



## The excess burden of tax evasion—An experimental detection–concealment contest

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### ABSTRACT

Tax evasion may cause social welfare losses due to the incentives of taxpayers to invest in the concealment and of tax authorities to invest in the detection of tax evasion. Reducing the investment of both parties at the same time would then lead to a Pareto improvement. Given that concealment and detection costs are hardly measurable in reality, we show in a controlled laboratory experiment that the welfare losses from a concealment–detection contest depend positively on the prevailing tax rate, but not on the penalty which is imposed in case of detected tax evasion. Hence, policy makers who are concerned about socially inefficient concealment and enforcement costs should focus on tax rates rather than penalty rates.

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## 1. Introduction

The welfare implications of income tax evasion *per se* are unclear. Some authors believe that tax evasion itself constitutes a deadweight loss for society (e.g. Usher, 1986). Some others point out the difficulty to assess the welfare effects of tax evasion, since the state of the economy, the efficiency of the prevailing tax system, and social preferences over income distributions are unknown (see Cowell, 1990a, Chapter 7). However, tax evasion implies welfare losses for society by inducing two kinds of socially wasteful activities. First, taxpayers invest effort and money in order to *conceal* tax evasion. For instance, a taxpayer might incur travel expenses or forgo possible interest payments in order to shelter black money abroad (Cowell, 1990b) or he might pay third parties for “laundering” his money and thereby hide the taxable objects from the tax authorities (Yaniv, 1999). Second, tax authorities invest effort and money in order to *detect* tax evasion. Such socially wasteful enforcement costs arise, for example, from hiring more tax administrators to monitor tax reports or from investing into better detection technology (Cebula, 2001). If both parties reduced their investment in such a way that the resulting detection probability remained unchanged then both parties would save some effort cost without changing anything else. Therefore, such a joint reduction in efforts would be a Pareto improvement. Hence, the welfare loss induced

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by concealment and detection activities gives rise to some extra excess burden of income taxation which has to be added to the well known deadweight losses caused by the distortionary impact of income taxes. The understanding of what determines the size of this extra welfare loss is essential when designing or reforming tax and tax-enforcement law.

In this paper we use experimental techniques to investigate whether and how concealment and detection costs depend on two key parameters of a tax system: The prevailing tax rate and the penalty rate for detected tax evasion. Our experiment is based on a simplified version of the game-theoretic model presented in Bayer (2006), which describes the interaction between taxpayer and tax authority as a detection–concealment contest. Taxpayers decide not only on how much income they declare. They can also invest some of their income in order to conceal evasion, while the tax authority may vary the resources spent on detection effort. The probability of detecting potential tax evasion is modeled by a contest function. It decreases with the taxpayer's concealment investment and increases with the authority's detection effort. By considering both concealment and detection costs we can compare the degree of this social inefficiency for different tax and enforcement regimes.

The model predicts that the waste increases with tax and penalty rates, as both increase the stakes of the contest and therefore the incentives for investment. As long as penalty rates are low—such that they do not reduce evasion behaviour—penalty rates and tax rates are perfect substitutes with respect to wasted resources. Once penalty rates are high enough to reduce evasion their impact on the inefficiency is less strong, but still positive. Our experiment shows that higher tax rates indeed lead to a considerable reduction of efficiency, while penalty rates do not have a significant influence on the social waste. This shows that the main focus of policy makers who are concerned about unproductive concealment and enforcement should focus on tax rates rather than on penalty rates.

It is important to stress that the primary focus of our paper is on the effects of tax rates and penalty rates on the social costs of concealment and detection efforts. Of course, tax rates and penalty rates also have an impact on the frequency of tax evasion (for a recent survey, see Slemrod, 2007). Broadly speaking, tax rates have been found to be a driving force for the frequency of tax evasion (Torgler, 2002; Kirchler, 2007; Maciejovsky et al., 2007), whereas the impact of tax penalties on compliance is ambiguous and often not significant (Baldry, 1987; Fischer et al., 1992; Fortin et al., 2007). Our experimental data yield the same pattern with respect to how tax rates and penalty rates influence the frequency of tax evasion. The novelty of our approach is to consider the social costs of tax evasion through concealment and detection costs. The traditional models of tax evasion—in the spirit of Allingham and Sandmo's (1972) seminal paper—have not been able to address the possible excess burden of tax evasion through concealment and detection costs, because taxpayers had no means of covering their evasion, and audit rates were exogenously fixed in these early models. Only later models have included the social costs of concealment and detection in different ways. Reinganum and Wilde (1985), for instance, have concentrated on detection costs. They endogenised the audit probability by letting the tax authority decide on the level of (costly) investment in the likelihood of a successful audit. Contrary to our model, taxpayers had no means of hiding their tax evasion from the tax authorities, however. Cremer and Gahvari (1994) have included expenditures on the concealment of tax evasion in their analysis of optimal linear income taxation, but have assumed purely random audits which are independent of the tax authority's efforts (and costs) for detecting tax evasion. Yaniv (1999) has studied the taxpayer's decision on laundering money and its consequences for an optimal deterrence policy, without examining the consequences for social welfare, though. Usher (1986) has been the first one to consider both concealment and detection costs in a general equilibrium model of optimal taxation and enforcement. He shows that costly evasion and detection increase the marginal cost of public funds considerably.<sup>1</sup> The main difference to our approach is Usher's (1976) assumption of homogeneous taxpayers. This homogeneity resolves all uncertainty about the true income of an individual taxpayer. Our taxpayers, however, are heterogeneous with respect to their income (or productivity), implying that the authority does not know which type of taxpayer it faces. Thus, our approach adds an interesting—and in reality highly relevant—strategical dimension to the contest between taxpayer and tax authority.

Besides these differences in the way concealment and detection efforts are integrated in our model as compared to previous papers, our paper is the first to provide an empirical/experimental attempt to measure the concealment and detection costs associated with tax evasion. All previous papers that consider concealment and detection have been purely theoretical. The lack of empirical evidence is not surprising, though, because an empirical test would require (a) to assign different taxpayers randomly to different tax systems and (b) to be able to observe evasion, detection and concealment costs. Unfortunately, the fulfillment of condition (a) would be very expensive and for equity reasons hardly feasible, while the information requirements for (b) are practically prohibitive. Given the limitations of observing the excess burden of tax evasion in the field we have opted for a controlled laboratory experiment. We can (a) assign subjects randomly to different (experimental) tax systems and (b) can induce preferences over efforts by assigning (experimental) cost functions, which enables the measurement of concealment and detection costs through the observed effort.

The remainder of the paper is organised as follows: Section 2 introduces the basic model and provides the main predictions for the parameter settings used in the experiment. Section 3 is devoted to our experimental results. In particular we analyse the influence of tax rates and penalty rates on evasion, detection, concealment, efficiency and revenues. A brief conclusion is offered in Section 4.

<sup>1</sup> The paper by Kaplow (1990) obtains results that are, basically, analogous to those in Usher (1986). Yet, Kaplow (1990) is less concerned with the cost of public funds, but he examines modifications to the Ramsey-type optimal commodity taxation in the presence of administrative and evasion costs.

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