Economic Modelling 42 (2014) 106–115

Contents lists available at ScienceDirect

Economic Modelling

journal homepage: www.elsevier.com/locate/ecmod

Tax evasion in a behaviorally heterogeneous society: An evolutionary analysis☆

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ARTICLE INFO

Article history:
Accepted 5 June 2014
Available online 6 July 2014

Keywords:
Behavioral heterogeneity
Cheating
Evolutionary game theory
Peer punishment
Public goods game
Tax morale

ABSTRACT

We focus on the tax evasion dynamics emerging from repeated interaction of three types of taxpayers: cheaters, honest citizens and punishers. By assuming that cultural evolution is driven by material payoffs only, we show that a long overlooked behavioral attitude towards taxation such as tax morale is important to dynamically induce higher levels of tax compliance within a large-scale population. The results of our evolutionary analysis reveal that the presence of taxpayers who both act honestly in the first place and are willing to costly sanction cheaters plays an important role for the long-run success of the social battle against tax evasion.

1. Introduction

In the last four decades, tax compliance has been extensively investigated in economics and also gradually evolved into a major research topic in economic psychology. Since the seminal papers of Allingham and Sandmo (1972) and Srinivasan (1973), the standard approach to income tax evasion models the decision process of tax compliance relying on two key assumptions: (1) a representative taxpayer is considered and (2) the taxpayer is a personal income maximizer, i.e. he is exclusively concerned about his own material utility. Over the years, the model has been expanded in many directions (see Kirchler et al., 2007, and the recent comprehensive survey by Pickardt and Prinz, 2014), but few variants of it relax either of these two assumptions.

In line with recent work in the area, we claim that the major problem with the standard economic approach to tax compliance is that it is too narrow for a comprehensive explanation of compliance behavior (Kirchler, 2007). In particular, available empirical evidence does not support neither (1) nor (2). Hence, in this article, we purposely take a different route and depart from both assumptions. As to the first one, empirical evidence indicates that a significant degree of behavioral heterogeneity exists among taxpayers. While some citizens are inherently honest and would not evade even if they had the concrete opportunity of doing it, others are not and tend to systematically free ride on others' willingness to comply (see e.g. Alm et al., 1992; Braithwaite, 2003; Epstein and Gang, 2010; Erard and Ho, 2003 and Section 2 in this paper). Laboratory data from both tax compliance studies and other settings complement field evidence and convey a similar message: different stable types exist, suggesting that people, far from quickly reacting to changes in parameters like the ones which are central in the standard framework, are to some degree 'hardwired in' certain behavioral patterns.[1] With regard to the second assumption, we know today that the canonical model of *homo oeconomicus* failed in a variety of contexts and that the tax compliance domain makes no exception. In their decision process over tax compliance, citizens seem to care not only about their own monetary payoff, but also about non-pecuniary sources of utility related, to some extent, to other citizens' well-being. Psychological factors associated with the so called pro-social emotions (guilt, shame) and pro-social motivations (altruism, fairness) seem to play an important role in affecting many taxpayers' decisions over tax compliance. In particular, ample empirical evidence documents the importance of taxpayers' intrinsic motivation to pay taxes, i.e. the so called 'tax morale', in explaining what is known as the 'puzzle of compliance', that is the fact that all over the world sizeable proportions of citizens comply with their fiscal duties even when expected penalties and audit probabilities are extremely low. This evidence still needs to be adequately rationalized, as it is in stark contrast with the predictions of classic deterrence models inspired by the economics of crime approach (Allingham

☆ The research of Angelo Antoci and Paolo Russu is financed by Regione Autonoma della Sardegna (L.R. 7/2007) under the project 'Capitale sociale e divari economici regionali.
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[1] More generally, behavioral economics has persuasively shown that laboratory findings on social dilemma games are compatible with the presence of motivationally heterogeneous agents, displaying both standard, self-centered preferences and non-standard, interdependent preferences (see e.g. Fischbacher and Gachter, 2010).

http://dx.doi.org/10.1016/j.econmod.2014.06.002
0264-9993/

and Sandmo, 1972) and based on the two major assumptions reported above. This is why tax morale has been suggested to provide the 'missing link' which may bridge the gap between theory and data and shed light on the puzzle of compliance: "The rationale behind the relationship between tax morale and tax compliance is that insofar as citizens are driven by a positive moral attitude towards taxation (i.e. a high degree of tax morale), the level of compliance – other things being equal – will turn out to be higher" (Lubian and Zarri, 2011). In the last years, a positive relationship between tax morale and tax compliance has been established on the basis of both direct and indirect approaches (Halla, 2010).[2]

However, it is worth pointing out that, despite the availability of rich empirical evidence on tax morale, few papers explicitly attempt to formalize this notion and incorporate it into theoretical models of tax compliance. Tax morale is a multifaceted concept and can take many forms (for empirical evidence on this, see Lubian and Zarri, 2011). Our contribution is both methodological and substantive. We depart from the two major assumptions of the standard approach and provide an evolutionary analysis of tax evasion within a behaviorally heterogeneous population where different types of taxpayers exist. In particular, we show that the presence of ethically motivated, inherently honest citizens who are also willing to sanction cheating plays an important role for the long-run success of the social battle against tax evasion.

The structure of the remainder of the paper is organized as follows. Section 2 reviews the related literature on tax compliance. Section 3 outlines our evolutionary model. Section 4 illustrates the social dynamics. In Section 5, we show our major results and Section 6 concludes.

2. Related literature

In this section, we shortly refer to relevant (theoretical and empirical) recent work on tax compliance related to our study. As we anticipated in the Introduction, a major problem with the standard model of income tax evasion is that empirical evidence based on surveys, laboratory experiments and analysis of aggregate data is ambiguous at best. In this model, a representative taxpayer is supposed to exclusively weigh (his personal, monetary) costs and benefits of compliance with the expected (monetary) utility of evasion. Hence, four parameters – i.e. level of actual income, tax rate, audit probability and penalty rate – crucially affect individual compliance decisions. However, most of these parameters have unstable and unclear effects (Kirchler et al., 2007). By contrast, empirical evidence indicates that citizens are heterogeneous, in their attitude towards taxation. Alm et al. (1992) show that people's tax reporting behavior exhibits much heterogeneity. Similarly, Erard and Ho (2003) find that individuals are characterized by highly diverse behavior ranging from the 'pathologically honest' to the 'flagrantly defiant' even among persons with ample opportunity to evade, such as informal suppliers of services and goods. Braithwaite (2003) claims that taxpayers follow quite diverse motivational postures in paying their taxes: some of them comply with their fiscal duties as they feel committed towards the community, whereas others are disengaged and perceive tax evasion as a sort of game to be played with the state.[3] As suggested by Kirchler et al. (2007), "Regarding the theoretical approach to the tax compliance problem, it might be useful to enrich compliance research by considering alternative theories, which are based on a more relaxed rationality assumption and take into account people's actual behavior" (see on this also Andreoni et al., 1998 and Prinz, 2010). Previous theoretical work where the issue of fiscal evasion has been investigated by means of evolutionary models focusing on behaviorally heterogeneous populations includes Hokamp and Pickardt (2010) and Bloomquist (2011). Hokamp and Pickardt (2010) study the evolution of income tax evasion in an agent-based model with heterogeneous agents driven by exponential utility functions. They interestingly show that the presence of ethical norms significantly reduces the extent of tax evasion. In Bloomquist (2011), four behavioral types (namely, honest, strategic, defiant and random agents) are considered.

As we observed in the Introduction, the *homo oeconomicus* model predicts that it is rational to try to evade and that compliance will occur only in the presence of some values of the key parameters characterizing the standard model. However, it is interesting to note that, even within the framework of the standard approach, over the years several authors alluded to significant departures by mentioning the possibility that tax morale provides non-pecuniary benefits and/or tax evasion entails specific non-pecuniary costs. For instance, Erard and Feinstein (1994) hypothesize that individuals experience guilt when they contemplate tax evasion and shame when they are caught by the authorities: many citizens may be deterred from making the economically rational decision to evade by the emotional disutility stemming from these 'moral sentiments'.[4] They also note that in their seminal theoretical model on tax evasion, Allingham and Sandmo (1972) explicitly consider this extension by alluding to the role of non-pecuniary factors affecting adversely a cheater's reputation as a citizen of the community. More generally, as pointed out by Lubian and Zarri (2011), these works shed light on the possibility that either non-pecuniary costs are associated with cheating (e.g. psychological costs such as anxiety, guilt, embarrassment or a reduction in self-image, or social costs such as shame or reputation loss) or, symmetrically, non-pecuniary benefits are associated with honest behavior (e.g. rejoicing or social custom utility), or both. This is in line with Sandmo (2004) and also with recent empirical evidence from neuroeconomic studies, laboratory experiments and survey data. Using survey data on Italian households' opinions on civicness and taxation for 2004, Lubian and Zarri (2011) assess the strength of tax morale by relying on single items as well as composite multi-item indices and present empirical evidence that tax morale constitutes a new determinant of happiness, even after controlling for several demographic and socioeconomic factors. Their econometric analysis shows that honesty and cheating produce markedly different hedonic consequences, consistently with the theoretical papers mentioned above. Instrumental variable estimation suggests that the positive correlation between fiscal morality and subjective well-being reflects an independent causal effect of tax morale on happiness. In their neuroeconomic experiment on tax compliance, Harbaugh et al. (2007) find that even mandatory, tax-like transfers turn out to elicit neural activity in the volunteers' ventral striatum, a key part of the brain's reward system. The laboratory experiment run by Coricelli et al. (2010) measures the emotional arousal associated with the reporting decisions and feedback on audits by recording the subjects' Skin Conductance Responses (SCRs) – as well as by using affective self-reports. Here, the authors isolate a 'shame' component, thanks to a 'picture treatment', where individual's cheating behavior is publicly revealed through the public display of his picture. They find evidence of negative anticipated emotions related to risk evaluation and of negative anticipatory emotions related to tax morale both arising with regard to people who cheat. As they point out: "People do not only feel anxiety because of the monetary prospects of a risky decision but also due to the moral implications associated with the risk of a public exposure of their behavior". They also claim that "the emotional costs and benefits of cheating should be included in the individual's utility function in interaction with its expected monetary return".

3. The model

Outside the economics literature, classic work on the evolution of altruism includes Hamilton (1964), Trivers (1971), Sober and Wilson

[2] While the direct approach mainly relies on data collected by running economic experiments in the lab, the indirect approach operates at a more aggregate level, as it collects tax evasion estimates for a large set of countries and years and matches them with country-averages of tax morale from international surveys. Recent evidence indicates that average levels of tax morale are negatively associated with the size of the shadow economy in Latin America, United States, Europe as well as in several transition countries (Halla, 2010).

[3] For similar results, see also Bloomquist's (2011) experimental findings.

[4] See on this also Gordon (1989), Bordignon (1993) and Myler and Naylor (1996).