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Tax compliance and psychic costs: Behavioral experimental evidence using a physiological marker☆

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ABSTRACT

Although paying taxes is a key element of a well-functioning society, there is still limited understanding as to why people actually pay their taxes. Models emphasizing that taxpayers make strategic, financially motivated compliance decisions seemingly assume an overly restrictive view of human nature. Law abidance may be more accurately explained by social norms, a concept that has gained growing importance as research attempts to understand the tax compliance puzzle. This study analyzes the influence of psychic stress generated by the possibility of breaking social norms in the tax compliance context. We measure psychic stress using heart rate variability (HRV), which captures the psychobiological or neural equivalents of psychic stress that may arise from the contemplation of real or imagined actions, producing immediate physiologic discomfort. The results of our laboratory experiments provide empirical evidence of a positive correlation between psychic stress and tax compliance, thus underscoring the importance of moral sentiments for tax compliance. We also identify three distinct types of individuals who differ in their levels of psychic stress, tax morale, and tax compliance.

1. Introduction

Above the entrance to the U.S. Internal Revenue Service (IRS) are inscribed the following words from Oliver Wendell Holmes: "Taxes are what we pay for a civilized society." Taxes are the fuel of civilizations, and few civilizations have failed to impose them (Adams, 1993). Yet despite the crucial importance of taxation, our understanding of why people pay taxes remains limited (see, e.g., Slemrod, 1992; Torgler, 2007; Alm et al., 2010; Konrad and Qari, 2012). In this article we provide physiological evidence of an intrinsic explanation for tax compliance.

The traditional approach is to focus on the effects of deterrence policies, a major component of the economics-of-crime approach (Becker, 1968; Allingham and Sandmo, 1972). Although this approach has produced many useful insights, it seems too narrow a framework for fully understanding tax compliance if it assumes a rational individual who maximizes the expected utility of the tax evasion gamble, weighing

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the benefits of successful cheating against the prospect of detection and punishment. Using this framework, tax evasion is negatively related to the probability of detection and the degree of punishment. Yet, in many countries, the level of deterrence is too low to explain the high degree of tax compliance, and even in the least compliant nations, an approach based purely on this standard economic theory can only explain observed levels of tax evasion by assuming unrealistic preferences like extreme risk aversion (Alm et al., 2010). This implies that tax compliance decisions must be influenced by motivations not fully captured by the basic economics-of-crime approach.

The inability of the economics-of-crime model to explain compliance is probably related to a variety of factors, including social norms and social and cognitive dissonance, as theorized in the psychological literature and conceptualized on both social and individual levels (Asch, 1952; Festinger, 1957). It has even been argued (e.g., Graetz and Wilde, 1985; Alm et al., 1992b) that social norms act as an alternative to law enforcement in motivating individual behavior. Investigating these norms may therefore help resolve the puzzle of (high) tax compliance. To influence tax payment decisions, social norms must be internalized; for example, through moral sentiments that create psychological costs or stress in case of norm violation. The (intended) violation of social norms triggers internal sanctioning (e.g., moral sentiments like guilt, remorse, or shame), augmenting effects of legal and social sanctions such as prosecution, gossip, or ostracism in the case of detection (Polinsky and Shavell, 2000). Internal sanctions could function by creating increased psychic stress (potentially varying across taxpayers according to how much the social norm is internalized).

We study the role of psychic stress in tax compliance decisions using an experiment that requires participants to make compliance choices while their heart rate variability (HRV) is recorded. HRV is an established correlate to psychic strain (Dishman et al., 2000), and hence a physiological marker for psychic stress, capturing psychobiological or neural equivalents of psychic strain that arise from the contemplation of real or imagined actions (Green and Paxton, 2009). It thus allows exploration of immediate physiological reactions represented by changes in the heart rate during participants' decision making. Our use of neuroscientific tools to examine the possible impact of psychic stress on tax compliance addresses the valid criticism that past research on moral sentiments has failed to reliably measure psychic stress (Andreoni et al., 1998). Our work thus has the potential to contribute to a better biological microfoundation for compliance behavior. In general, inclusion of data from brain systems, heart rate, skin resistance, genes, neurons, and neurotransmitters can reveal otherwise unobservable aspects of the individual decision-making process. For example, functional magnetic resonance imaging (fMRI) evidence suggests that mandatory (tax-like) transfers to charity lead to neural activation in areas linked to reward processing (Harbaugh et al., 2007).

Noninvasive procedures like HRV are particularly attractive for understanding the biological bases of human decisions in a laboratory setting (Dulleck et al., 2011). Coricelli et al. (2010), for instance, use skin conductance responses (SCR) to explore the link between physiological measures and tax evasion. They find that SCR is correlated with self-reported emotional arousal and hedonic valence. Specifically, they link an increased SCR before decision making (i.e., higher anticipated and anticipatory emotional arousal) to a greater degree of tax evasion. Such a result is consistent with the idea that detected evasion creates shame, while in our framework the intention to evade taxes induces guilt, which consequently reduces the utility of noncompliance and thus the amount of tax evasion.[1]

We chose the HRV measurement technique because it is nonintrusive and requires only compact equipment, which allows us to design a complex environment (i.e., a large variety of settings and interpersonal contexts). Additionally, HRV permits observation of a larger group of participants and interactions in the laboratory compared to alternatives such as fMRI. Our experiment can therefore include a larger sample than is typically possible with fMRI studies.

2. Tax compliance and psychic stress

Erard and Feinstein (1994) describe the role of moral sentiments in tax compliance, using a theoretical model that outlines how these sentiments could influence decisions. Because our approach is best understood in the light of their theory, we summarize their framework as it identifies two central moral sentiments connected to tax evasion: shame and guilt. Both have an influence on tax compliance as guilt and shame arise from the contemplation of imagined actions. However, guilt is seen to be more anticipatory (Turner and Stets, 2006). Erard and Feinstein relate shame to the imagination of being caught and punished. In contrast, guilt is felt independently of detection; it is exclusively an internal sanctioning mechanism that arises when the individual contemplates violating an internal moral norm. In both cases, Erard and Feinstein's model suggest that it is the mere contemplation of an incorrect declaration that generates psychic costs, which produce a desire to reduce this stress by reducing evasion.

We are not able to measure psychic costs directly but they are related to pain or negative emotions. The actual pain experienced while contemplating cheating behavior serves as a survival signal to demonstrate that corrective behavior is required (Churchland, 2011). In our case the corrective behavior would be to reduce tax evasion. Thus, experienced pain serves as a *homeostatic emotion* reflecting an adverse condition in the body that prompts a behavioral reaction (such as being more compliant) to remove or reduce the pain (Craig, 2003). Thus, by measuring such a body reaction with a physiological HRV marker we can determine whether pain or stress is related to the actual final decision (level of tax compliance). According to Erard and Feinstein's (1994) model, psychic cost has a positive influence on tax compliance. In other words, if their model is correct we would observe that a higher level of psychic stress measured during the decision making process (when individuals contemplate what to do) would be correlated with a higher level of tax compliance (final decision). The theoretical framework of moral sentiments in tax compliance decisions is rarely tested; however, survey evidence suggests that the anticipated psychic stress associated with tax evasion can serve as a much stronger compliance enforcement mechanism than the perceived threat of legal sanctions (Grasmick and Bursik, 1990).

The following introduces Erard and Feinstein's theoretical model in order to provide an understanding of how psychic costs can be introduced into the standard setting. As a starting point, we introduce the common approach taken in the tax compliance literature. Agents choose an optimal amount of income to report (D_i) taking into account the probability that they will be audited and penalized (if audited and underreporting is discovered). In our experimental design, we assume a proportional tax t and an exogenous audit probability p (i.e., we do not assume endogenous audit selection rules like dependence on the amount reported). If the individual is audited (which happens with probability p), then her true income Y_i will be determined and the difference between true tax liability and declared income $t(Y_i - D_i)$ will be taxed with a fine multiplier ($ft(Y_i - D_i)$). For example, for $f = 2$, participants pay a fine equal to the amount they evaded on top of the outstanding tax. The following expected utility model describes the decision for a risk-neutral taxpayer:

$$E[u(D_i)] = p[Y_i - tD_i - ft(Y_i - D_i)] + (1 - p)[Y_i - tD_i] \quad (1)$$

[1] Coricelli et al. (2010) also observe that negative feelings are related to a higher fine, and learning that photographs of participants would be disseminated increases this effect. This supports their explanation that tax compliance is driven by shame, which is increased with greater public punishment. They also find that avoiding an audit generates positive feelings, possibly out of relief or the joy of higher earnings, which also hints at the importance of external sanctioning mechanisms.