Tax Morale, Leviathan and the Political Process: A Theoretical Approach

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ABSTRACT. It is proposed that a more accurate predicition of tax evasion activity than in the standard portfolio-choice model can be derived even for risk-neutral individuals if psychological costs are considered. Contrary to earlier models integrating psychological costs they are systematically derived by assuming a relationship between cognitive dissonance, taxpayer satisfaction with public policy and taxes evaded. It is shown that this approach to modelling tax evasion can bridge a gap to the literature from economic psychology on the same topic by accounting for several influences that traditionally play a role there, but are neglected in the portfolio-choice model.

1. INTRODUCTION

A large amount of empirical evidence accumulated over the years suggests that, compared to the observed behaviour of actual taxpayers, the standard model by ALLINGHAM/SANDMO (1972) predicts too high levels of tax evasion. In the context of their model, the observed low evasion activity can be explained only with unreasonably high Arrow-Pratt-measures of risk aversion.[1] However, relatively low levels of tax evasion may not be the result of risk-aversion at all. For instance, contributions from the realm of economic psychology dating back (at least) as far as SCHMÖLDERS (1951) conjecture that tax evasion will be the lower, the more satisfied the citizens are with the policy conducted by their government.

In the present paper, we attempt to show that a low propensity to evade taxes can be explained even for risk-neutral individuals by taking the considerations of economic psychology seriously and integrating them – at least to a certain degree – into a modified Allingham-Sandmo-model of tax evasion. The difference between the model presented here and the theoretical approaches reviewed in Section 2 is constituted mainly by the following two points: (i) we attempt to bridge the gap between the strictly neoclassical literature on tax evasion and the literature from the realm of economic psychology by integrating the concept of cognitive dissonance; (ii) we introduce the notion of informal institutions and thus open the door for a little more far-reaching theoretical speculations concerning the interdependency between tax evasion and the politico-economic process.

In Section 2 we give a more detailed account of this paper's differences compared to and common ground with the existing literature on tax evasion. Section 3 gives a short review of the risk-neutral taxpayer in a pure portfolio-choice model. In Section 4, the notions of cognitive dissonance and informal institutions are introduced and the optimal rate of tax evasion for a risk-neutral individual with a conscience is derived and in Section 5 it is shown how these results correspond to the politico-economic process and some possible and plausible extensions are considered. Finally, Section 6 concludes.

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1. This argument has been put forward by, among others, ALM, MCCLELLAND and SCHULZE (1992) as well as by GRAETZ/WILDE (1985), SKINNER/SLEMROD (1985) and, for Swiss data, by POMMEREHNE/FREY (1992).

2. Links to the existing literature on tax evasion

There are mainly two strands of literature attempting to explain actual tax evasion behaviour. On the one hand, we have models of mainstream neoclassiscal provenience which include, somewhat arbitrarily, the phenomenon of tax morale in the taxpayer's calculus, but do not venture to explain why the otherwise uncompromisingly self-interested homo economicus is plagued by moral considerations on the day he fills out his tax declaration. The consideration of the taxpayer's conscience has, however, proven to be exceptionally fruitful in empirical research, where tax morale itself has been made the dependent variable. For example, experimental research by Elffers et al. (1987) has shown that the magnitude of tax evasion depends on the satisfaction of the taxpayer with the tax system as well as the system of tax administration.[2] Similar experimental evidence has been brought forward in contributions reaching back as far as Spicer/Becker (1980) and Thibaut et al. (1974). More recently, Alm, Jackson and McKee (1992) found in an experimental setting that tax morale is more significant if taxpayers believe that there is a direct relationship between taxes paid and utility gained from a public good. Baldry (1986) has shown in an experiment that some people never evade taxes, seemingly paying no regard to expected utility considerations whatsoever. Finally, Wahlund (1992) gives an exhaustive list of possible influences on tax evasion behaviour based on survey data. Among these influences are a generally negative attitude towards the tax system and the belief that the marginal tax rate is too high.

There is also a considerable amount of non-experimental evidence, indicating that a relationship exists between the taxpayer's satisfaction with his government in general or the tax system in particular on the one hand, and the amount of taxes evaded on the other hand. Frey (1997) has shown, that in those Swiss cantons where citizens have means of direct democratic influence and control, tax evasion is significantly lower. Similar results have been found by Pommerehne/Weck-Hannemann (1996) and Feld/Frey

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2. See also Webley et al. (1988).

(2001) have shown that if there is a relationship based on trust between the tax administration and the taxpayer, then evasion will tend to be lower. KUCHER/GÖTTE (1998) show by means of an empirical analysis for the city of Zürich that tax morale was higher, the higher the rate of concurrence between the people's votes in referenda and the government's recommendation to vote was – i.e., the more people have trusted the recommendations given to them by their representatives. Finally, GRAETZ ET AL. (1986) have found a decline in tax morale in US data on tax evasion.

So, it appears to be safe to say that there is something like tax morale, and that it depends systematically on the institutional environment as well as on the policy parameters chosen by the government. But this statement still does not answer the question why the otherwise rational, self-interested taxpayer acts in a manner that leaves the observer adhering to the assumption of homo economicus being in fact susceptible to morality. There are relatively few theoretical approaches to this problem. For instance, POMMEREHNE ET AL. (1994) formulate a simulation model in which they assume that taxpayers follow a tit for tat strategy, so that "good" taxpayers, who initially do not evade for moral reasons, start to evade taxes when they recognise that politicians deviate from the citizens' preferences. It is shown that in a direct democracy, with fewer possibilities of deviation compared to a representative democracy, tax evasion will be lower. POMMEREHNE ET AL. (1997) go a step further and try to explain why taxpayers feel obliged to be honest. They assume that taxpayers who are included in the decision-making process via direct democratic institutions gain utility by not breaking a commitment in whose formulation they have participated. This explanation is, however, limited to countries where collective decisions are made (at least partly) by following direct democratic rules.

GORDON (1989) formulates a model of tax evasion in which he allows for an individual honesty characteristic, representing the propensity to be honest which can vary from individual to individual. This allows him to model interactions between taxpayers, because the individual's own honesty can be assumed to depend on the honesty of his peers. Reactions to the government's choice of policy parameters are not modelled. BORDIGNON (1993) introduces a fairness constraint to a standard, portfolio choice

model of tax evasion. This constraint, which is simply a maximum level of tax evasion, is determined endogenously by assuming that individuals abide by a Kantian ethical rule in determining the tax they consider fair and are willing to pay. Although this modelling approach gives valuable insights by allowing for the interaction between individual taxpayers and between the taxpayer and the government to play a role, it has a shortcoming in not explaining why individuals adhere to the Kantian rule. Finally, ERARD/FEINSTEIN (1994) have also integrated a variable accounting for psychological costs, but have made no assumptions regarding this variable's dependency on the policy conducted by the government.

Reviewing these theoretical approaches, one might come to the idea that the matter of tax morale is not a matter of morals at all, which would be a rather comforting thought from the perspective of the economist, who generally believes that most if not all important features of economic life can be explained by means of a marginalist rational choice model. In the following sections, we will attempt to show that low tax evasion activity can indeed be explained by employing a rather conventional model built around an agent maximising expected income. We do attempt to bridge the gap to the literature from the realm of economic psychology, however, by recognising the possible occurrence of psychological costs to our taxpayer. Obviously, the consideration of psychological costs is often regarded a little dubious among methodologists, because by using an unsystematic concept of such costs, any theory can be protected from falsification, but the price to pay is a loss of predictive power.[3] Therefore, psychological costs are most of the time not considered in economic models for the same reasons that preferences are held constant.

We bear in mind these serious and well-founded methodological objections and attempt to put forward some clear cut hypotheses on the occurrence of psychological costs associated with tax evasion behaviour. Furthermore, it will be shown that this modification of the standard model leads to a considerable widening of the theoretical playing field, because various attributes of the politico-economic process can have a direct impact on tax evasion. But first, we will quickly review our theoretical yardstick in the following

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3.   See, for example, KIRCHGÄSSNER (2000), pp. 60-62.

section: the risk-neutral tax evader in a pure portfolio-choice model in the Allingham-Sandmo-tradition.

3. The standard risk-neutral tax evader

The tax evasion decision of a rational, self-interested, risk-neutral and completely conscience-free evader can be modelled with a small number of simple equations. We assume a simple, proportional income tax with a uniform rate t on gross income y, so that taxes paid by a completely honest taxpayer would amount to $T = ty$. A less honest taxpayer conceals a portion $0 \leq \tau \leq 1$ of his income, and this activity is detected by the tax authorities with a probability $0 < p < 1$. In case of being convicted, the evader has to pay his regular taxes and in addition a penalty tax $S = s\tau y$. The penalty tax is to be calculated by applying a penalty tax rate s to the total amount of concealed income. Being risk-neutral, he maximises utility by maximising expected income, and he does so by letting τ rise until the expected marginal gain in saved taxes equals the expected marginal loss in expected punishment, which is the case when

$$(1 - p)ty = psy. \tag{1}$$

In this formulation, tax evasion is an all-or-nothing decision. The taxpayer hides all his income if the left has a bigger value than the right hand side of the equation, and he does not evade at all if the right hand side assumes a higher value. We can change this by making assumption that the penalty tax rate depends on the portion of income concealed. It will be convenient to assume that

$$s = \alpha\sqrt{\tau} \quad \text{with} \quad \alpha > 0 \tag{2}$$

so that the marginal effect of a rise of τ on s is positive but declining and, since $\tau \leq 1$, the highest possible penalty tax rate is $s = \alpha$. The penalty tax schedule assumed here is obviously a simplification, but it does not defy reality completely as, for instance, the depiciton of german tax-related criminal law in TIPKE/LANG (1996) shows. The expected punishment is then

$$E[P] = p\alpha\tau^{1.5}y \tag{3}$$

and the expected marginal punishment is

$$\frac{\partial E[P]}{\partial \tau} = 1.5 p \alpha y \sqrt{\tau}. \tag{4}$$

Substituting this into (1) and solving for τ yields

$$\tau = \left[\frac{(1-p)t}{1.5 p \alpha} \right]^2. \tag{5}$$

Summing up, the magnitude of tax evasion will rise with t, but decline with a rise of p and α. If we stop here, however, we would usually end up forecasting too high levels of tax evasion, as the empirical evidence cited above indicates.

4. Rational tax evasion with psychological costs

4.1. **Introducing: A taxpayer with a conscience.** We will now embark upon our effort to allow for the taxpayer to have a conscience and to do so in a way that leads to empirically testable rather than sterile, infalsifiable hypotheses. The first step will be to introduce the idea of cognitive dissonance, which can be traced back to Festinger (1957). The basic concept is surprisingly simple: it is assumed that every individual is endowed with a set of cognitions. A cognition is defined as a normative or positive view held by the individual about the world or about himself. For instance, "*The government is making efficient use of public funds*" is cognition A (a positive statement), "*I as an individual believe that progressive taxation is just, on the condition that A is true*" is cognition B (a normative statement) and "*I have only recently transferred my taxable income to a carribean tax haven, where the tax administration will certainly never find it*" is cognition C (another positive statement). Obviously, there is a contradiction between statement C and the other two statements A and B, but it is a contradiction that would not bother a conscience-free homo economicus, since he is certain that his evasion of taxes will not be discovered and he therefore has no reason to fear either legal punishment or being socially ostracised.

Things appear different when cognitive dissonance matters in his considerations on the optimal level of tax evasion. Dissonance appears whenever an individual recognises that two or more of his cognitions are contradictory. The psychological costs that occur to

the individual because of dissonance imply an incentive to reduce dissonance, usually by means of changing one of the dissonant cognitions. There are already several contributions which attempt to utilise the concept of cognitive dissonance in an economic context. For example, AKERLOF/DICKENS (1982) explain an inefficiently low demand for safety gear by individuals employed in dangerous workplaces by showing that these individuals have an incentive to disclaim the cognition that their workplace is indeed dangerous. MAYER (1993) shows that policy decisions of american central bankers can be explained by referring to the concept of cognitive dissonance. And MEIER/DURRER (1992) show how an entirely new approach to explaining economic policy making may be built around a model of man that combines economic rationality and aspects of social cognition.[4]

Now, suppose that costlessly altering cognitions ex post is not feasible. This means that, once the taxpayer has evaded taxes and once he has recognised that this activity is dissonant with the other cognitions he holds, he will have to cope with psychological costs. From an economist's point of view, it seems plausible to assume that a rational individual will be able to assess the magnitude of these costs ex ante, especially because they depend on his own cognitions and his own attitudes. This is a central premise for the following speculations, when we assume that psychological costs resulting from cognitive dissonance are considered by the tax payer ex ante in the marginal calculus by which he determines his optimal level of tax evasion.

4.2. **The optimal level of tax evasion with cognitive dissonance.** First of all, a more precise assumption regarding the magnitude of psychological costs is required. If we have another look at the three cognitions from the above paragraph, we see that cognitive dissonance will be a problem only in the case when cognition A holds. Cognition A can be formulated more broadly as the statement that the individual is satisfied with his government's taxing and spending decisions. Following the lead of the literature on spatial preferences, it may be assumed that the taxpayer values public policy by means

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4. See also SLEMBECK (1997) for an english summary of this approach. In a remotely similar approach, BRADY ET AL. (1995) show how government failure can be explained by employing the concept of cognitive dissonance.

of a simple utility function of the form

$$U_i(x) = U_i(x_i^*) - \Delta_i^B(x, x_i^*), \tag{6}$$

where x is a vector describing the actual policy executed by the government in the policy space $\Re^N$ and x^* is the ideal vector of an individual i.[5] $\Delta^B(\cdot, \cdot)$ is the euclidian distance between two vectors, weighed with a matrix B whose elements $b_{nn} > 0$ and $b_{nm} = 0 \forall n \neq m$ indicate how important an individual considers one policy item to be relative to the others.

Adding to the assumption of the existence of a personal ideal vector x^*, we also assume that in the economy, there exist a number of informal institutions defining a subset $\mathcal{I} \subseteq \Re^N$ of policy vectors that are generally regarded as fair and acceptable. The term 'informal institutions' has a number of different connotations in the economic literature, for instance as an obstacle to the effectivity of formal institutions in transition processes[6] or as norms internalised by individuals[7]. Here, we will follow KNIGHT (1992) and assume that informal institutions are simply self-enforcing rules which are not drafted formally. The question of how the mechanism of self-enforcement exactly works will be tackled later. It will be further assumed that $U(x^\mathcal{I}) > U(x) \forall x \notin \mathcal{I}, x^\mathcal{I} \in \mathcal{I}$, which can, for example, be achieved with a utility function of the form

$$U(x) = \begin{cases} U(x^*) - \Delta^B(x, x^*) \forall x \in \mathcal{I} \\ U(x^\bullet) - \Delta^B(x, x^\circ) \forall x \notin \mathcal{I} \end{cases} \tag{7}$$

where

$$x^\bullet = \arg\max_{x^\bullet \in \mathcal{I}} \Delta^B(x^*, x^\bullet) \qquad \text{and} \qquad x^\circ = \arg\min_{x^\circ \in \mathcal{I}, x \notin \mathcal{I}} \Delta^B(x, x^\circ). \tag{8}$$

This is illustrated in Fig. 1. It means that $x^\bullet$ is the least valued policy vector in $\mathcal{I}$ and x° is that policy vector in $\mathcal{I}$, that has the smallest weighted distance to the actual policy vector x.

Put into words, a policy that is in compliance with the informal institutions of a society is always considered better than a policy that is not in compliance – even if a policy in

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5. For notational simplification, the suffix i will be omitted from now on.
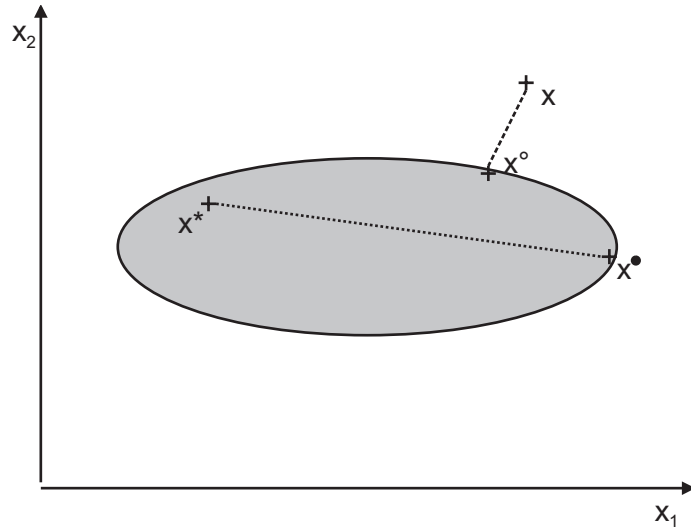6. See NORTH (1992).
7. See ELSTER (1989).

Figure 1: A graphic illustration of the taxpayer's utility from public policy. Suppose that x is the actual policy vector, x^* the most preferred policy vector and the shaded area represents $\mathcal{I}$. The loss in utility compared to the ideal vector is then not simply given by the weighted distance between x^* and x, because in this case, a higher utility may be associated with a vector $x \notin \mathcal{I}$ than with a vector $x^\bullet \in \mathcal{I}$. To avoid this, we assume that the utility of any $x \notin \mathcal{I}$ is given by the distance from x to the nearest $x^\circ \in \mathcal{I}$, substracted from $U(x^\bullet)$, with $x^\bullet$ being the least valued vector in $\mathcal{I}$.

compliance has a larger weighted distance to the personal ideal vector x^* than a policy not in compliance. The policies in $\mathcal{I}$ are all in accordance with the individuals' shared notions about which policy is still acceptable, even if it deviates from their own personal ideal points. From (7), it follows logically that $x^* \in \mathcal{I}$. Note also that we simply assume that there is one common informal institution shared by all individuals in our model economy – an assumption that is obviously not always true in reality. So, the question of how such informal institutions arise and what follows from conflicts between, for example, two rival notions of an acceptable policy, are left open at this point, albeit these are certainly interesting issues for future research.

Futhermore, it is assumed that only a loss of legitimacy resulting from a transgression of the informal institutions can be utilised to reduce dissonance. Evading taxes is an illegitimate act and, from the perspective of the taxpayer, it is only vindicable when the government, as the antagonist in the tax evading game, chooses to execute a policy that is also considered illegitimate. Legitimacy of a policy x from the perspective of any

individual is defined by

$$
L = \begin{cases} 1 - \sqrt{\sum_{n=1}^{N}[b_{nn}(x_n^{\circ} - x_n)]^2} & \text{if} \quad \sum_{n=1}^{N}[\cdot]^2 < 1 \\ 0 & \text{if} \quad \sum_{n=1}^{N}[\cdot]^2 \geq 1 \end{cases}.
\tag{9}
$$

A policy is completely legitimate ($L = 1$) when the weighted euclidian distance between the actual policy and the nearest x° is zero. With a rising weighted distance, $L \to 0$. This allows us to also formulate a simple functional relationship for the costs emerging from cognitive dissonance:

$$
D = a\tau y L.
\tag{10}
$$

When the legitimacy of the actual policy vector equals zero, there is no dissonance and therefore, there are no dissonance costs. The parameter $0 < a < 1$ stands for the individual susceptibility to cognitive dissonance. The intuition behind this is as follows: most individuals consider themselves to be acting on sound moral grounds, so that their a will take a reasonably high value. But this is not necessarily true for everybody. If, for instance, one has accepted and learned to enjoy cognition D, "*I am a nasty scoundrel*", then the contradiction between cognitions A, B and C will not bother him to any great extent, so that he acts nearly like homo economicus without a conscience and $a \approx 0$. Finally, dissonance is assumed to depend on the absolute amount of taxable income concealed, τy.

These dissonance costs can now easily be accounted for in the portfolio-choice model. Remember that the expected punishment is $E[P] = p\alpha\tau^{1.5}y$, then the expected overall costs of tax evasion amount to

$$
E[C] = \tau y(p\alpha\sqrt{\tau} + aL).
\tag{11}
$$

The objective of the taxpayer, therefore, is

$$
\max_{0 \leq t \leq 1} \tau y[(1 - p)t - p\alpha\sqrt{\tau} - aL]
\tag{12}
$$

with the f.o.c. being

$$
(1 - p)ty - 1.5p\alpha y\sqrt{(\tau)} - aLy \stackrel{!}{=} 0,
\tag{13}
$$

which yields

$$\tau = \left[\frac{(1-p)t - aL}{1.5p\alpha} \right]^2 \tag{14}$$

as the optimal amount of tax evasion for an evader who suffers from positive dissonance costs.[8] Obviously, the propensity to evade taxes is lower here than in the pure portfolio-choice model. For sufficiently high values of a and/or L, we might even have a situation as with c_3, where no taxes are evaded at all. This leads us to

Proposition 1. *With a decline in legitimacy of the actual policy vector x, the taxpayer's propensity to evade taxes rises, but never above the level predicted in the standard portfolio-choice model. With a rise of legitimacy, on the other hand, the propensity to evade is reduced, possibly even so far that $aL > (1-p)t$ holds for very large t, so that no evasion occurs at all.*

Proposition 1 can be supplemented with

Proposition 2. *The impact of a rise (decline) in legitimacy on τ will be larger the higher the value of a.*

This is illustrated in Fig. 2: The more susceptible individuals are to cognitive dissonance, the greater will be the effect of a change of legitimacy. In each case, the lowest curve is calculated for $L = 0$, the highest for $L = 1$, with an interval of $\Delta L = 0.1$ between each curve. Having a closer look at (14), we see that for

$$t < \frac{aL}{1-p} = \bar{t} \tag{15}$$

τ can be downwards-sloping in t, which, at least in the model as formulated here, does not make too much sense economically. This is, however, quite easy to explain, because in this case the marginal psychological costs alone have a greater value than the expected marginal gain from tax evasion, so that it makes perfect sense to say that no tax evasion does occur at all if $t < \bar{t}$. From (15), we can also infer

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8. Note that with $-0.75p\alpha\frac{1}{\sqrt{\tau}} < 0$ for given ranges of parameter values, the s.o.c. for a maximum is also met.

Proposition 3. *If the legitimacy of the actual policy vector is positive, then tax evasion takes place only at a tax rate $t > \bar{t} > 0$. If $L = 0$, then evasion takes place at any rate $t > 0$.*

Obviously, we can also hold the tax rate constant in (15) and ask how far legitimacy has to decline to reduce dissonance far enough to make tax evasion an interesting option for the taxpayer. In answering this question, we come to

Proposition 4. *Holding the tax rate constant, we can say that tax evasion begins exactly when $L < \dfrac{(1-p)t}{a}$.*

This means that, starting from $L = 1$, the decline in legitimacy that is just enough to prompt tax evasion activity has to be the lower, the smaller the value of p and a and the higher the tax rate t. It also means that, if $(1-p)t > a$, all the scruples of the taxpayer cease to matter for the starting point of tax evasion, in terms of L.
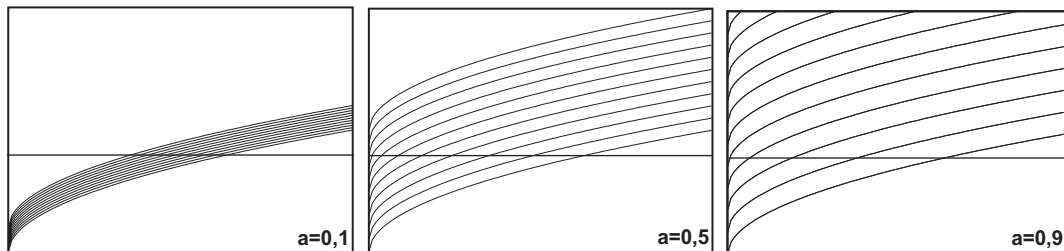

Figure 2: Changes of legitimacy with different values for a.

4.3. **A more general case: legitimacy depends on the tax rate.** Contrary to what was implicitly assumed in the above subsection, L will usually itself depend on the tax rate t. Suppose that all $N - 1$ policy-issues are in line with the corresponding informal institutions and that the Nth issue is the tax rate. Suppose further that the informal rule

related to the tax rate demands that $t \leq t^*$. Then we can reformulate (9) as

$$
L = \begin{cases} 1 & \forall t \leq t^* \\ 1 - (t - t^*)b_t & \forall t^* < t < \frac{1}{b} + t^* \\ 0 & \forall t \geq \frac{1}{b} + t^* \end{cases} \tag{16}
$$

with $\frac{1}{b} + t^*$ being the value for t where $(t - t^*)b = 1$. Substituting this into (14) we can determine the magnitude of tax evasion by

$$
\tau = \begin{cases} 0 & \forall t \leq \bar{t} \\ \left[\dfrac{(1-p)t - a}{1.5p\alpha} \right]^2 & \forall t \leq t^* \wedge t > \bar{t} \wedge [\cdot] \leq 1 \\ \left[\dfrac{(1-p)t - a(1 - b(t - t^*))}{1.5p\alpha} \right]^2 & \forall t^* < t \leq \frac{1}{b} + t^* \wedge t > \bar{t} \wedge [\cdot] \leq 1 \\ \left[\dfrac{(1-p)t}{1.5p\alpha} \right]^2 & \forall t > \frac{1}{b} + t^* \wedge t > \bar{t} \wedge [\cdot] \leq 1 \\ 1 & \forall t > \bar{t} \wedge [\cdot] > 1 \end{cases} \tag{17a-e}
$$

Departing from here, we can now also make a conjecture on where tax evasion will start when legitimacy depends on the tax rate chosen. We have to distinguish two seperate cases. In the first case, suppose that government decides to choose a tax rate that is in compliance with the informal institution. Then from (17b) we can infer that tax evasion starts at a tax rate $\bar{t} = \frac{a}{1-p}$. Thus, if the taxpayer's susceptibility to cognitive dissonance is sufficiently low, or the probability of detection is sufficiently small, so that $a < t^*(1-p)$ and therefore $\bar{t} < t^*$, then tax evasion starts even if the government chooses a tax rate $\bar{t} < t < t^*$ and informal institutions are not transgressed. Now suppose that, in the second case, government decides to pick a tax rate not in compliance with the informal rule, so that $t > t^*$. Note that as long as $t \leq t^*$, the starting point of tax evasion is always determined by $\bar{t}_{L=1} = \frac{a}{1-p}$. Note also that $\bar{t}_{L=1}$ as well as $\bar{t}_{L<1} = \frac{a+abt^*}{1-p+ab}$ (for $t > t^*$, folowing from (17c)) predict t^* to be the starting point of tax evasion if $a = t^*(1 - p)$. Keeping this in mind, we can state

Proposition 5. *If $a < t^*(1 - p)$, then tax evasion always starts even before legitimacy is lost, i.e., even with $t < t^*$. If $a \geq t^*(1 - p)$, then tax evasion always starts at a tax*

rate $t > \bar{t}_{L<1} \geq t^*$. *With a rise of b,* $\bar{t}_{L<1}$ *declines and converges towards* t^* *and with a decline in b,* $\bar{t}_{L<1}$ *rises and converges towards* $\bar{t}_{L=1} = \frac{a}{1-p}$.

The claim of convergence in Proposition 5 follows from $\lim\limits_{b\to\infty} t^E_{L<1} = t^*$ and from $\lim\limits_{b\to 0} t^E_{L<1} = \frac{a}{1-p}$. Intuitively speaking, this means that with a growing weight attached to the matter of being taxed at a rate of t^* or lower and with $a > t^*(1-p)$, the starting point of tax evasion will decline towards t^* – individuals can reduce cognitive dissonance resulting from tax evasion more easily, if the violated informal rule is considered important. If, on the other hand, this rule is considered to be utterly unimportant so that $b \approx 0$, then this rule's violation does not help to reduce dissonance at all. In this case, the starting point of tax evasion will again be determined solely by the conscience parameter a and by the probability of detection.[9]

So far, we have only investigated the tax rate where tax evasion sets in. In this sense, tax morale appears as the habit of taxpayers to evade taxes not at any tax rate $t > 0$, but only at a tax rate $t > \bar{t} > 0$, where the expected marginal gain from tax evasion outweighs the expected marginal dissonance costs. However, the magnitude of tax evasion, τ, will also be of considerable interest. Once tax evasion sets in (i.e. for tax rates $t > \bar{t}$)[10], the dissonance model in (17) yields non-ambiguous comparative statics for the policy parameters t, p and α similar to the conscience-free individual in (5): $\frac{\partial \tau}{\partial t} > 0$, $\frac{\partial \tau}{\partial p} < 0$ and $\frac{\partial \tau}{\partial \alpha} < 0$. Having a closer look at (17), we also see that what is commonly called tax morale becomes visible as the psychological costs of tax evasion, and it is obvious that tax morale also has an impact on the magnitude of tax evasion.

With $L = 1$ in (17b), the taxpayer has no means of reducing cognitive dissonance following from evading taxes. Depending on how susceptible to dissonance he is (i.e. depending on the value of a), the level of tax evasion may be substantially below the level predicted by the portfolio-choice model. In both (17b) and (17c), a rise of the conscience parameter a will always lead to a decline of taxes evaded, and a decline of a will conversely lead

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9. Note that for $a > t^*(1-p)$, which is the range of parameter values relevant here, it will always be true that $\frac{a}{1-p} \geq \frac{a+abt^*}{1-p+ab}$ with $t^* \leq 1$. In other words: With $b \to 0$, $\bar{t}$ rises.

10. For the remainder of this section, we will restrict our attention to this case where $t > \bar{t}$, i.e. where the taxpayer evades taxes.

to a rise of τ. This influence, however, ceases to matter when the legitimacy of the government's policy is completely deteriorated, so that $L = 0$. In (17c), we see that legitimacy deteriorates faster, the higher the value b, i.e., the greater the importance attached to this matter by the individuals. With a completely illegitimate policy and $L = 0$, we are back in the pure portfolio-choice model in (17d), with moral scruples and legitimacy having disappeared simultaneously. With $b \to \infty$, we enter the pure portfolio-choice model immediately after t^* is violated, but with $b \to 0$, the government can deviate from t^* as far as it desires without doing serious harm to the taxpayer's scruples depicted by a. Summing up, we can state

Proposition 6. *The stronger the taxpayer's interest b in the informal institution violated by the government is, the better he can utilise this violation to reduce cognitive dissonance by justifying his evasion of taxes, and the stronger is the rise of τ resulting from a given deviation from the informal rule. Also, the higher b, the more quickly deteriorates the legitimacy of the government's policy.*

5. POLITICO-ECONOMIC IMPLICATIONS

5.1. **Taming a Leviathan while suffering from dissonance.** Assuming that the government of our model economy is a revenue maximiser like the Leviathan modelled for instance by BRENNAN/BUCHANAN (1980), we will have to draw our attention to the relationship between the nominal tax rate chosen and the revenue generated by this tax rate. Let R denote the portion of gross income appropriated by the government via the tax system. Also, let $t^\bullet$ be the tax rate for which $\tau(t^\bullet) = 1$. In our model, the expected R is then given by

$$E[R] = \begin{cases} (1 - (1-p)\tau)t + p\alpha\tau^{1.5} & \forall t < t^\bullet \\ (1 - (1-p)t) + p\alpha & \forall t \geq t^\bullet \end{cases}, \tag{18a-b}$$

i.e., $E[R]$ is equal to the statutory due amount, from which the successfully evaded taxes are to be substracted and to which the revenue from the penalty tax on detected hidden income is to be added. The objective of a self-interested Leviathan whose only policy

15

instrument in the short run is the tax rate is then

$$\max_{0 \le t \le 1} \quad E[R(t)]. \tag{19}$$

Now it can be quite easily shown that, if we calculate τ within the pure portfolio-choice model, $E[R]$ is rising strictly monotonously in t with $t \in [0,1]$. From (5), we have $t^{\bullet} = \frac{1.5p\alpha}{1-p}$. The f.o.c. for a maximum of (18a) with (5) substituted in for τ is given by

$$1 - \frac{(1-p)^3 t^2}{2.25 p^2 \alpha^2} = 0 \tag{20}$$

which yields the revenue maximising t at

$$t^R = \frac{1.5p\alpha}{(1-p)^{1.5}}. \tag{21}$$

For $p < 1$, however, it is always true that $t^R > t^{\bullet}$, so that t^R is beyond the range of (18a). Intuitively speaking, we would reach this maximum only if the taxpayers were able to evade more than their gross income. (18b), on the other hand, is obviously linearly upward sloping in t. Even with $\tau = 1$, additional revenue is still generated with a rise of t due to rising revenue from detected evaders. For a rational Leviathan, it would therefore always be optimal to set the nominal tax rate at $t = 1$.
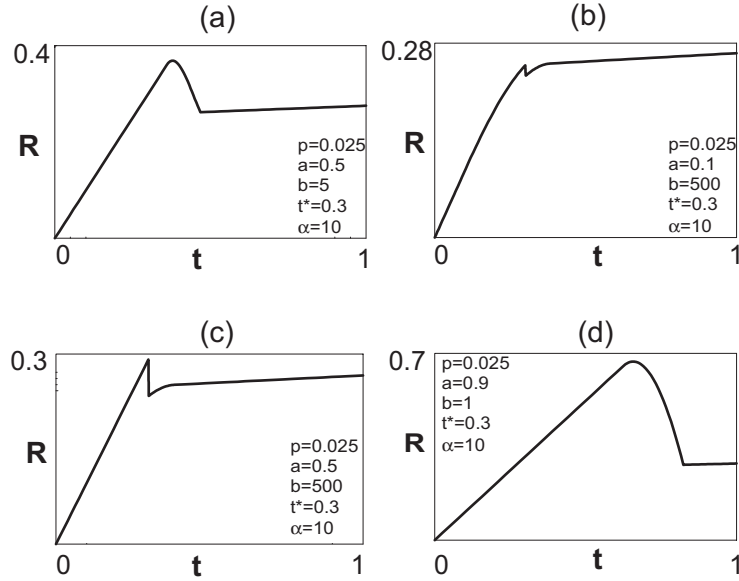

Figure 3: Revenue generated with different evasion patterns.

The picture is a bit more complicated if we allow for cognitive dissonance to occur. First of all, in (17) we saw that the higher the value of b, the faster the taxpayer's transition to the portfolio-choice model following from a deviation from t^* is completed. The importance of this effect becomes visible when comparing Fig. 3a and 3c, which appear to be completely similar with the only difference being the higher value of b in Fig. 3c. As a result of the considerable weight attached to the policy matter in Fig. 3c, even a very little transgression of the informal rule leads to a complete deterioration of legitimacy. A sudden switch to the portfolio-choice regime occurs at $t = t^*$. Associated with this switch is a global maximum in Fig. 3c, but only a local maximum in Fig. 3b. The reason is the difference in a: In Fig. 3c with $a = 0.5$, a legitimate policy generates higher revenue than in Fig. 3b with $a = 0.1$. This is also the only reason for the existence of local and global maxima where, in the pure portfolio-choice model, we have no maximum: the effective tax rates are closer to the nominal tax rates as long as the tax payer has to cope with a bad conscience, i.e., as long as aL assumes a positive value. With $t > t^*$ and a high value of b, his conscience suddenly ceases to matter and we are back in our yardstick model of Section 3.

The simulations in Fig. 3a and Fig. 3d show that with lower values of b and moderate or high values of a there is still a global maximum, but larger deviations from t^* are required to reach $L = 0$. If the interest in tax policy is comparatively low, then the legitimacy of a policy deteriorates more slowly with t rising over t^*, and the issue serves less well to vindicate tax evasion and reduce dissonance costs. Leviathan, therefore, has more leeway to expand his budget than he has when b assumes a comparatively high value. Summing up, we can, somewhat surprisingly, state

Proposition 7. *With a rational Leviathan, tax evasion does exert a control function with respect to the choice of the nominal tax rate only if the representative taxpayer suffers from cognitive dissonance, i.e., if he has a sufficiently high value of a. Also, tax evasion controls the choice of t more precisely if b takes a high value.*

Obviously, these results only hold if the tax rate is the only instrument available to the revenue-maximising government. This his not entirely unrealistic, however, since it may

often not be politically viable to change p or α in the short run. In this sense, tax evasion controls self-interested governments in the short run, within given institutional constraints.

5.2. **Implications for the politico-economic process.** So far, we have taken the parameters newly introduced to this model, t^*, a and b, as given. These parameters, however, will also depend on various influences, some of them related to the politico-economic process. In fact, neither t^* nor the other parameters can be simply set or chosen by some agent in the model, but they are the result of public discussion of political ends and means, of political climate and culture. For example, the informal institution, in this case the rule that government ought to choose a tax rate $t \leq t^*$, may in principle depend on a great number of influences: Consider, for instance, the case that there is a given demand for a minimum level of public goods that the individuals expect to be provided. For illustrative purposes, think of a given level of social security that is considered to be an absolute necessity. The value of t^* will then depend on the government's endowment with resources that the individuals assume to be necessary to provide this level of public goods.

If we assume, in concordance with approaches that model the relationship between citizen and government as a principal-agent relationship, that the individual taxpayer has no precise knowledge of the government's production function for the public good, then the determination of t^* is not a trivial problem. In the process of finding a t^* that is widely accepted among individuals, there will be not only conflicts of interest – the type of conflict public choice usually deals with – but also conflicts among different theories about the true properties of the production function.[11] From this point of view, which has already for some time been taken by heterodox approaches such as MEIER/DURRER (1992), it would be interesting to investigate whether any particular institutional setting, such as competitive federalism, can be expected to enhance the rationality of the politico-economic process by fostering the formation of a more rational (in the sense of:

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11. It is also quite probable that conflicts of interest and theory may be intertwined in the sense that an agent with a specific interest has an incentive to put forward a specific theory which suits his interest.

more closely in accordance with the true properties of the economy) estimation of the t^* necessary to provide the desired bundle of public goods.

Similarly, a and b cannot be simply decreed by the government or any other agent in the model, but will depend on both the institutional environment and on particular attributes of the politico-economic process. For example, the conjecture of POMMEREHNE ET AL. (1997) that taxpayers feel more obliged to be honest when they participate in decision-making via direct democracy, may be fitted into the model presented here by assuming that a rises with the degree of participation. On the other hand, a may decline in the long run when a political climate evolves where individuals feel completely detached from policy decisions (or put differently: where politics has no appeal to the polity). The value of a may rise if public funds are needed for relief in a state of emergency and return to its earlier level when the emergency is overcome. Finally, the value of b may be particularly vulnerable to the rhetoric of the political process. For example, a simple informal rule calling for $t \leq 0.5$ may be charged with an incredible normative appeal by stating that at least half of a citizen's honestly earned income should be at his own disposal. The weight that an individual attaches to a particular policy matter is not simply given, but it can be raised or diluted by political rhetoric.

6. CONCLUSIONS

Taking the above examples into consideration, it should become clear that the approach proposed here is intended as a bridge over the gap between the standard, pure portfolio-choice approach to tax evasion and the corresponding approaches from the realm of economic psychology. By opening the former model for the concept of cognitive dissonance, influences that are traditionally accounted for within the latter approaches, can be also considered within a model determining the individual's optimal rate of tax evasion in a rather conventional marginalist framework.

Obviously, the tax system in our model is largely simplified and it may be a worthwhile effort to extend this framework to a more realistic modelling of tax systems. In this paper, however, the main purpose was to show that the introduction of dissonance costs is

practicable and does yield sensible results open to empirical testing, be it in an experimental setting or by combining survey data with data about actual tax evasion.

Finally, we hinted at the fact that the explanation of the formation of informal institutions, of the importance attached to them by the taxpayer and of the individual susceptibility to cognitive dissonance probably call for more interdisciplinary research, taking into consideration the institutional framework as well as elements of the politico-economic process that so far are more or less neglected by economic approaches, such as conflicts of theory and political rhetoric.

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