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Evaluating competing public policy approaches towards the informal economy: some lessons from the United Kingdom

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Abstract

Purpose

Conventionally, participation in the informal economy has been explained by viewing citizens as rational economic actors participating when the pay-off is greater than the expected cost of being caught and punished, and thus tackled by raising the sanctions and risks of detection. Given that many citizens do not engage even when the benefits outweigh the costs, a new social actor approach has begun to emerge which explains the informal economy as arising when tax morality is low and seeks to foster commitment to compliance. The aim of this paper is to provide an evidence-based evaluation of these competing policy approaches.

Methodology

To do so, the results are reported of 1,306 face-to-face interviews undertaken during 2013 in the United Kingdom.

Findings

The finding is that raising the sanctions and risks of detection has no significant impact on the likelihood of participation in the informal sector. However, participation in the informal economy is significantly associated with tax morality. Indeed, the only time that increasing the sanctions and risks of detection reduces the level of participation in the informal economy is amongst citizens with very low tax morality.

Practical Implications

Rather than continue with the current rational economic actor approach of increasing the penalties and risks of detection, this case study of the UK reveals that a new policy approach is required that seeks to improve tax morality by introducing measures to reduce the acceptability of participating in the informal economy. Whether this is more widely applicable now needs to be tested, given the dominance throughout the world of this punitive rational economic actor approach.

Originality/value

This paper provides evidence supporting a new social actor approach towards explaining and tackling participation in the informal economy.

Keywords: informal sector; hidden economy; tax evasion; tax morale; United Kingdom

Introduction

Across the world, employers exploit the advantages of the informal economy in various ways to reduce their labour costs, such as by employing off-the-books workers, outsourcing to the informal economy or under-reporting the wages of their formal employees (Williams, 2014). This has significant deleterious consequences. Economies lose competitiveness because productive formal enterprises witness unfair competition from unproductive informal enterprises (Leal Ordóñez, 2014), governments lose regulatory control over work conditions (ILO, 2014) and tax revenue (Bajada and Schneider, 2005), and customers lack legal recourse and certainty that health and safety regulations have been followed (Williams and Martinez, 2014). Informal workers, moreover, lack entitlement to labour rights such as the minimum wage and sick pay, cannot build up rights to the state pension and access occupational pension schemes, and lack access to health and safety standards as well as bargaining rights and voice (Andrews et al., 2011; European Commission, 2007; TUC, 2008).

Although there is a growing understanding of the extent, character and impacts of the informal economy both in the UK and the wider world (ILO, 2014; Williams, 2015), with estimates suggesting that the UK informal economy is equivalent to some 10 per cent of GDP (Murphy, 2014; Schneider and Williams, 2013), there has been less attention paid to evaluating how this sphere can be explained and tackled. The aim of this paper, therefore, is to evaluate different ways of explaining and tackling the informal economy.

Until now, a rational economic actor perspective has been dominant which views participation in the informal sector as occurring when the pay-off is greater than the expected cost of being caught and punished (Allingham and Sandmo, 1972), resulting in governments increasing the actual or perceived penalties and risks of detection so as to deter participation. However, recognising that many citizens voluntarily comply even when the pay-off from the informal sector is greater than the expected costs (Alm et al., 2010; Kirchler, 2007; Murphy, 2008), a "social actor" perspective has emerged which views participation in the informal sector as arising when there is low tax morality, defined as the intrinsic motivation to pay taxes (Cummings et al., 2009). A resultant discussion has been whether the conventional rational economic actor perspective needs to be either replaced or combined with an approach that elicits greater voluntary commitment to compliant behaviour by improving tax morality (Alm and Torgler, 2011; Torgler, 2012). Here, an evidence-based evaluation is conducted of these competing policy approaches.

To advance understanding, the next section reviews the rational economic actor and social actor perspectives and also whether they can be combined. To provide an evidence-based evaluation of these approaches, the third section then introduces the data and methodology, namely a logistic regression analysis of 1,306 face-to-face interviews conducted in 2013 in the UK. The fourth section reports the findings, revealing no association between participation in the informal sector and the perceived level of penalties and risk of detection, but a significant positive association between participation in the informal sector and the level of tax morality, along with how the impact of deterrents on the likelihood of participation is moderated by the level of tax morality. The fifth and final section then concludes by discussing the theoretical and policy implications.

In theoretical terms, the significant contribution of this paper therefore, is that it is the first known evaluation in a UK context of the rational economic actor and social actor approaches towards explaining and tackling the informal economy, along with whether they can be combined. In doing so, not only are theorisations of the distribution of the informal economy advanced, but also a significant shift advocated in policy towards tackling the informal economy away from the conventional rational economic actor approach focused on deterrents and towards a social actor approach focused upon improving tax morality.

Before commencing, however, the informal economy needs to be defined. Here, we define it as paid activity that is legal in all respects other than it is not declared to the authorities for tax, social security or labour law purposes (European Commission, 2007; OECD, 2012; Williams, 2014). If it is not legal in all other respects, it is not part of the informal economy. If the goods or services traded are illegal for instance (e.g., illegal drugs), then it is not part of the informal economy, but the wider criminal economy.

Competing public policy approaches towards the informal economy

Reviewing the literature, two distinct ways of explaining and tackling the informal economy can be discerned. Here, each is considered in turn along with whether they can be combined.

Rational economic actor approach

The original source of the rational economic actor approach is the classic utilitarian theory of crime that views citizens as participating when the expected costs (i.e., the penalty and probability of being caught) are outweighed by the benefits (Bentham, 1788). Becker (1968) popularised this arguing that by increasing the risks of detection and penalties facing those considering or actually flouting the law, acting legally would become a rational choice for citizens. Allingham and Sandmo (1972) then applied this to tax evasion, viewing the non-compliant as doing so because the benefits outweighed the expected costs of being caught and punished. To alter the cost/benefit ratio facing those participating or thinking about engaging in tax evasion, it was asserted that the actual and/or perceived sanctions and risks of detection had to be increased. This way of explaining and tackling the informal economy was subsequently widely adopted (Grabiner, 2000; Hasseldine and Li, 1999; Richardson and Sawyer, 2001).

However, despite the dominance of this perspective, the evidence that increasing the penalties and risks of detection reduces participation in the informal economy is mixed. Although some assert that increasing the risks of detection diminishes participation in the informal economy, at least for some income groups (Klepper and Nagin, 1989; Slemrod et al., 2001) and that increasing sanctions diminishes engagement in the informal economy (Wenzel, 2004), others find that increasing the probability of detection does not result in less non-compliance (Shaw et al., 2008) and that increasing sanctions leads to either greater participation, has no effect, or only short-term effects (Feld and Frey, 2002; Murphy, 2005; Spicer and Lunstedt, 1976). To evaluate the validity of this rational economic actor perspective, therefore, the following hypothesis can be tested:

> Rational economic actor hypothesis (H1): the higher are the perceived penalties and probability of detection, the lower is the likelihood of participation in the informal economy, ceteris paribus.
>
> H1a: the higher are the perceived penalties, the lower is the likelihood of participation in the informal economy, ceteris paribus.
>
> H1b: the higher is the perceived probability of detection, the lower is the likelihood of participation in the informal economy, ceteris paribus.

Social actor approach

Given that many citizens voluntarily comply even when the perceived sanctions and probabilities of detection suggest that they should not, the rational economic actor perspective has begun to be questioned (Alm et al., 2010; Murphy, 2008). Consequently, to explain and tackle the informal economy, a perspective has emerged which views citizens as social actors and explains participation in the informal economy to be a result of low tax morality, by which is meant a low intrinsic motivation to pay taxes (Alm and Torgler, 2006, 2011; Cummings et al., 2009; McKerchar et al., 2013; Torgler, 2011; Torgler and Schneider, 2007). The resultant goal is to improve the commitment of citizens to voluntarily comply by seeking to enhance tax morality (Kirchler, 2007; Torgler, 2011).

The origins of this social actor approach can be traced back to Georg von Schanz (1890) who was one of the first scholars to highlight the tax contract between citizens and the state. Some six decades later, the German "Cologne school of tax psychology" then popularised this approach and developed measures of the level of tax morality (Schmölders, 1962; Strümpel, 1969). Although this social actor approach then went into abeyance with the emergence of the rational economic actor approach from the 1970s, the new millennium has witnessed its re-emergence (Alm et al., 2012; Kirchler, 2007; Torgler, 2011).

In this social actor approach, compliance is sought through engendering greater voluntary commitment to compliant behaviour by building a high trust, high commitment culture that aligns the values of citizens with the formal rules so as to engender greater self-regulation (Alm and Torgler, 2011; Torgler, 2012). This sits in stark contrast to the rational economic actor approach where deterrents are used to engender compliance through the close supervision and monitoring of citizens, the imposition of tight rules, prescribed procedures and centralised structures in a low commitment, low trust and adversarial culture.

Indeed, such an approach can be read through the lens of institutional theory (North, 1990). Institutions represent "the rules of the game", prescribing what activities are acceptable (Baumol and Blinder, 2008; Denzau and North 1994; Mathias et al., 2014; North, 1990). All societies have both formal institutions (i.e., codified laws and regulations) that define the legal rules of the game (prescribing "state morality") as well as informal institutions which are the "socially shared rules, usually unwritten, that are created, communicated and enforced outside of officially sanctioned channels" (Helmke and

Levitsky, 2004: 727), prescribing "civic morality". From this social actor perspective, participation in the informal economy arises when there is a gap between the formal institutions ("state morality") and informal institutions ("civic morality"), which is measured by the level of tax morality, and the consequent goal is to better align civic morality with state morality so as to reduce engagement in the informal economy. To evaluate this approach in consequence, the following hypothesis can be tested:

> Social actor hypothesis (H2): the higher the tax morality, the lower is the likelihood of participation in the informal economy, ceteris paribus.

Combining the approaches

In the UK, akin to most developed nations, the rational economic actor perspective has been dominant, with the informal economy primarily being tackled by increasing the risks of detection and sanctions (Dekker et al., 2010; Grabiner, 2000; National Audit Office, 2008). Less attention has been paid to the social actor approach of improving tax morality, despite the mixed evidence on whether the rational economic actor perspective is effective.

These two approaches, however, are not mutually exclusive. The "slippery slope" approach argues that governments can pursue not only "enforced" compliance by increasing the penalties and risks of detection and therefore the power of authorities, but also "voluntary" compliance by improving tax morality and therefore trust in authorities (Kirchler et al., 2008; Kogler et al., 2015; Kastlunger et al., 2013; Khurana and Diwan, 2014; Muehlbacher et al., 2011; Prinz et al., 2013; Wahl et al., 2010). The view is that when there is neither trust in authorities and authorities have no power, then participation in the informal economy will be higher. When trust in, and/or the power of, authorities increases however, then participation in the informal economy decreases. In a laboratory experiment for example, Wahl et al. (2010) randomly present participants with one of four different descriptions of a fictitious country, in which the authorities are portrayed on the one hand, as either trustworthy or untrustworthy and on the other hand, as either powerful or powerless. The finding is that participants paid significantly more taxes when both power and trust were high. The result is that a combination of greater trust in authorities and the greater power of authorities is asserted to be the most effective way of tackling the informal economy (Kogler et al., 2015; Muehlbacher et al., 2011).

However, there is also an emergent understanding that increasing the power of authorities and trust of authorities may have complex interaction effects. Applying higher risks of detection and penalties might not always lead to the same outcome. When tax morality is high for example, increasing the probability of detection and sanctions might lead to greater non-compliance, not least due to a breakdown of trust between the state and its citizens (Chang and Lai, 2004; Kirchler et al., 2014). Put another way, the suggestion is that tax morality may moderate the effects of increasing the perceived risks of detection and penalties on participation in the informal economy. Little if any research, however, has been undertaken on such moderating effects. Here, therefore, the following hypothesis can be tested:

> Moderating effects hypothesis (H3): the higher the tax morality, the smaller the effect of perceived penalties and risk of detection on participation in the informal sector, ceteris paribus.
>
> H3a: the higher the tax morality, the smaller the effect of perceived penalties on participation in the informal sector, ceteris paribus.

H3b: the higher the tax morality, the smaller the effect of perceived risk of detection on participation in the informal sector, ceteris paribus.

Methodology

To evaluate these hypotheses, 1,306 face-to-face interviews are reported conducted in the United Kingdom as part of Eurobarometer survey no. 402 undertaken in 2013. This used a multi-stage random (probability) sampling methodology in order to ensure that on the issues of gender, age, region and locality size, both the UK sample as well as each level of the sample, was representative in proportion to its population size. Here, therefore, a weighting scheme is used which adjusts the British and the Northern Ireland samples to their respective proportions of the UK population. For the univariate analysis, in consequence, we use this sample weighting scheme as recommended in both the wider literature (Sharon and Liu, 1994; Solon et al., 2013) and the Eurobarometer methodology, to obtain meaningful descriptive results. For the multivariate analysis, in contrast, a debate exists over whether to use weighting (Pfefferman, 1994; Sharon and Liu, 1994; Solon et al., 2013; Winship and Radbill, 1994). Reflecting the dominant viewpoint, the decision has been here taken not to do so.

The face-to-face interviews firstly asked participants attitudinal questions regarding the acceptability of different types of informal work as well as the expected sanctions and risks of detection, followed by questions on whether the participants had purchased from the informal economy and finally, whether they had participated in the informal economy over the past year. Here, the focus is upon firstly, the attitudinal questions on the acceptability of working in the informal economy, which measure the level of tax morality, secondly, their views on the expected sanctions and risks of detection and thirdly, whether they had participated in the informal economy.

To determine whether increasing the penalties and risks of detection, and higher tax morality, reduces the likelihood of participation in the informal economy in the UK, the dependent variable used is a dummy variable with recorded value 1 for persons who answered “yes” to the question: “Apart from a regular employment, have you yourself carried out any undeclared paid activities in the last 12 months?”.

To evaluate the association between participation in the informal economy and the policy approaches, three explanatory variables are used. Firstly, to evaluate whether the perceived risk of detection influences engagement, a dummy variable was used describing the perceived risk of being detected when participating in the informal economy, with value 0 for a very small or fairly small risk and value 1 for a fairly high or very high risk. Secondly, to evaluate how penalties are associated with engagement, a dummy variable was used, describing the expected sanctions if caught doing work in the informal economy, with value 0 for those asserting that the normal tax or social security contributions would be due and value 1 for those stating that the normal tax or social security contributions due, plus there would be a fine or imprisonment.

Third and finally, to evaluate the association between participation in the informal economy and tax morality, participants were asked to rate the acceptability of participating in six types of work in the informal economy using a 10-point Likert scale (where 1 means absolutely unacceptable and 10 means absolutely acceptable), namely: an individual is hired by a household for work and s/he does not declare the payment received to the tax or social security authorities even though it should be declared; a firm is hired by a household for work and it does not declare the payment received to the tax or social security authorities; a firm is hired by another firm for work and it does not declare its activities to the tax or social security authorities; a firm hires an individual and all or a part of the wages paid to him/her are not officially declared; someone receives welfare payments without entitlement, and someone evades taxes by not declaring or only partially declaring their income. After conducting a factor analysis (using the Kaiser rule), which grouped the six questions into a single factor, an aggregate tax morality index for each individual was constructed by collating participants' responses to the six questions. The Cronbach's Alpha coefficient is 0.897 which shows an excellent internal consistency of the scale (Kline, 2000). Here, the index is represented in the original 10-point Likert scale format, meaning that the lower the index value, the higher is their tax morality.

Drawing upon past studies that identify the important socio-demographic and socio-economic variables determining participation in the informal economy (Williams and Franic, 2016; Williams and Horodnic, 2015a,b,c,d), the control variables selected are:

- Gender: a dummy variable with value 0 for females and 1 for males.
- Age: a continuous variable indicating the exact age of a respondent.
- Occupation: a categorical variable grouping respondents by their occupation with value 1 for self-employed, value 2 for employed, and value 3 for not working.
- People 15+ years in own household: a categorical variable for people 15+ years in respondent`s household (including the respondent) with value 1 for one person, value 2 for two persons, value 3 for 3 persons or more.
- Children: a dummy variable for the presence of children up to 14 years old in the household with value 0 for individuals with no children and value 1 for those having children.
- Difficulties paying bills: a categorical variable for the respondent difficulties in paying bills with value 1 for having difficulties most of the time, value 2 for occasionally, and value 3 for almost never/ never.

- Area: a categorical variable for the area where the respondent lives with value 1 for rural area or village, value 2 for small or middle sized town, and value 3 for large town.

To evaluate the association between participation in the informal economy and the perceived penalties and risk of detection, and the level of tax morality, only those 1,060 respondents for whom data on each and every control variable was available are here used in the logistic regression analysis. Below, the results are reported.

Findings

Examining the descriptive findings, 3 per cent of participants reported participating in the informal economy over the past 12 months. Hence, even if participation in the informal economy is a sensitive issue, meaning that this is a lower-bound estimate of the level of participation, 1 in 33 UK citizens reported participating in the informal economy in the past year. Another previous survey regarding this topic estimates a higher level of participation of 7 per cent (Pedersen 2003).

To analyse the relationship between participation in the informal economy and the various policy approaches, Table 1 reveals the differences between those engaged and not engaged in the informal economy regarding their perceptions of the risks of detection, the expected sanctions if caught and their tax morality. Those participating in the informal economy perceive the expected sanctions and risk of detection as lower than those not engaging in the informal economy; 30 per cent of those working in the informal economy consider that only the normal tax or social security contributions will be due if caught compared with just 18 per cent of those not engaged in the informal economy. Those engaged in the informal economy and those not engaged however, perceive the risk of being detected very similarly. Participants in the informal economy, nevertheless, have a lower level of tax morality (3.9) compared with those not participating (1.9).

INSERT TABLE 1 HERE

To evaluate whether these relationships are significant when other control variables are taken into account and held constant, as well as the moderating effects of tax morality on the effectiveness of sanctions and detection risk, Table 2 reports the results of a logistic regression analysis. Before analysing this however, it is important to highlight the findings in Table 2 regarding the groups most likely to participate in the informal economy and thus that need to be targeted by policy. This reveals that men are significantly more likely to participate in the informal economy in the UK than women and so too are younger people, and those facing difficulties in paying the household bills. Compared with self-employed people, moreover, those employed and those not working are significantly less likely to engage in the informal economy.

Evaluating the approaches and commencing with whether participation in the informal economy is associated with the perceived level of penalties when other variables are introduced and held constant, no statistically significant association is found. Those perceiving the expected sanctions to be higher (i.e. tax or social security contributions plus a fine or prison) are not significantly less likely to participate in the informal economy (refuting H1a). Similarly, no significant association exists between participation in the informal economy and the perceived risk of being detected. Those viewing the risk of being caught as fairly high or very high are not less likely to participate in the informal economy compared with those viewing the risk as fairly small and very small (refuting H1b). These results thus refute in a UK context the rational economic actor perspective which asserts that increasing the actual or perceived penalties and risks of detection reduces the likelihood of participation in the informal economy.

INSERT TABLE 2 HERE

Turning to the social actor approach, meanwhile, the finding is that participation in the informal economy is significantly associated with the level of tax morality. The direction of the association is that the higher the tax morality, the lower is the propensity to participate in the informal economy (confirming H2). The outcome of model 1 therefore, is that little or no association is found between the likelihood of participating in the informal economy and the level of punishments and risk of detection, but an association is identified with the level of tax morality. The suggestion, therefore, is that interventions which seek to increase the level of punishments and risk of detection will have little influence on participation but policy interventions which seek to improve tax morality may well reduce engagement.

To examine whether tax morality moderates the impacts and effectiveness of penalties and detection risk, model 2 in Table 2 introduces the interaction terms between tax morality and the level of punishment and risk of detection. Overall, the finding is that the interaction terms between perceived penalties and risk of detection, and tax morality, are not significant (refuting H3a and H3b). However, although there is overall a lack of significance of the interaction terms, some important relationships exist at lower levels of tax morality that need to be reported. Figure 1 graphically portrays the impact of increasing the penalties and risks of detection on participation in the informal economy at various levels of tax morality for a "representative" UK citizen, derived by taking the mean and modal values of the other independent variables. As such, this representative UK citizen is a 47 year-old not working woman, living in a two person household in a small or middle sized town, with no children who never, or almost never, faces financial difficulties paying the household bills.

INSERT FIGURE 1 HERE

This displays that among those with low levels of tax morality, the predicted odds of the representative citizen engaging in the informal economy is smaller when the penalties and risks of detection are higher. That is, when tax morality is relatively high (i.e., below a score of 6), the perceived level of sanctions and risks of detection has little if any impact on the probability of participation in the informal sector. When tax morality decreases above a score of 6, however, the perceived level of punishment and risk of detection has an impact; the lower the perceived risk and the lower the expected penalties, the higher is the probability of participation in the informal sector. Increasing the perceived risks of detection, moreover, has a greater impact on reducing participation than increasing the expected punishments. However, as mentioned above, overall, these interaction terms are not statistically significant. Table 3 provides a summary of which hypotheses have been confirmed and which not.

INSERT TABLE 3 HERE

Discussion and Conclusions

Recently, the rational economic actor perspective towards explaining and tackling the informal economy has been challenged by a social actor perspective. To evaluate the validity of this challenge, we have here examined in a UK context whether the expected penalties and risks of detection, as well as level of tax morality, is associated with participation in the informal economy. The finding is that engagement in the informal economy does not significantly decrease as the perceived level of penalties and risks of detection increase, but does so as tax morality improves. This, therefore, tentatively refutes in a UK context the conventional rational economic actor perspective and provides support for the social actor perspective focused upon improving tax morality. Moreover, although increasing the sanctions and risks of detection do reduce the level of participation in the informal economy when tax morality is low, overall the interaction effects between the level of tax morality and the level of penalties and risks of detection are not significant.

In consequence, if participation in the informal economy is to be reduced, it appears that the conventional rational economic actor perspective focused on deterrents needs to be replaced by a social actor perspective which focuses upon improving tax morality. What tools, therefore, can achieve this? Viewing low tax morality through the lens of institutional theory as a measure of the lack of alignment of the laws, codes and regulations of formal institutions and the norms, beliefs and values of informal institutions (Helmke and Levitsky, 2004; North, 1990), two changes are necessary.

On the one hand, the norms, values and beliefs regarding the acceptability of participating in the informal economy need to be altered. This can be achieved by providing education about the value and benefits of paying taxes in order to elicit an intrinsic motivation to comply. Measures might include not only an annual letter to taxpayers about where their taxes have been spent, as introduced in the UK in 2014 by Her Majesty's Revenue and Customs (HMRC), but also "your taxes are paying for this" signs in hospitals, on ambulances and on public construction projects. Advertising campaigns about the benefits of working in the formal rather than informal economy can be also used. An evaluation of the advertising campaigns run by HMRC reveals a return of 19:1 on the expenditure compared with a return of 4.5: 1 on expenditure detecting those operating in the informal economy (National Audit Office, 2008). The above analysis reveals the population groups usefully targeted by such campaigns, namely men, younger people, those living in households with financial difficulties and the self-employed.

On the other hand, alterations in formal institutions are also required. As previous studies reveal, compliance rises when there are improvements in procedural justice, which refers to whether citizens perceive the government to treat them in a respectful, impartial and responsible manner (Gangl et al., 2013; Murphy, 2005), procedural fairness, which refers to the extent to which citizens believe that they are paying their fair share compared with others (Kirchgässner, 2011; Molero and Pujol, 2012) and redistributive justice, which refers to whether citizens believe they receive the goods and services they deserve given the taxes that they pay (Kirchgässner, 2011).

In sum, if this paper stimulates further evaluations of the different approaches towards explaining and tackling the informal economy, as well as the interaction effects, both in individual countries and other global regions, then this paper will have fulfilled one of its intentions. If this then results in not only the UK government but also others widening the range of policy approaches and measures used to tackle the informal economy beyond the currently dominant approach of increasing the penalties and risks of detection, then it will have fulfilled its wider objective. What is certain, however, is that the UK government and others can no longer assume that the conventional rational economic actor approach is the way to explain and tackle the informal economy and continue to underplay the potentially important role of tax morality.

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Table 1. Expected sanctions, detection risk and tax morality: by whether respondents participate in the informal economy

	United Kingdom	Western Europe	EU 28
Engaged in the informal economy (%)	3	4	4
Expected sanctions (%)			
Tax or social security contributions due	30	26	32
Tax or social security contributions + fine or prison	70	74	68
Detection risk (%)			
Very small/ Fairly small	49	70	72
Fairly high/ Very high	51	30	28
Tax morality (mean)	3.9	3.7	3.5
Not engaged in the informal economy (%)	97	96	96
Expected sanctions (%)			
Tax or social security contributions due	18	19	24
Tax or social security contributions + fine or prison	82	81	76
Detection risk (%)			
Very small/ Fairly small	49	59	59
Fairly high/ Very high	51	41	41
Tax morality (mean)	1.9	2.1	2.2

Table 2. Logistic regressions of the propensity to participate in the informal economy in the United Kingdom

	Model 1				Model 2			
	β		Robust se(β)	Exp(β)	β		Robust se(β)	Exp(β)
Expected sanctions (Tax or social security contributions due)								
Tax or social security contributions + fine or prison	-0.180		0.656	0.835	-0.939		1.159	0.391
Detection risk (Very small/ Fairly small)								
Fairly high/ Very high	-0.832		0.689	0.435	-0.158		1.030	0.854
Tax morality	0.659	***	0.118	1.932	0.617	**	0.296	1.852
Gender (Female)								
Male	2.954	**	1.167	19.18	2.885	**	1.148	17.90
Age (Exact age)	-0.055	***	0.019	0.946	-0.053	***	0.018	0.948
Occupation (Self-employed)								
Employed	-1.723	***	0.631	0.179	-1.661	**	0.645	0.190
Not working	-1.409	*	0.789	0.245	-1.375	*	0.797	0.253
People 15+ years in own household (One)								
Two	0.912		1.020	2.490	0.989		1.020	2.688
Three and more	0.593		0.987	1.809	0.680		0.987	1.975
Children (No children)								
Having children	0.183		0.759	1.201	0.201		0.756	1.222
Difficulties paying bills (Most of the time)								
From time to time	-2.365	***	0.917	0.094	-2.367	**	0.927	0.094
Almost never/ never	-2.163	***	0.814	0.115	-2.134	***	0.820	0.118
Area (Rural area or village)								
Small or middle sized town	0.912		0.661	2.489	1.028		0.713	2.797
Large town	0.869		0.843	2.385	0.980		0.862	2.665
Interactions								
Tax or social security contributions + fine or prison x Tax morality					0.188		0.281	1.207
Fairly high/ Very high x Tax morality					-0.179		0.264	0.836
Constant	-3.680	*	1.976	0.025	-3.704		2.273	0.025
N				1,060				1,060
Pseudo R^2				0.3894				0.3969
Log pseudolikelihood				-58.1515				-57.4426
χ^2				81.57				91.23
p>				0.0000				0.0000

Notes:
Significant at *** p<0.01, ** p<0.05, * p<0.1.
All coefficients are compared to the benchmark category, shown in parentheses.
When multiple imputation techniques are used (ten imputations were simulated through a system of chained equations for every missing value) for addressing the missing responses issue, the same variables are significantly associated with participation in the informal economy. Therefore, we use the available data, with no imputation, to keep minimize bias.

Table 3. Testing the competing perspectives towards explaining and tackling the informal economy and their interaction

Hypothesis	Result
Rational economic actor	
H1a: the higher are the perceived penalties, the lower is the likelihood of participation in the informal economy, ceteris paribus.	Refuted
H1b: the higher is the perceived probability of detection, the lower is the likelihood of participation in the informal economy, ceteris paribus.	Refuted
Social actor	
H2: the higher the tax morality, the lower is the likelihood of participation in the informal economy, ceteris paribus.	Confirmed
Moderating effects hypothesis	
H3a: the higher the tax morality, the smaller the effect of perceived penalties on participation in the informal sector, ceteris paribus.	Refuted
H3b: the higher the tax morality, the smaller the effect of perceived risk of detection on participation in the informal sector, ceteris paribus.	Refuted

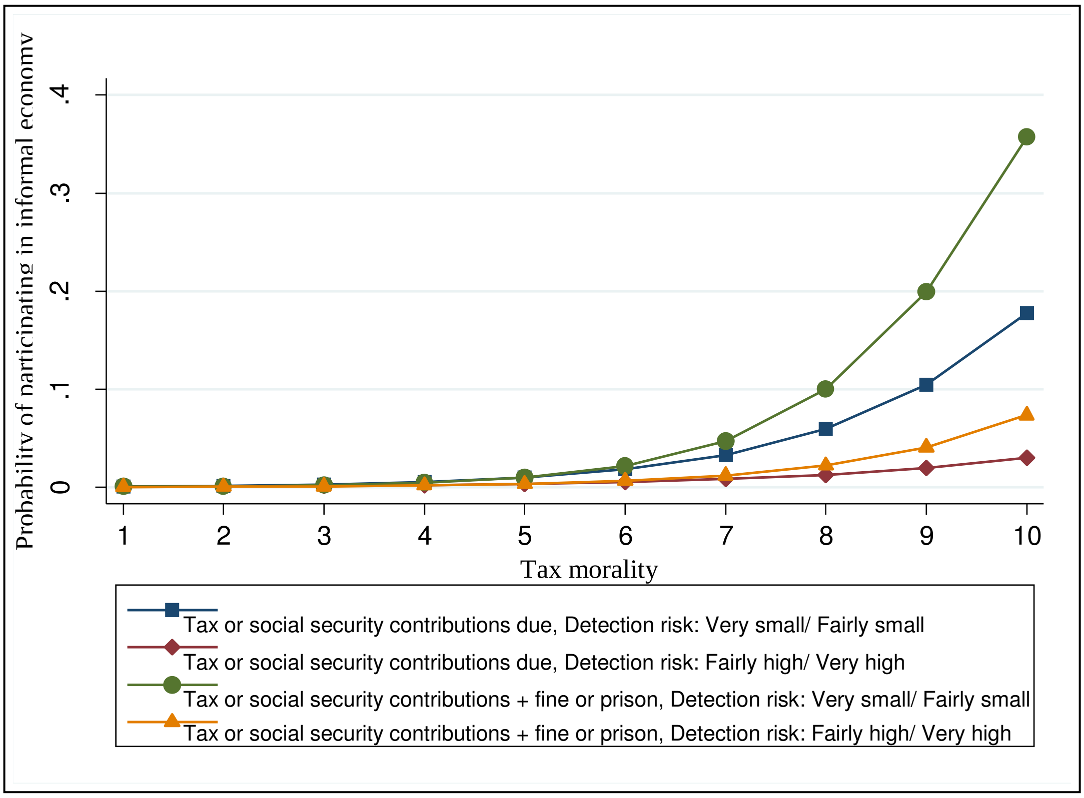

Figure 1. Predicted probability of participating in informal economy of a "representative" citizen living in United Kingdom: by expected sanctions, detection risk, and tax morality

Appendix

Table A1. Variables used in the analysis: definitions and descriptive statistics (N = 1,060)

Variables	Definition	Mode or mean	Min / Max
Engage in the informal economy (dependent variable)	Dummy variable of undeclared paid activities carry out in the last 12 months, apart from a regular employment	Not engaged in the informal economy (97%)	0 / 1
Expected sanctions	Dummy for the penalties associated with participation in the informal economy	Tax or social security contributions + fine or prison (81%)	0 / 1
Detection risk	Dummy for the perceived risk of detection	Fairly high/ Very high (51%)	0 / 1
Tax morality	Constructed index of self-reported tolerance towards tax non-compliance	1.97	1 / 10
Gender	Dummy for the gender of the respondent	Female (51%)	0 / 1
Age	Respondent exact age	47 years	15 / 93
Occupation	Respondent occupation in categories	Employed (47%)	1 / 3
People 15+ years in own household	People 15+ years in respondent`s household (including the respondent) in categories	Two (47%)	1 / 3
Children	Dummy for the presence of children (up to 14 years old) in the household	No children (68%)	0 / 1
Difficulties paying bills	Respondent difficulties in paying bills in categories	Almost never/ never (71%)	1 / 3
Area	Size of the area where the respondent lives in categories	Small/ middle town (46%)	1 / 3

Table A2. Mean score of the acceptability of participating in six types of work in the informal economy (where 1 means absolutely unacceptable and 10 means absolutely acceptable)

Type of work in the informal economy	Mean score
Someone receives welfare payments without entitlement	1.66
An individual is hired by a household for work and s/he does not declare the payment received to the tax or social security authorities even though it should be declared	2.64
A firm is hired by a household for work and it does not declare the payment received to the tax or social security authorities	1.93
A firm is hired by another firm for work and it does not declare its activities to the tax or social security authorities	1.77
A firm hires an individual and all or a part of the wages paid to him/her are not officially declared	1.91
Someone evades taxes by not declaring or only partially declaring their income	1.97