



Optimal taxation in the presence of tax evasion: Expected utility versus prospect theory

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ARTICLE INFO

Article history:

Received 28 September 2007
Received in revised form 1 March 2010
Accepted 5 March 2010
Available online 16 March 2010

JEL classification:

D81 (criteria for decision making under risk and uncertainty)
H26 (tax evasion)
K42 (illegal behavior and the enforcement of law)

Keywords:

Prospect theory
Expected utility theory
Tax evasion
Optimal taxation
Normative versus positive economics
Context dependent preferences
Liberalism
Paternalism

ABSTRACT

It is now well known that the predictions of expected utility theory (EUT) applied to tax evasion are quantitatively and qualitatively at variance with the evidence while prospect theory (PT) makes the correct predictions. In this literature, the tax rate is exogenous. We endogenize the tax rate, and require that a successful theory should explain, jointly, the facts on the tax rate, tax gap and the level of government expenditure. We find that the data is best described by taxpayers using PT and the government using standard utility theory, EUT. The results are robust to several possible alternative specifications. We discuss how our results have a bearing on the debate between liberalism *versus* paternalism in behavioral economics. We also propose an alternative explanation based on the notion of context dependent preferences.

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“Even when an agent is perfectly rational in the sense that he systematically maximizes some function, it is not at all obvious that the utility function which explains his behavior should be inserted into the welfare considerations . . . More generally, once psychological effects enter into the calculus, there is no escape from separating welfare and behavior.” Rubinstein (2005).

“paternalism [is the] power and authority one person or institution exercises over another to confer benefits or prevent harm for the latter regardless of the latter’s informed consent . . . paternalism . . . increases the potential for the abuse of state power, arbitrary discrimination, tyranny, and civil strife . . . liberalism . . . provides the only way for the proponents of conflicting ways of life to live together . . . liberalism [is] the only viable basis for peaceful coexistence in culturally and religiously plural societies.” The Oxford Companion to Philosophy (2005, pp. 515, 648).

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“... the tax context produces a rather unique behavioral framework which arguably requires different theoretical approaches.” Graetz and Wilde (2001, pp. 358, 359).

1. Introduction

Issues of tax evasion are extremely important for all countries. Losses to society from tax evasion are huge. For the USA, for example, based on the most recent data, the *tax gap*² is of the order of \$300 billion per year (Slemrod, 2007).³ An important feature of the existing analysis of tax evasion is that it is largely carried out in an expected utility theory (EUT) framework.

Recent research points to several serious problems in using an EUT approach to tax evasion. Dhimi and al-Nowaihi (2007) apply Kahneman and Tversky's (1979) prospect theory⁴ (PT) to the tax evasion decision facing a taxpayer. They show that while EUT gives the correct qualitative results for the effects of the probability of detection and the penalty rate, there are several problems. First, EUT makes the prediction that under reasonable attitudes to risk, namely, non-increasing absolute risk aversion, the taxpayer evades less as the tax rate goes up. The implication is that tax evasion will be at a minimum when the tax rate is 100 percent. This result, due to Yitzhaki (1974), is contradicted by the bulk of empirical evidence. Second, at existing penalty rates and detection probabilities, the quantitative predictions of EUT on the extent of tax evasion are wrong by a factor of about 100. On the other hand, PT gives the correct quantitative and qualitative results.⁵ Given the magnitudes involved, the misleading welfare consequences of applying EUT to an analysis of tax evasion are potentially very large.

Dhimi and al-Nowaihi (2007), however, treat the tax rate as exogenous. In this paper, we extend the analysis of Dhimi and al-Nowaihi (2007) by making the tax rate endogenous. This, in turn, requires the specification of an objective function for the government. There are two standard approaches to the latter problem. The first is to select a positive political economy model that seeks to accurately describe actual government behavior. A difficulty in implementing this approach arises from the multifarious government objectives and the complexity of the constraints facing it. An additional difficulty is that there is no generally agreed upon positive model of government behavior. The second, but also standard approach, is to select on normative grounds a simple social welfare function for the government, then ask the question ‘to what extent do the predictions conform to the stylized facts?’ We follow the second approach. Although normative criteria considerably reduce the set of possible social welfare functions, they do not determine a unique social welfare function. Therefore, we consider three very different regimes (regimes PT1, PT2 and PT3, see Section 2.4). We find that our results are robust across these regimes. We also explain why we expect that a more general model would give substantially similar results (Section 5.1).

1.1. A brief description of the model

Our framework of analysis is as follows. We consider a model where the government levies taxes to finance public provision of goods and services. Individuals can choose to evade a fraction of their income. The government audits a fraction of the tax returns. If a taxpayer is caught evading, he pays back owed tax plus a penalty. Individuals gain utility from both private and public consumption. The government chooses the optimal tax rate, given society's preference between private and public expenditure, and taking the subsequent tax evasion behavior of taxpayers into account. In this simple framework, we assess the relative success of EUT and PT. We find that PT far outperforms EUT. We also highlight the importance of recognizing that preferences are context dependent.

1.2. Brief literature review

The literature on endogenous evasion and optimal taxation is fairly limited and, without exception, uses EUT. There are three main strands of the literature.

The first strand is exemplified in the work of Reinganum and Wilde (1985),⁶ Cremer and Gahvari (1996), Marhuenda and Ortuno-Ortin (1997) and Chandar and Wilde (1998). Here the approach is to choose, simultaneously, the optimal tax and

² The *tax gap* is the difference between the amount owed in taxes and the amount actually collected by the tax authorities. Income tax accounts for about two-thirds of this gap; see Slemrod (2007).

³ To this has to be added the cost of enforcement, the cost of misallocation of resources due to workers and firms diverting their efforts to less productive but easier to evade activities and the cost due to distorted prices, in particular between privately and publicly provided goods and services.

⁴ The standard references for prospect theory are Kahneman and Tversky (1979) and Tversky and Kahneman (1992). Incidentally, Kahneman and Tversky (1979) is the second most cited paper in *Econometrica* and in all of economics. We are grateful to Peter Wakker for pointing this out to us. Section 4, gives a self-contained exposition of prospect theory.

⁵ But these are not the only problems that PT can rectify in the context of tax evasion. Empirical and experimental evidence show that *obligatory advance tax payments* reduce tax evasion, a fact that can be explained by PT but not by EUT; see Elffers and Hessing (1997) and Yaniv (1999).

⁶ Reinganum and Wilde (1985) was the pioneering paper in the mechanism-design approach to tax evasion. However, as a piece of positive analysis it has its limitations. From their assumptions A1 to A7 and A9, Reinganum and Wilde show that the optimal audit and taxation strategy takes the following form. The government announces a cutoff point, T , and audits all taxpayers who report a pretax income less than T . An audit reveals the true income of the taxpayer, which the government then expropriates in total. The government audits no taxpayer who reports an income equal to, or greater than, T , and simply collects a lumpsum tax equal to T from that taxpayer. No attempt is made to compare the predictions of the model with the evidence on taxation, which is not surprising since they are grossly at variance with any known tax system.

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