place). However, Kahneman and Tversky (1979) argue that 'aspiration' levels may also act as reference points. They argue that "...there are situations in which gains and losses are coded relative to an expectation or aspiration level that differs from the *status quo*" (p.286). Figure 2 illustrates the way that different social norms might influence the location of reference points.

FIGURE 2 [about here]

In Figure 2, B and I are assumed to have the same gross income however B 's 'aspiration' reference point (R_B) differs from I 's 'aspiration' reference point (R_I). With evidence that individuals' goals serve as reference points (Heath, Larrick and Wu 1999), individual B 's goal is to retain the amount of personal income that s/he perceives to be consistent with a normative principle. They recognise that some tax should be paid. Individuals might reason that without the existence of a minimal state (policing and enforcing property rights, contract law and defending a country from external attack) their gross income levels are likely to be very much lower. Perhaps more nobly Bordignon (1993) has individuals modifying their behaviour in the light of

a social norm, based on a Kantian perspective, with each one assessing their fair share of tax payments towards the provision of public goods and services. In effect the individual sees the 'social norm' as the state having a legitimate property right over part of their income. Given this for individual B , distance $R_I - R_B$ in Figure 2 can be interpreted as the 'fair' tax contribution and the origin labelled R_I as gross income. For individual I the reference point (R_I) is the *status quo* gross income (at the origin of Figure 2) because, for individual I , there is no presumption that individuals 'should' make any contribution to provide goods and services in the public sector there is no positive fair tax for them. The signal that influences I 's reference point, or aspiration level, is the shared understanding that individuals have an entitlement, or property right, to all of their gross income.

To illustrate the argument above the representative, *ceteris paribus*, individuals will appear to have identical but laterally displaced ('shifted') value functions (by distance $R_I - R_B$). But what are the 'tax' implications? Assuming individuals are asked to pay a tax (t^*), the outcome for individual I is always in the 'loss' domain witness point 2 and associated 'value' $v(I)^*$. By comparison, the outcome for individual B is in the 'gain' domain as long as the tax does not exceed their conception of 'fair' taxation $R_I - R_B$. For the tax t^* point 1 and $v(B)^*$ are relevant for individual B . The reference point for I is R_I and the reference point for B is R_B . The implication is that B will be more risk averse than I who is predicted to be risk loving. (Of course, this prediction is sensitive to the value of the tax; if tax were set higher individual B would also be in the risk seeking domain i.e. outside the range $R_I - R_B$.)

If these interpretations are accepted then Figures 1 and 2 illustrate two different ways in which social norms might affect value functions and influence individuals' willingness to comply with taxation. In the changes of slopes ('swivelling') case taxes are coded in the same way by representative individuals but reacted to with different

intensities of response. In the 'shift' case taxes are coded differently by the representative individuals invoking a different behavioural response – a risk loving versus risk averse perspective with the latter implying greater voluntary tax compliance over a range – there should be greater honesty observed. The question is whether social norms are more likely to exert an influence on the slope of the value function, or on the intercept of the value function or both. Evidence of a 'shift' might come from greater observed 'out and out' honesty in the country in which B is representative. 'Swivells' suggest different intensities of response in I and B . If both are observed it would not be inconsistent with the hypothesis that value functions are both 'shifted' and 'swivelled' between countries.

3. Towards an Empirical Analysis of the Impact of Social Norms

The first objective is to test the proposition that social norms influence the decision to pay tax. If social norms are relevant, the second step is to consider the way they frame the decision to pay tax.

3.1 Do social norms exert an influence?

The first question is whether differences in social norms that might be attributed to *national fiscal identity* and to *education* are relevant when comparing individuals' willingness to evade. National fiscal identity is important when considering the way that social norms are imbibed and this paper compares responses in Italy with responses in the UK. National fiscal identity is important because signals are emitted in different countries by:

(a) *Political representatives*. Empirical studies indicate that citizens' perceptions of the intrinsic value of civic duty depend on signals emitted by political representatives (e.g. Jones and Hudson 2000). Traxler (2010) describes the 'externality' consequences of signals emitted by political leaders. While British politicians frown on tax evasion, the Prime Minister of Italy, Silvio Berlusconi, stated that evading taxes is not immoral if you deem they are high.⁴

(b) *Social institutions*. Edlund (1999:343) insisted that institutions are "...conceived as normative orders...". Different institutions emit different signals. In Italy the influence of the Catholic Church is obvious. Booth (2007) argues that the Catholic Church attaches greater importance to voluntary support *within families* (than to support coerced by the public sector).⁵ Historically, the coalition governments led by the *Democrazia Cristiana* party – since they first came into power in the late 40s – have used the redistributive capacity of state to establish patron-client relationships in the *Mezzogiorno* (e.g., via public employment, as documented in Alesina et al 2001). By comparison, British citizens set greater store by redistribution processes that take place via the public sector (Le Grand 2003).

(c) *The behaviour of others of the same nationality*. The informal sector can be defined as market-based production of goods and services, whether legal or illegal, that escapes detection in the official estimates of GDP (see Schneider 2002). If the value of wg (the 'warm glow' derived when performing an act) depends on moral

⁴ See the articles appeared on Corriere della Sera ("Berlusconi: giusto evadere le tasse esagerate", 17th February 2004 at http://www.corriere.it/Primo_Piano/Politica/2004/02_Febbraio/17/berlusconi2.shtml) and La Repubblica ("Berlusconi sull'evasione fiscale: Con tasse alte è autorizzata", 17th February 2004 at <http://www.repubblica.it/2004/b/sezioni/politica/cdlverifica2/incontro/incontro.html>).

⁵ In 'Catholic Social Teaching and the Market Economy' Booth (2007:121) cites the Rio Declaration: "Charity is more virtuous than redistribution through taxation because it is based on love and not coercion. Equality is not a goal that should be pursued for its own sake. Mechanisms of improving the condition of the poor by giving them access to property (widely defined) are regarded as desirable. The principle of subsidiarity demands that government and coercive measures are a last resort. Subsidiarity means that the family, not the State, not large organizations, must be given responsibility in managing and developing its own economy' (Rio Declaration on the Family: para. 3.12)."

consideration, $1-m$ (the perceptions that others comply with civic duty) depends on how others behave.

Table 1 reports estimates of informal economies for OECD countries and highlights the difference between the UK and Italy (Schneider 2002). The size of the informal economy influences perceptions of the way that other citizens behave.

TABLE 1 [about here]

As Schneider (2002:17) notes, within the informal sector there is "... a particularly tight relationship and ... 'social network' between people...". The percentage of the official labour force working in the informal sector was 20 to 35 per cent of the official labour force in Italy in 1979 and 30 to 48 percent in 2001-2 (Schneider 2002). In 2001-2, Italy's informal sector of 27 % of GDP was second only to Greece (28.5 %). In the United Kingdom less than half this percentage of GDP was produced in the informal sector (12.5%).

Signals are important. Consider responses to questionnaire surveys in Italy. The 2004 Survey of Household Income and Wealth by the Italian central bank (Banca d'Italia, 2006) presents an original section, collecting opinions about public spirit and tax evasion. Fiorio and Zanardi (2008) analysed the results. Focussing on such interview responses, the major share of Italian interviewees (37.47%) felt that the state was losing an amount of tax revenue that ranged between 20% and 30% of the revenues and this is not far from official estimates.⁶ It was also the case that individuals' perceptions were that people would be more likely to pay tax if they felt

⁶ The differences in perceptions are described in Table 1n:
TABLE 1n [about here]

that others in the country paid tax. Table 2 reports these responses. The importance of perceptions of the behaviour of others, i.e. $b(1-m)$, stands proud.

TABLE 2 [about here]

The proposition is that individuals are receptive to social norms in signals emitted by politicians, by social institutions and by the behaviour of others. Of course, there is considerable variation within different countries. Fiorio and Zanardi (2008) demonstrate that evasion is more pervasive in the south of Italy than in the north. The research department of Italian Revenue Office (*Agenzia delle Entrate*) has ranked the levels of tax evasion in 20 Italian regions, by absolute and relative amounts of undeclared income for the IRAP tax (Pisani and Polito, 2006), highest in the *Mezzogiorno*.⁷ But with this qualification, the testable proposition is that, other things equal, British citizens are more likely to comply with taxation.

While the main focus of this study is on differences that exist between individuals with different national fiscal identities, the opportunity is also taken to consider differences that might exist within national cohorts. The second testable proposition is that individuals who study different disciplines will differ systematically when focussing on willingness to comply with taxation. This proposition is drawn from a growing literature that suggests that students of economics take the behaviour of *homo economicus* to be the *norm* (neither wg nor $b(1-m)$ are likely to matter to these students). As an example consider Frank et al's (1993; 1996) report that, when students are faced with the 'prisoners' dilemma', there is greater instrumental behavior on the part of economics majors. They report that "...the probability of an

⁷ IRAP is the acronym for *Imposta Regionale sulle Attività Produttive* (it translates as "regional tax on productive activities"). It is a direct tax on companies' gross income levied by the Italian Regions representing approximately 50% of their revenues in 2006 and, for these reasons, is particularly suited to analyse the geography of tax evasion in Italy.

economics major defecting is almost 0.17 percent higher than the corresponding probability for a non major..."(1993:166).

It is important to note that it is possible to offer different explanations. First, if students of economics are more artful at tax evasion, this difference may exist because economics students are more adept at the calculations required to evade tax. (The study of economics may hone the skills required to evade *instrumentally*.) Second, students of economics, as a self-selected group, may already be different from other students (self-selection may be more relevant than the socializing impact of the discipline - see Cipriani et al 2009). In this study it will be possible to compare the extent to which students of economics act artfully at different stages of their university program but it is always possible that innate differences might have already distinguished individuals who have already chosen to study economics. With this qualification, the proposition considered in this paper is that there are systematic differences in willingness to pay tax between students of economics and students of other social sciences.

With all these qualifications, the first step is to test the hypothesis that *national fiscal identity* and *education* are relevant when explaining tax compliance.

(ii) *How do social norms exert an influence?*

If national fiscal identity and education are relevant, *how* do social norms influence decisions? Is it possible to assess the impact of social norms in terms of the influence they exert on the value function (that informs decision-making in prospect theory)? If so, is it possible to distinguish between the impact that social norms exert on the intercept and on the slope of the value function?

The value function has been used to analyse the importance of *framing* (Kahneman and Tversky 1979). With loss aversion, individuals are sensitive to the way that choice is framed. As illustrated in Figure 1, they may be more likely to risk tax evasion if tax is perceived as a 'loss'. Conversely, in situations in which tax is perceived to be a 'gain' they are far more risk averse. Citizens are more likely to under-report income if they are asked to declare income for tax, than if they are asked to declare income to receive a tax rebate (because governments have relied on a withholding tax). Studies have already reported this difference (e.g. Chang and Schultz 1990; Robben et al 1990; Schepanski and Kelsey 1990 and White et al 1993).

To focus on the way social norms influence decisions, the first step is to establish whether there is a framing effect based on loss aversion. Are individuals sensitive to the way that choice is framed? Are they more likely to be more honest in declaring income if they are claiming tax refunds? The second step is to consider whether there are differences in framing effects in different countries. While differences may depend on differences in attitudes to risk, they may also depend on different norms concerning payment of taxation. Does the slope of the value function differ for British citizens and for Italians?

If there is a difference, the objective will be to explain the difference. If there is no apparent difference in the impact of framing, but there is a difference in tax compliance, the implication is that social norms exert their influence on the intercepts of the value functions (as illustrated in Figure 2). If this is the case, the influence of social norms is encapsulated in the impact they exert on aspirations (to retain a greater, or lower, share of income). If tax compliance is lower in Italy (and Italians are more risk-seeking) the explanation is that aspiration levels differ and Italians are more likely to code tax as a 'loss'.

4. Empirical analysis: The Data and the Tests

The first question is whether social norms are relevant when individuals choose to comply with taxation. In section two of the paper, the argument is that the decision to comply with taxation depends on:

(a) *Pecuniary considerations*. Individuals' decisions are likely to depend on: the tax rate, the probability of detection and the fine for evasion (Allingham and Sandmo 1972). The tax rate and the fine are to be held constant in the empirical analysis in order to focus on the impact of audit rates (a '*detection*' factor).

(b) *Cognitive ability*. If decisions are sensitive to 'loss aversion', the test must also consider the extent to which tax is perceived as a 'loss' rather than a 'gain' (i.e. a '*framing*' factor).

(c) *Social norms*. If national fiscal identity and education are significant, the test must consider the way that these variables influence the decision to comply with taxation.

Cullis et al (2006) offer an approach that can be applied to analyse some of these issues. The authors analysed the responses of undergraduate students of economics and psychology in the UK. The students participated in a hypothetical experiment. Each participant was asked to imagine they were an established trader with a taxable income of £20,000 (30,000 €). They were then asked how much income they would declare when the probability of detection was 1%, 5% and 25% respectively. Half the participants were told that taxes had not already been deducted and the other half that taxes had already been deducted based on the previous year's income.

The authors reported statistically significant results when focussing on detection rates (participants declared more when the probability of detection rose). The *framing* effect was not statistically significant in the overall sample, but things changed radically when degree studied and gender were taken into account. Economists declared less in all detection conditions and declared less when tax had not previously been deducted (the *framing* factor).

Male economists declared less than male psychologists. Qualitative results revealed that it was much more common for psychologists to consider the moral aspects of tax compliance and not just their chances of getting caught. Economists were far more likely to view tax evasion as an amoral gamble.⁸ The social norm that compliance was the 'right thing to do' was stronger for psychologists.

In order to consider the relevance of *national fiscal identity*, the same questionnaire was distributed (under identical conditions) to students of economics and other social sciences at the University of Salerno. The University of Salerno is located in Campania (Naples being the capital city). This region was ranked fourth in Italy for tax evasion (Pisani and Polito, 2006). Further information about the questionnaires and the way the questionnaires were delivered (i.e. information given to students) is provided in the Appendix to this paper.

The full dataset (UK and Italian) is described in Table 3 (with reference to response variables, explanatory variables and their expected sign).

TABLE 3 [about here]

⁸ Half the participants were also deliberately instructed to behave instrumentally and the other half to respond as they would normally do (to ascertain the relevance of an '*instrumentality*' effect). Instrumentality was not relevant for the whole sample but male economists were more likely to behave instrumentally when asked to do so and they were also more susceptible to loss aversion.

The overall dataset comprises 965 questionnaires. Some 43% of respondents are male. Social science students are 35% of respondents. British (economics and other social science) students are 65% of respondents.⁹

Table 4 reports the proportion of (i) students of economics and (ii) students of other social sciences (mainly psychology) who were completely honest in the UK and in Italy.

TABLE 4 [about here]

Referring back to the discussion of Section 2(ii) of ‘out and out’ honest responses as a possible indicator of a value function ‘shift’ the evidence seems mixed. The data suggest a possible shift in the contrary direction to the one proposed for economists but one consonant with the discussion for non-economists.

4.1 Econometric methods and results

To design the econometric analysis, the first observation to make is that British and Italian students are asked questions at different times: first when the probability of investigation is 1%, second when it is 5% and, finally, when it is 25%.¹⁰ This means that it is possible to pool the data and treat it as panel data (where the time

⁹ The original database has also 29 cases where individuals have reported an income greater than £20,000 (21 of them are British), which is the total declarable income. Such values were discarded as the respondents were not seemingly engaging with the experiment.

¹⁰ The ordering of the questions is such that students are asked how much income they would declare with an *increasing* probability of detection. An anonymous referee has suggested that there could be another type of framing effect that relies on framing the questions with a *decreasing* probability of detection. This is an interesting theoretical possibility, which is worth exploring in future research. However, it is unlikely this would have any implications for the key empirical results of the paper, even if we assume it is a statistically significant effect. Omitting this type of effect from the regression would result in a biased coefficient of the national identity dummy, but only if the two variables were correlated. It is suggested here that there is no compelling reason to argue that the two are correlated.

dimension is expressed by the different probability of being investigated by the tax authority in each successive question).

The second observation is that, while the response variable is broadly continuous, the range is limited (the range is truncated at particular values of income). The amount of income declared (and its change) at different probabilities of audit is bounded between £20,000 and £0. As a result, the dependent variable is composed of 1008 uncensored observations and 1187 right-censored observations (of which 733, 61.75%, are reported by British students).¹¹

Samples are defined as 'censored' when the nature of the limitation of the data is a matter of how the data is recorded. The value of the dependent variable for individuals whose y_i is beyond the censoring point is not observed but the value of the explanatory variable is recorded. There is some discussion (see Wooldridge, 2002) about the interpretation of Limited Dependent Variables. Data that appears to be censored includes data that may be the result of a corner solution in a choice problem.¹² In this study, individuals' decisions on declared income may be zero or the full amount of earnings - but both genuine censoring and corner-solution cases can be treated with Tobit models (e.g. Fortin et al, 2007).

Tobit models focus on a latent variable y_{ik}^* , representing the desired amount of income reported by individual i at round k (with $i=1, \dots, N$; and $k=1, 2, 3$). While the desired amount is unobserved, it is possible to specify the regression model as:

¹¹ 282 individuals report the full amount of income in all three rounds (176 of them were British). There are also 49 left-censored observations. In one of the three rounds, 28 individuals (of which 24 are British) reported zero income. Seven individuals reported zero income in all three rounds (one of them was Italian). Eight reported zero in the first two rounds (one was Italian); the remaining thirteen only in the first round, when the probability of detection was 1%. But left-censored observations are a small share of the dataset.

¹² Zero-reporting may simply reflect the perception of the low probability of being investigated (rather than indifference on the part of subjects in the experiment).

$$y_{ik}^* = x_{ik}\beta + u \quad (2)$$

As y_i^* is observed if $y_{ik}^* > 0$ and if $y_i^* \leq 20000$, y_{ik}^* can be defined as:

$$y_{ik} = \begin{cases} y_{ik}^* = x_{ik}\beta + u & \text{if } 0 < y_{ik}^* \leq 20000 \\ 20000 & \text{if } y_{ik}^* > 20000 \\ 0 & \text{if } y_{ik}^* \leq 0 \end{cases} \quad (3)$$

At a *corner solution* there are no observations of values for y_{ik}^* for which $y_{ik}^* \leq 0$ and $y_{ik}^* \geq 20000$. However, the estimated coefficients are the marginal effects of a change in x_j on the unobservable latent variable.

Table 5 reports regression results. The dependent variable is the declared amount of income in the three rounds. The key results are those from Tobit regressions, in the last two columns. For ease of comparison, we report them alongside pooled OLS and Random Effects regressions. The estimates show that all the coefficients have the expected sign and most of them are statistically significant (in particular, the national culture dummy).

Tobit estimates can be compared with those from the OLS-based regressions to appreciate the differences with the censored regression framework. All the OLS slope coefficients are in absolute terms smaller than those for the Maximum Likelihood Tobit (the reduction being sizable). The OLS intercept is the largest. The impact of censoring on the OLS results depends on the proportion of censored observations (which in this case is 55%). As Tobit results are sensitive to the assumption of homoskedasticity, the standard errors have also been calculated by bootstrapping, but this does not alter the results significantly (using nonparametric bootstrap with 200 replications).

To test for robustness, regressions were extended to include nonlinearities, via interaction terms. However, adding interaction terms did not improve the explanatory power of the model. There was no evidence (for example) that the effect of British nationality is different at different probabilities of investigation (in column 3). Similarly, there was no evidence that the framing effect is more pronounced for a particular nationality.

TABLE 5 [about here]

With reference to the predictions in sections two and three of the paper, the results indicate that:

(1) Regardless of the probability of investigation, there is a statistically significant association between *national fiscal identity* and the decision to evade taxes. In all cases, British identity is positively and significantly correlated with more honest declaration of income. The marginal effects for an average individual are calculated and are reported in Table 6.

(2) *Education* is also relevant when explaining willingness to comply with taxation. With reference to Tables 5 and 6, the coefficients and the marginal effects for this variable support the proposition that individuals reading for a degree in social sciences (other than economics) declare higher incomes, on average. This result is consistent across the different specifications in Table 5. There is no evidence that this effect is nonlinear or that it depends on the year of study (or the probability of investigation).

(3) In Table 5 there is evidence of a '*framing*' factor that depends on 'loss' aversion (and this is robust across specifications).

(4) Tests undertaken to see if the *'framing'* factor depends on the type of degree, on national fiscal identity or the year of study (via cross-products) indicate that this is not the case. While framing (based on the extent to which individuals perceived tax compliance as a 'loss' rather than a 'gain') is relevant, the extent of the *'framing'* factor is not related to national fiscal identity.¹³

TABLE 6 [about here]

Before focussing on the implications of these results, it is important to acknowledge that they are based on questionnaire responses drawn from a group of individuals who have a very similar socio-demographic background. Datasets based on questionnaire responses are always open to the criticism that individuals have not understood questions, or that they have answered strategically. A dataset drawn from a very similar cohort may also be misleading if other socio-economic variables are relevant. If this is the case, regression estimates may be biased due to omission of relevant variables. However, with this qualification, empirical studies of tax compliance are usually premised on the way students respond to hypothetical situations (because the costs of focusing on a wider social cohort are formidable).

5. Conclusions

In an earlier study, Cullis et al. (2006) focussed on the determinants of willingness to comply with taxation. They noted the importance of the probability of detection and the relevance of systematic differences in tax compliance between economics students and students of other social sciences. Here, results (in section four) are

¹³ In Table 6 the non-instrumentality dummy is not statistically significant (although it takes the expected sign). Of course, instrumentality effects may already be captured by the type-of-degree variable.

based on a much larger dataset. They also highlight the importance of (i) the probability of detection and (ii) differences between economics students and students of other social sciences. However, the results indicate that differences in tax compliance also depend on differences in national tax culture. Both *education* and *national fiscal identity* are relevant when explaining tax compliance.

When focussing on the impact of social norms, the responses of economics students and students of other social sciences differ systematically. Students who focus on the behaviour of 'rational' *homo economicus* are more likely to be instrumental. Of course, the question is whether this difference is created by differences in different social norms imbibed from different disciplines, and this is difficult to answer. The results do not indicate that students of economics become more instrumental (in terms of their response to variables discussed in Allingham and Sandmo 1972) as they proceed from first to final-year undergraduate study of economics. It is possible that students may have imbibed different norms in their study of different disciplines before arriving at university. It is also possible that student responses may differ because individuals with different social norms choose different disciplines. With these qualifications, the evidence is that students of economics and students of other social sciences are guided by different norms when they are asked to comply with taxation.

This paper indicates that social norms depend on differences in national fiscal identity and Cullis et al. (2006) did not consider this issue. Here the results are consistent with the proposition that willingness to comply with taxation is sensitive to signals emitted by: political leaders, social institutions and by the presence of thriving informal sectors.

It is important to acknowledge that these conclusions are based on student responses. They are not based on comparisons between taxpayer responses in Italy and in the UK. Many empirical studies rely on students' responses, but it is not sufficient to ignore the criticism that student responses may differ from taxpayers' responses. This said, a growing literature now indicates that, if there are differences, the differences are not likely to be significant. Alm and Jacobson (2007) comment: "...there is now much evidence that the experimental responses of students are seldom different than the responses of other subjects (Plott 1987). There is no reason to believe that the cognitive processes of students are different from those of 'real' people".

Cullis et al. (2006) asked whether differences in social norms were relevant when explaining differences in tax compliance but here the focus is on a different question. This paper focuses on the way that social norms influence behaviour. An established literature indicates that social norms are relevant (e.g. see the survey by Torgler 2003), but *how* do they exert their influence?

Studies indicate that prospect theory is relevant when framing means that there is a difference between: (i) the perception that income must be declared to experience a 'loss' and (ii) the perception that income must be declared to experience a 'gain'. While the results (in section four) indicate that this difference in perceptions is relevant, they also indicate that social norms exert their own framing effect. Individuals' decisions are informed by value functions (as described by Kahneman and Tversky 1979) but the results also indicate that social norms influence the intercepts of value functions.

The results reported in this paper indicate that the slopes of value functions are similar for representative individuals in the UK and in Italy. When interactive terms

between framing and national identity were added they were not significant. If responses to framing effects (based on the slopes of value functions) are similar in Italy and in the UK, differences in tax compliance depend on differences in individuals' perceptions of entitlements to income. Social norms exert their influence on the reference points that individuals use when they code changes as 'gains', or 'losses'.

The absence of any evidence of differences in the slopes of the value functions and the presence of significant differences in willingness to comply with tax suggest that social norms exert their influence on the intercepts of value functions.¹⁴ The implication is that policymakers should focus on the way that social norms affect citizens' aspirations of their entitlement to their income.

This conclusion is consistent with results reported by Kirchler et al. (2009). Kirchler et al. analyse the impact of sunk costs on willingness to declare income. They argue that, if there are sunk costs producing high-effort income, individuals are more compliant (because they expect to pay tax on high-effort income). On the other hand, if they are in receipt of low-effort income (e.g. as a lottery win) there are no sunk costs and there is no expectation that they should pay tax. Individuals' perceptions of entitlement to income are quite different. Kirchler et al. conclude that the important observation is that this "...changes the reference point rather than the slope..." of the value function (p.488).

¹⁴ Two other considerations should be noted. The first is the possibility that there are differences in loss aversion in the UK and in Italy that perfectly offset differences in the impact of social norms. There is no evidence to suggest the presence of such a remarkable coincidence. The second is that differences in the positions of the value functions can be explained solely by a systematic difference in the presence of a remarkable behavioural anomaly. Fennell (2006) demonstrates that some taxpayers behave as if they have a preference for a withholding tax in excess of the tax that they will ultimately pay. If there was a systematic difference in this preference in the UK and Italy the position of the value function might be different in each country. However, in the absence of any reason to assume that there is such a systematic difference, the conclusion is that differences in social norms explain differences in the intercepts of representative value functions in the UK and in Italy.

The results in this paper augment a literature that indicates that differences in social norms in different countries are relevant when explaining differences in willingness to comply with tax but more than this, they also offer insight into the way social norms are imbibed. Social norms influence aspirations. They change the position of the value functions that individuals rely on when deciding whether to be risk-seeking or risk-averse. These conclusions are relevant when designing policy to deter tax evasion. While audit rates and fines are important, policy signals that influence perceptions of individuals' entitlements to income also influence tax compliance. Policy to deter evasion is likely to be more effective if attention is also given to the way that social norms frame individuals' perceptions of their entitlement to income.

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Appendix: The Data

This Appendix provides a brief description of the procedure and of the questionnaires.

(i) *The Procedure*: At the beginning of lectures to economics students and lectures to students of other social sciences (at the Universities of Bath and Salerno), the authors read a preamble that described the hypothetical experiment. In the preamble the authors assured respondents that there were no 'right' or 'wrong' answers and that students had plenty of time to respond. The same preamble was read on each occasion, and students were thanked for their co-operation.

Four different questionnaires (A, B, C and D) were distributed evenly across the students at the lecture. Each student received a written copy of the preamble and one of the four questionnaires.

(ii) *The Questionnaires*. The four questionnaires asked students to imagine that they were a hypothetical trader. Questionnaire A is presented in full at the end of this Appendix. Students were informed about their income, the rate of tax and the penalty for evasion. They were asked to report the amount of income that they would declare for taxation when the probability of detection was 1%, 5% and 25%.

One objective was to consider whether respondents (across different countries and across different academic disciplines) might be sensitive to framing effects.

Questionnaire C was identical to Questionnaire A, except that the trader declared income to receive a tax refund (because the government had relied on a withholding tax).

Another objective was to test whether respondents (across different countries and across different disciplines) might be sensitive to the instruction to act instrumentally. Questionnaire B was the same as Questionnaire A, except that in Questionnaire B each respondent was asked to maximise income. Questionnaire D was also the same as Questionnaire C, except that in Questionnaire D each respondent was asked to maximise income.

To describe the experiment, Questionnaire A is reported here in its entirety.

Questionnaires B, C, and D are reported in their entirety in Cullis et al (2006).

Questionnaire A

Thank you for helping us with our research. The information you provide is completely confidential and remember there are no 'right' or 'wrong' answers to the questions posed.

Please fill these in first

Degree Programme:

Year of study:

Sex:

Please answer the following questions in terms of what you would do in these situations

Imagine you are an established trader with a taxable income this year of £20,000. It is time to file your tax return and no tax has been deducted so far this year. The tax rate for the whole of the £20,000 is 30%.

Q1. In the following 3 cases you are asked to say what income you would state you earned. Remember the tax authorities conduct investigations of your response and if you are found to be evading, any detected undeclared income will be taxed at 60%.

Case 1

The probability of investigation is
1% (1 in 100)

The income I would declare is

£.....

Case 2

The probability of investigation is
5% (5 in 100)

£.....

Case 3

The probability of
investigation is
25% (25 in 100)

£.....

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Rank by % size	OECD Country	GNP at market prices (current US\$, billion) 2000	Informal Economy in % of GNP 1999/2000	Informal Economy (current US\$, billion) 2000	Informal Economy GNP per capita
15	Austria	1859,8	10,2	189,7	2572,4
3	Belgium	2290,6	23,2	531,4	5693,3
9	Denmark	1601,1	18,2	291,4	5875,0
8	Finland	1194,0	18,3	218,5	4598,8
12	France	13046,5	15,3	1996,1	3736,3
11	Germany	18592,5	16,3	3030,6	4094,6
1	Greece	1151,1	28,6	329,2	3420,6
10	Ireland	802,1	15,8	126,7	3580,3
2	Italy	10667,2	27,0	2880,1	5443,2
13	Netherlands	3675,4	13,0	477,8	3246,1
6=	Norway	1602,3	19,1	306,0	6595,2
4=	Portugal	1032,4	22,6	233,3	2513,1
4=	Spain	5524,0	22,6	1248,4	3408,1
6=	Sweden	2244,8	19,1	428,7	5183,7
16	Switzerland	2537,7	8,8	223,3	3356,3
14	United Kingdom	14170,7	12,6	1785,5	3078,2
	AVERAGE	5125	18	894	4150

Source: Based on Schneider (2002).

Percent	< 10%	10% - 20%	20% - 30%	30% - 50%	> 50%
Tax Loss	9.48%	23.13%	37.47%	21.06%	8.86%

Source: Fiorio and Zanardi (2008), based on Banca d'italia (2006).

Table 2 – Determinants of tax evasion: to what extent you would agree with the following statements?					
	Not at all	Very little	So-so	Quite a lot	Very much
1. People do not pay taxes because they know that the Government misuses the revenues	10.92%	15.20%	28.77%	28.35%	16.76%
2. People are compelled to evade taxes to make their business survive	12.67%	14.19%	31.68%	30.23%	11.23%
3. People do not pay taxes because of complicated taxing procedures	26.22%	20.71%	27.61%	18.74%	6.72%
4. People are more willing to pay taxes if they know that everyone else does	2.68%	5.53%	15.24%	35.22%	41.33%
5. Some people do not pay taxes because tax rates are too high	10.24%	13.88%	29.37%	31.36%	15.15%
6. Some people do not pay taxes because the probability of being caught is low	7.11%	11.40%	27.70%	33.55%	20.24%
Source: Fiorio and Zanardi (2008), based on Banca d'Italia (2006).					

Table 3 – list of variables and expected signs			
Variable name	Description	Value labels	Expected sign
Declared Income 1	Amount declared (in pounds): probability of investigation is 1%	Positive integer, [0, 20,000]	Response variable
Declared Income 2	Amount declared (in pounds): probability of investigation is 5%	Positive integer, [0, 20,000]	Response variable
Declared Income 3	Amount declared (in pounds): probability of investigation is 25%	Positive integer, [0, 20,000]	Response variable
Social science student, other than economics	Type of degree dummy. Identifies students in social sciences, as distinguished from students reading economics	1 is social sciences, 0 is economics	Positive
UK	National culture dummy, capturing different social norms	1 is United Kingdom, 0 is Italy	Positive
Year	Year of study	It ranges from 1 to 6	Nonlinear
Male	Gender dummy	1 is male, 0 is female	Negative
Instrumental	Instrumentality dummy	1 is non-instrumental, 0 is instrumental	Positive
Framing effect	Framing effect dummy: income is deducted	1 is deducted, 0 is not deducted	Positive

Table 4 – Percentage of Completely Honest Responses in Each Sample		
	UK	Italy
Economists	38.33%	46.03%
Non Economists (mainly Psychologists)	61.67%	53.97%

Table 5 – Regression results					
Dependent variable: declared income					
	Pooled OLS	Random Effects	Random Effects 2	Pooled Tobit	RE Tobit
UK dummy	1477.276*** (334.521)	1492.152*** (337.597)	1709.642*** (438.979)	3239.431*** (505.336)	3366.269*** (830.545)
Year 2 nd	149.081 (380.848)	125.006 (383.842)	125.369 (383.919)	701.458 (570.507)	540.697 (938.673)
Year 3 rd	593.923 (525.225)	598.224 (525.699)	597.980 (525.927)	1877.221** (700.851)	2204.586 (1172.130)
Year 4 th	-559.270 (569.596)	-530.069 (565.624)	-529.592 (565.909)	-508.863 (652.097)	175.332 (1087.550)
Year 5 th	1392.861 (2072.278)	1398.329 (2072.296)	1397.918 (2073.235)	3532.147 (2553.226)	5479.772 (4437.473)
Year 6 th	-4917.431 (4087.600)	-4911.179 (4088.204)	-4911.443 (4090.120)	-6798.393** (2557.600)	-7012.080 (4532.122)
Male	-1404.89*** (334.586)	-1407.75*** (334.422)	-1407.91*** (334.548)	-2605.09*** (459.284)	-2624.17*** (764.479)
Instrumental	164.437 (294.462)	163.031 (294.378)	163.147 (294.490)	697.299 (405.901)	848.654 (673.099)
Framing eff.	1298.360*** (292.543)	1299.780*** (292.658)	1300.012*** (292.752)	2181.321*** (408.894)	2203.890** (676.847)
Social science	1770.881*** (331.683)	1767.247*** (331.114)	1767.462*** (331.223)	4515.220*** (530.682)	4542.427*** (864.294)
Round 2	2096.833*** (115.581)	2099.006*** (115.312)	2229.271*** (165.631)	3109.544*** (467.584)	3474.976*** (213.580)
Round 3	4363.193*** (184.043)	4366.160*** (184.009)	4619.028*** (275.088)	9667.102*** (536.116)	9515.153*** (261.155)
UK * round 2			-222.399 (229.044)		
UK * round 3			-431.039 (369.449)		
Constant	12708.56*** (454.727)	12701.66*** (455.207)	12574.13*** (478.618)	12289.98*** (679.244)	12312.32*** (1046.041)
F-stat	52.352***				
Chi-Sq.		630.306***	633.673***	530.123***	1376.107***
R-Squared	0.198	0.383	0.384		
R-Sq.(within)		0.202	0.202		
Obs.	2244.000	2244.000	2244.000		
Individuals	752.000	752.000	752.000		
RMSE	4619.735				
sigma_e		2773.566	2773.514		
Log-Likelih.				-11289.182	-10712.684
Rho					0.862
sigma_u_cons				8335.101*** (208.265)	8323.499*** (332.050)
sigma_e_cons					3323.843*** (94.949)
Hausman test (p-value)		0.676			

Note: *, ** and *** stand for significant at 10, 5 and 1% respectively, two-tailed test – OLS and RE Standard errors, in parenthesis, are robust for arbitrary heteroscedasticity and clustering at individual level.
Likelihood-ratio test of sigma_u=0: chibar²(01)= 1153.00 Prob>=chibar² = 0.000.

Table 6 – Random Effects Tobit: marginal effects							
Marginal effects of each X on the expected declared income, given that an individual has not been censored.							
Variable	dy/dx	Std.Err.	Z	P>z	[95% C.I.]	X	
UK dummy	930.646	232.54	4.00	0.000	474.88 1386.41	0.586	
Year 2 nd	146.774	253.06	0.58	0.562	-349.22 642.76	0.203	
Year 3 rd	581.929	298.11	1.95	0.051	-2.36 1166.22	0.132	
Year 4 th	47.786	295.54	0.16	0.872	-531.46 627.03	0.127	
Year 5 th	1326.953	937.53	1.42	0.157	-510.57 3164.48	0.007	
Year 6 th	-2164.718	1533.3	-1.41	0.158	-5170.01 840.57	0.005	
Male	-720.703	211.55	-3.41	0.001	-1135.33 -306.08	0.452	
Instrumental	232.139	184.19	1.26	0.208	-128.87 593.14	0.526	
Framing	600.546	184.62	3.25	0.001	238.70 962.40	0.470	
Social sc.	1209.065	223.83	5.40	0.000	770.37 1647.76	0.366	
Round 2	926.278	62.168	14.90	0.000	804.43 1048.12	0.333	
Round 3	2424.688	92.727	26.15	0.000	2242.95 2606.43	0.333	

Note: Marginal impacts are calculated at the average values of each explanatory variable (such averages are reported in the last column).

FIGURE 1. 'Swivelling' the Value Function

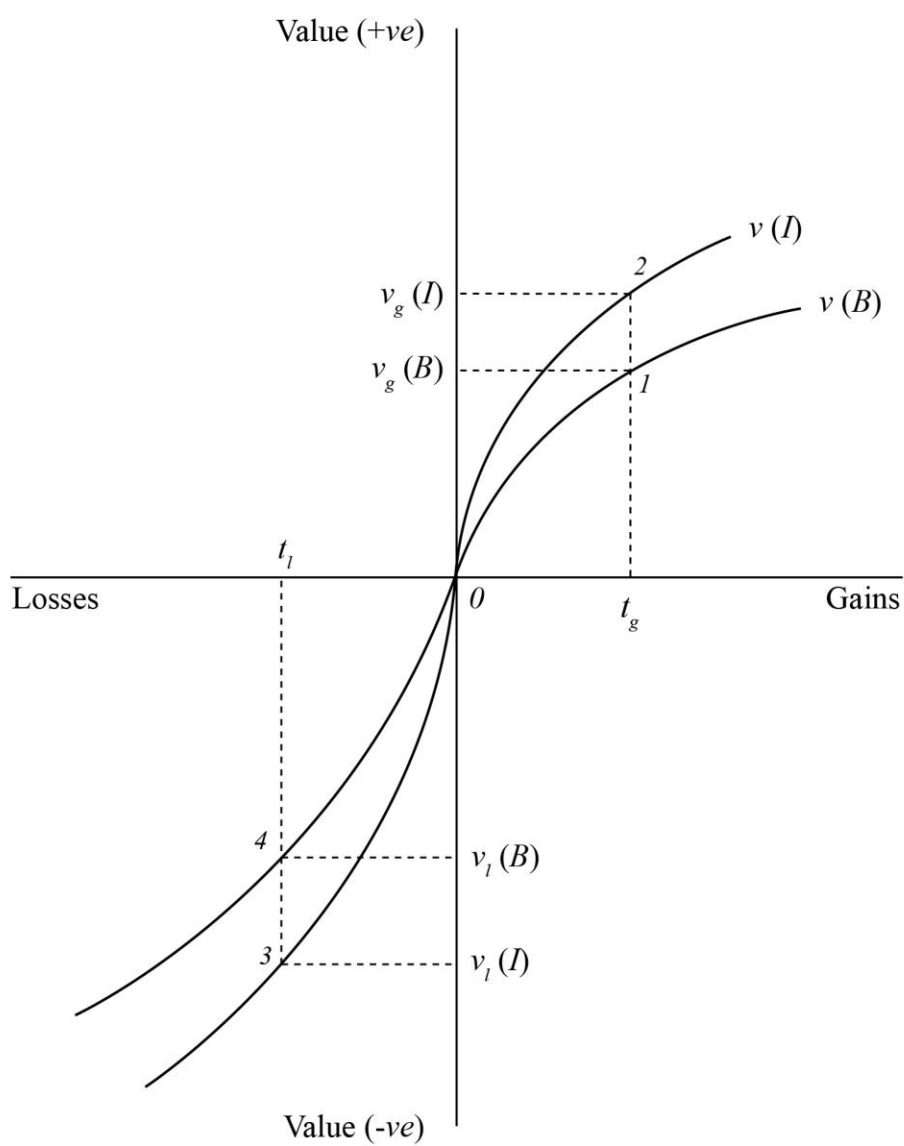


FIGURE 2. 'Shifting' the Value Function

