

Tax Morale, Tax Evasion and the Choice of Policy Instruments in Different Political Systems*

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Abstract

This paper studies the interaction between tax morale and the performance of different political systems (direct/representative democracies). A stylized model allows one to trace the action/reaction patterns of tax payment/tax evasion and tax control in a dynamic setting. The simulation results lead to the insight that private commitment is higher, and hence tax evasion is lower in direct democracies, public audit intensity is higher in representative democracies, while fines on tax evasion are higher in direct democracies. Our results suggest that in the case of convergence to a stable pattern, performance of direct democracies is better than that of representative democracies.

1. Introduction

Morale poses a problem for economic analysis. Since it is not directly observable, it can only be quantified by looking at its effects. Economists usually ignore the phenomenon as a whole, and this for two reasons: First, they are traditionally preoccu-

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pied with the private sector and perceive public decisions as being governed by the same motives as private decisions. Second, many economists do not want to deal with aspects they cannot quantify. However, aprioristically ignoring potential influences produces overestimation of quantifiable explanatory factors and may result in extremely high levels of unexplained variation. In fact, there are cases in which neoclassical theory, based on rational egoism as a paradigm, does not provide any suitable explanation at all.¹

In this paper, we concentrate on morale as a human predisposition that might account for actual behavior. Some economists such as Günter Schmolders (1951/52) or Dennis Mueller (1986) have emphasized that economic phenomena can hardly be analyzed from the traditional viewpoint exclusively. We follow their lead and analyze taxpayer behavior as an example of the importance of 'ethical' influences for public decisions.² Attention is given to the interaction between taxpayer behavior under different institutional settings, i.e. political systems. In line with standard economic theory, the importance of restrictions on individuals' behavior is stressed. The interaction between individuals and institutions is modelled as a dynamic process which enables us to trace phenomena such as an endogenous erosion of morale. We will describe a hypothetical evolutionary model of the economy which, of course, does not claim to take into account every aspect of reality. Testable hypotheses will be derived and a number of simulation results will be provided.

II. The Outset: The Social Contract as a Starting Point

We start out from the assumption that men act according to general modes of behavior (Frey, 1993, p. 6). Their actions are guided by programs, so to speak. According to Heiner (1986, pp. 309ff.), behavior in situations of great uncertainty, as is the case in a social contract setting, is typically governed by rules. To allow for modifications in behavior, we will introduce feedback loops.³ In other words, in the world as we see it, people act adaptively.⁴

At the constitutional stage, people come together to create a state which is to provide public goods. To this end, the collective body is endowed with the competence to raise taxes. We assume that when the constitution is being drafted, i.e. the collective body is endowed with the task of providing the public good, the possibility of tax evasion is not well conceived of. Tax evasion will thus come as an unforeseen event.

Immediately after the drafting of the constitution, will people initially pay taxes?⁵ Based on experimental evidence and other empirical findings discussed in Mueller (1986, pp. 10f.), we assume that for most people "the first reaction ... is to cooperate", as Mueller (1986, p. 11) puts it. In other words, they voluntarily pay their taxes in the beginning.⁶ In line with Margolis (1982) such behavior could be called "participation altruism". Cooperativeness can also be seen as an action stimulated by recent experi-

ence. People came together to create a body for the provision of public goods, and the payment of taxes is a consequence of this decision.⁷

The population is assumed to consist of two groups: a large group which acts cooperatively in the very beginning (they are 'good'), and a small group which does not cooperate (they are 'bad'). Most human beings in our view have a natural sense of what should be done and what should not.⁸ Presumably, cooperative behavioral disposition can be found in most human beings, but it can be eroded gradually (or rebuilt) by experiences in the past. The question is whether the political framework furthers or discourages ethical behavior, i.e. behavior for which there is no rationale in terms of some outlook for private material gains.⁹ For simplicity, we think of individuals as framing their decisions about whether to evade taxes on a yes/no basis. By disposition,¹⁰ either an individual originally pays all his taxes, or he pays nothing.¹¹ Note that at the start of this post-constitutional area, it is not the political structure, but the share of non-cooperative people which determines the original amount of tax evasion.

III. Citizens and Politicians in Different Political Systems

Let us move over to the post-constitutional periods. Concerning the political sector, constitutions may allow for several ways of organizing the manner in which public goods are provided. It is possible to realize various degrees of delegation of provision. In a representative democracy the delegation is relatively high, because individuals in the public sector are held accountable every fourth or fifth period, with the natural consequence that politicians have some discretion. In contrast, in direct democracies "political action" is tightly controlled by the citizens via, for example, town meetings, referenda, and initiatives. Thus, political decisions are not delegated. The question is whether there is a difference in outcomes in the two types of democratic systems, especially in the long run.

We assume that voting by the citizens as well as general decisionmaking in the public sector is carried out according to the majority rule, not the unanimity principle. This helps to explain why tax evaders, in general, do not have a decisive influence on collective decisionmaking, and it mirrors common practice both in representative as well as direct democracies.

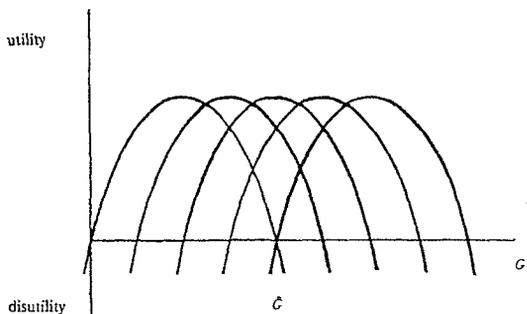
In a representative democracy, at the very beginning, choice of politicians can be thought of as a random draw from the population. That means that, in line with our basic assumptions, you get a large percentage of 'good' and a small percentage of 'bad' politicians, reflecting the shares of those groups among citizens.

The public sector is not a monolithic bloc, but rather consists itself of individuals. Of course, in a pure direct democracy, there is no political sector as an "active" organization. Hence, there does not exist the possibility of abusing public revenues. But in a representative democracy, where the public sector exists on the basis of delegation, the administrative authority is usually fragmented to a certain extent. Individuals in the

political sector thus administer part of the tax revenue, namely that which is at their discretion. However, as regards deciding over certain measures, those people have to come to a *joint* and binding decision. Tax payments and tax evasion, as a contrast, are basically private, independent actions, subject to individual strategizing.

Citizens presumably look at the provision of public goods in terms of some kind of binary "exchange relationship". Whether they deem sufficient the amount of goods

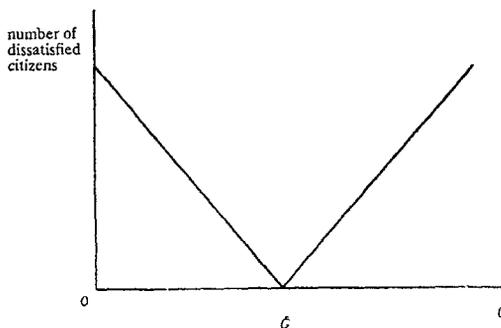
Figure 1a
Distribution of individual preferences for public good G



provided by the public sector is determined by their individual preferences. We assume single-peakedness and equal distribution among individuals over a certain range (as shown in Figure 1a).

The midpoint \hat{G} of the range of potential levels of the public good G indicates the "ideal" level of the public good - ideal in the sense that the number of citizens who are disappointed with the actual provision is minimal. At any other level some citizens will

Figure 1b
Number of dissatisfied citizens



be dissatisfied, and the number of dissatisfied people will be higher the farther away you are from \hat{G} . As a result, some kind of "loss function" as regards dissatisfied citizens can be derived (as shown in Figure 1b).¹²

The behavioral assumptions regarding citizens as taxpayers in a repeated game are as follows: 'Good' taxpayers (the ones who do not *principally* evade) pay their taxes in the very first period; in subsequent periods, they condition their behavior on whether in the period before the amount of public goods provided was to their satisfaction or not. In the latter case, they will stop paying taxes. The reaction lag is thus one period, the strategy applied being tit for tat. Presumably, 'bad' people always evade.

IV. Actions and Reactions: Evasion and the Choice of Policy Instruments

Tax Evasion as a Problem

Tit for tat is characterized by nice behavior in the beginning. After 'good' people have paid their taxes for the first time, it is recognized that the overall tax amount falls short of the sum of what has been specified as the personal tax duties in the constitution. There are some who did not comply, namely the 'bad' ones.

Before the tax revenues can be transformed into public goods, a second source of possible "fallout", as already mentioned, occurs: politicians can divert part of the public revenue for their own purposes. If the institutional framework allows for delegation, as is the case in representative democracies, then 'bad' persons in the political sector have a chance of abusing part of the tax contributions of the citizens. This feature is accentuated if there is a party system with listwise voting. In that case, selecting out 'bad' individuals in the political sector seems quite impossible, because one group consisting of good and bad individuals is replaced by another group which is comprised of 'good' and 'bad' individuals in the same fashion. The behavior of 'bad' politicians may be an additional reason for the evasion of 'good' taxpayers over time.

Reasons for the Choice of Policy Instruments

At the very beginning, tax evasion of 'bad' individuals results in an underprovision of public goods. Once this underprovision gets noted, either the public administration in a representative democracy or the community in a direct democracy realizes that something has to be decided *jointly* about the outstanding revenue. There are basically two instruments at hand: audits and fines. We assume that only those people who are suspect of having evaded taxes can be audited.

From a technical point of view it is easy to note that both instruments, audits and fines, are not independent of each other in fiscal terms. If the intensity of auditing is raised, *ceteris paribus*, this produces more revenue in a situation where fines are high than when they are low. And it is just this revenue-recapturing property which, in our view, is the primary purpose of using tax control instruments.¹³ Here, we depart from the deterrence-oriented viewpoint which is normally taken by economists.¹⁴ One can reasonably conjecture that this revenue-generating property is subject to decreasing

returns of scale: The higher the level of fines, the higher the percentage of taxpayers being unable to pay the fine in full. The higher the intensity of audits, the more costly it gets to produce evidence of citizens evading tax if, as is assumed here, random controls are not allowed.

The general idea of trying to find out about tax evaders and of charging them their due taxes plus the additional fine on evasion - in order to recapture missing revenues - can be conceptualized as follows: In a representative democracy, people in the political sphere wish to do something about outstanding revenues, be it for the reason that most of them, as 'good' people, want to fulfill their duty, or be it for the existence of the reelection constraint.¹⁵ For vote-maximizing politicians, fulfilling their duty as correctly as possible might be the most plausible goal in a world of uncertainty. This, however, is not related to the existing incentives for bad politicians to abuse that part of the revenues which is administered by them. It appears straightforward to assume that the alternative of checking the political sector for internal leakages is not relevant in our context. First, it is not possible to regain as much revenue by stopping abuse of means by politicians as is obtainable through auditing and fining evaders. The uprise of dissatisfaction on the part of citizens is a process which can only be slowed down or reverted by immediately enhancing public sector performance. This requires that (massive) revenues come as quickly as possible, as dictated by the dynamics of the model. Second, it is simply much more convenient to vary one macro parameter such as audits than to dig into the internal workings of the political sector. Once the (majority of) politicians feel that they have to act, the use of macro instruments to fight tax evaders will be a dominant strategy. This task can be delegated to the staff of the tax administration, since the problem is a recurring one.

Determination of Tax Control Instruments

The two parameters suitable for the purpose of controlling tax evasion, fines and audits, are quite different in nature: while audit intensity can be adjusted to the needs of the day, fines on tax evasion are integrated into the judicial code and cannot be changed a posteriori. This brings us to an important side-effect of using fines as a tax control instrument: Fines on tax evasion not only have the property of generating revenue, they are also related to penalties on other criminal activities in terms of 'justified' ratios of punishment.¹⁶ Thus, tempering with fines is something outside the executive body's reach. Hence, in representative democracies, the political sector will be reluctant to use fines as a control instrument. Fines will be left for variation in the aftermath of elections (as part of a winning ticket, for example).¹⁷ In direct democracies, where referenda can be enforced immediately after tax payments, fines are a much more flexible instrument than in representative democracies since they can be changed quickly by these referenda.

Auditing can be left to an administrative body of experts, in both direct and representative democracies. The public administration is not omniscient, and it adjusts the intensity of audits in a very rough manner. It is quite plausible (and, by the way, fully in line with existing evidence) that auditing is determined by an adaptive process of incrementalism (cf. Lindblom, 1959). The algorithm itself might be primitive or well-developed, but auditing is reactive in any case. There are two constraints according to which auditing is conceivably exercised: First, only those who are suspect of having evaded taxes are potential candidates for an audit; random audits are prohibited. This implies that the upper bound on audit intensity is the percentage of people who actually have evaded taxes. Second, auditing is costly (cf. Kolm, 1973, p. 267) since tax commissioners have to make inquiries about the financial situation of potential evaders. It might be reasonable to assume that the tax administration, if it notices that the control revenues have fallen short of control expenses, reverts its course sooner or later.

As regards the relative magnitudes of fines and audits we might guess that in representative democracies audits have to be relied upon much more than in direct democracies since fines are a not so flexible instrument - due to the potential goal conflict at elections between the politicians' and citizens' motives regarding the setting of fines.¹⁸ Hence the ratio of audit intensity to the magnitude of fines will tend to be higher in representative than in direct democracies.

V. The Systems Dynamics in Direct and Representative Democracy

General Description

At the very beginning, only those who are of a 'bad', i.e. non-cooperative, character do not pay their taxes. As a result, some 'good' taxpayers at the margin will answer the resulting underprovision (later on: possibly also overprovision) of public goods by non-cooperativeness, i.e. tax evasion. The problem is aggravated in representative democracies due to internal leakages, since 'bad' politicians have leeway to abuse part of the means which were collected in the current period. Yet, in the short run, fines as a source of revenue can be enjoyed for a longer time, compared to direct democracies.

Regarding the public sector's reaction it depends on the quick success of counter-measures in terms of raising additional revenue whether the system can attain a sustainable path of tax payments and provision of public goods. There is an inherent tendency for the process of tax evasion to be self-reinforcing, because if some evade out of dissatisfaction, this will *ceteris paribus* imply less revenue and a lower public goods provision in the subsequent period and will discourage even more honest taxpayers. There is a potential for the erosion of trust capital, or, as Mueller puts it, the evolution of adaptive egoism in originally cooperative individuals. It depends on the public sector's behavior and ability to counter those tendencies by means of tax control whether a collapse of the system can be avoided.

Due to the different characteristics of the two types of political systems considered here, performance may vary considerably: First, sustainability/unsustainability itself can be totally different in both types of democracy, as shown in the following subsections. Second, if both systems turn out to be sustainable, the average performance of the direct democracy might well be better than that of a representative democracy.

Setup for the Simulation Experiment

Our simulation model is a stylized model. It is not primarily intended to mimic the quantitative developments in existing economies. Rather, it is the qualitative dimension that matters. We consider it as an experimental study on basic interaction patterns between commitment and tax behavior. This kind of approach is in line with a number of experimental simulation studies.¹⁹

The model concentrates on the nexus between tax payments on the part of the private sector and the use of tax control instruments on the part of the public sector. Hence, the interesting variables whose development patterns we want to trace are tax payments (and its complement, tax evasion), intensity of tax control and magnitude of fines on tax evasion.

The model contains two versions, one framework for a stylized direct democracy, one for a stylized representative democracy. The main differences consist in the way fines are set and in the scope of politicians to access tax revenue. In the model of a representative democracy (where an election period of four years is assumed), we include politicians as a (small) constant share of the population. The model is set up so that in the end, a comparison can be made between average outcomes of both types of democracy.

Regarding policy instruments, the current optimal magnitude of fines, as determined in elections, corresponds in the 'good' citizen's view to his own single-peaked utility function value at the actual level of public goods provision (see Figure 1b). If this value is high, he will like to see evaders punished quite strictly, if it is low, this desire will be far less developed. In the aggregate, the preference of the median voter regarding the demanded fine on evasion will more or less decide the ultimate level. Since there is some fuzziness inherent in the mechanism of deciding on the magnitude of the fine, we allow for a random term within a certain belt around the theoretical level.

The model features two alternative versions regarding the determination of fines on tax evasion. In a first version, fines in representative democracies are set more or less by the median politician during the very first election term. This amounts to saying that fines in the very first period are equal in both systems, *ceteris paribus*, since the median politician does not differ from the median voter. In a second version, however, politicians stay away from setting fines for tax evasion in the initial term. Therefore, fines (that means extra payments in excess of what was owed in taxes) are set at the end of the first "post constitutional" election term, at the earliest, i.e. when voters can influence the

Figure 2
Flow chart of the simulation model

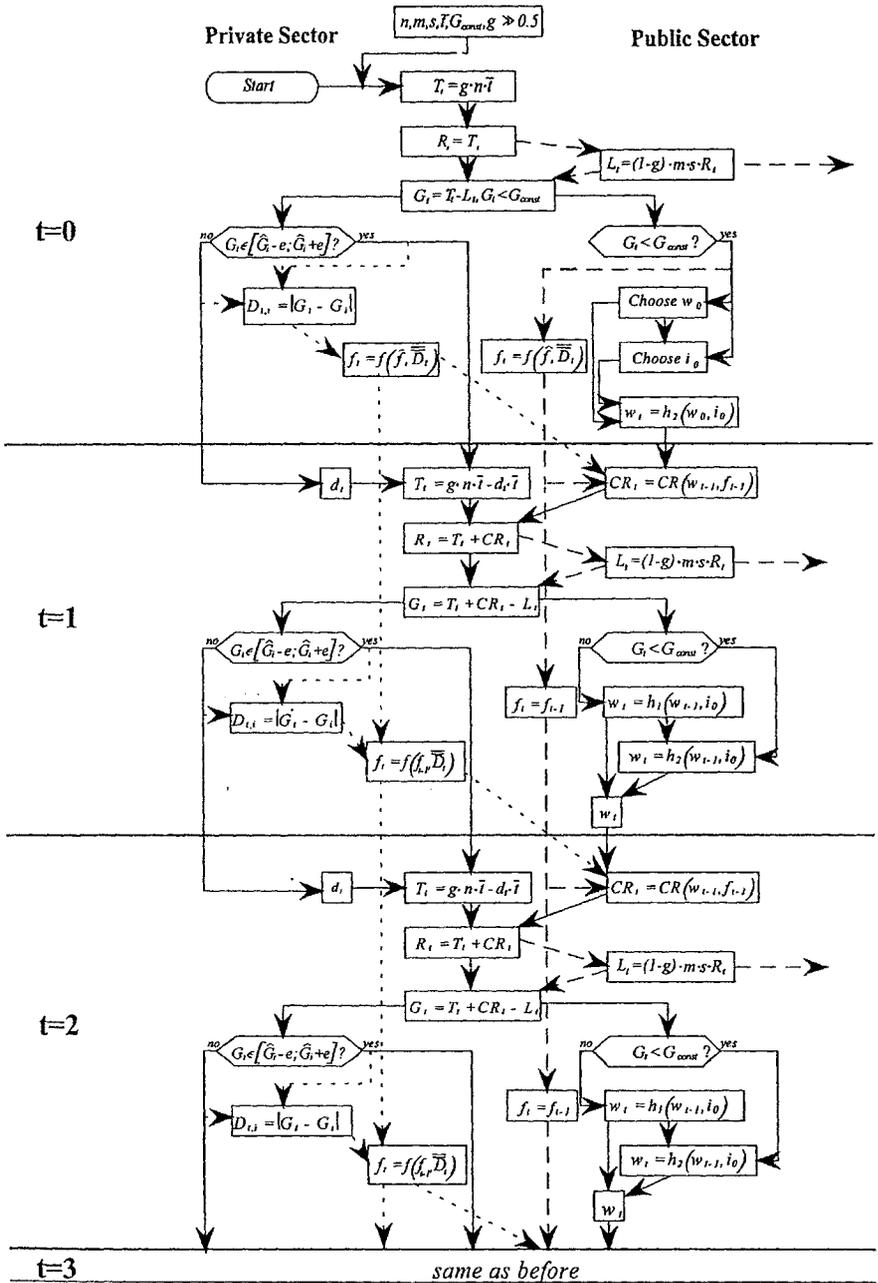
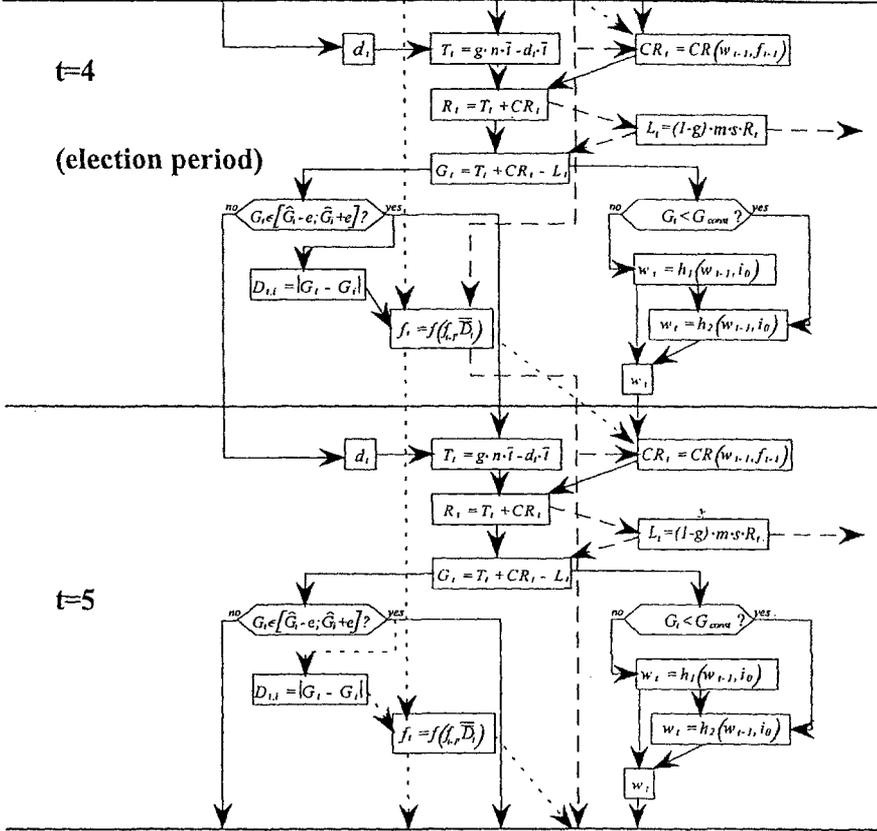


Figure 2 (continued)



- G_{const} : Constitutional amount of public goods
- \hat{t} : Individual taxes due
- g : Share of 'good' people
- n : Population size
- m : Number of politicians
- s : Share of discretionary revenue
- T_t : Taxes of time t
- R_t : Total revenue at time t
- CR_t : Revenue from tax control activities at time t
- G_t : Actual provision of public goods at time t
- L_t : Leakage in the political sector at time t
- \hat{G}_t : Individually 'ideal' level of public goods
- e : Maximum tolerable deviation from \hat{G}_t
- d_t : Number of dissatisfied 'good' citizens at time t
- $D_{t,t}$: Distance of actual provision of public goods from \hat{G}_t
- w_t : Audit intensity at time t
- i_0 : Minimum step length
- f_t : Fine on tax evasion at time t
- w_0 : Base rate for audit intensity
- $\hat{f}_{t,t}$: 'ideal' fine
- \bar{D}_t : Distance between actual provision of public goods and the median voter's 'ideal' level at time t
- $h_1(\cdot), h_2(\cdot)$: Reaction functions of tax administration (incrementalist)
- dotted line: Direct democracy
- dashed line: Representative democracy
- solid line: Both types

political variables for the first time.^{20,21} In any case, if more than 50% of the citizens evade and there is an election, fines will be set at zero. In that case, evasion is no longer considered as blameworthy by a majority.

With respect to audit intensity, tax administrators have to choose some arbitrary starting level in the first period. In the following periods, depending on whether it was possible to provide the contracted amount of public goods in the relevant period or not, they change the direction of audit intensity incrementally upwards or downwards (or leave it unchanged). The increments (basic step length) have to be set arbitrarily as well. On this, the model features several versions, each containing a unique potential iterative strategy.²²

Since according to the law, only suspected individuals can be screened, audit intensity can never be higher than the share of tax evaders in the relevant period. As for the sequencing of actions, Figure 2 provides an illustration.

First, people pay taxes. Then, auditing is (possibly) carried out and additional revenue is collected - given the old levels of the control parameters as of the previous year. On the basis of these two kinds of revenue, public goods provision is carried out, with part of the resources being diverted to politicians' own purposes in representative democracies. After the provision has been carried out, the population sets fines if that is possible. In the latter event, the magnitude of these fines is adjusted according to the public sector's recent performance. The tax administration sets audit intensity levels for the upcoming year, based on the experience of the current year. Finally, people pay taxes for the next period, and we reach another period of the game.

Finally, we make certain assumptions on the technology of auditing and tax controls in general: (1) The higher the audit intensity, the more difficult it becomes to find out about additional suspected individuals. Thus, auditing is costless up to a certain (absolute) level. From that point on, it requires progressively more resources. (2) Proportional increases in the magnitude of fines do not produce proportional increases in revenue. The higher the fine, the more likely the possibility that tax subjects cannot pay the amounts they have to, since their income might not be sufficient. Therefore, decreasing marginal revenues from fines are assumed.

Simulation Results

In our simulation runs, we systematically tried several levels of "ideal" fines, several starting values for initial audit intensities, and several basic step sizes for the increments. 200 periods were used as a basis.

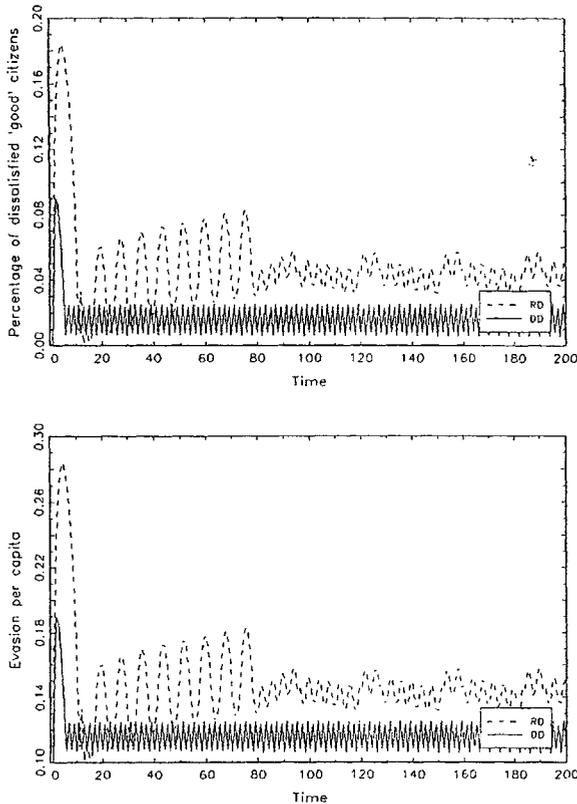
Before we proceed we would like to point out that we are well aware of the principal possibility for chaotic dynamics (cf. Nordhaus, 1992, p. 16ff.). The equations in our model have very complicated lag structures, the functional relationship being highly nonlinear. But notwithstanding this difficulty, our results turned out extremely robust and unambiguous. The various results can be classified into 3 categories:

As a first possibility, tax payments in both systems converge to a positive number, rendering the system itself stable. Sustainability paths of policy sequences can thus be

achieved in either case. The more effective public countermeasures to fight tax evasion in early stages, the better the outlook for avoiding a collapse of the system. Although the paths in both systems can be sustainable given appropriate strategies and parameter choices, this does not imply that the performance in both systems is equal. In fact, as shown in Figures 3a to 3e, we obtain clear tendencies regarding the average values of system specific outcomes for tax payments, audit intensity, and the magnitude of fines.

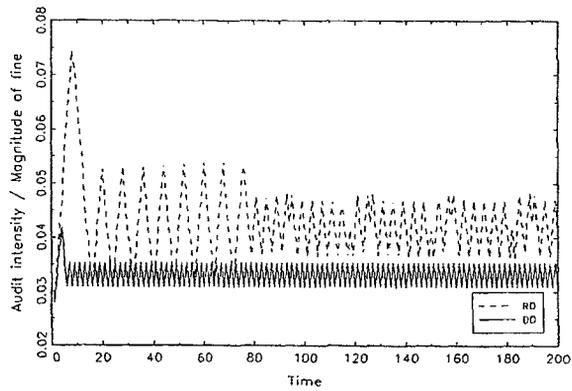
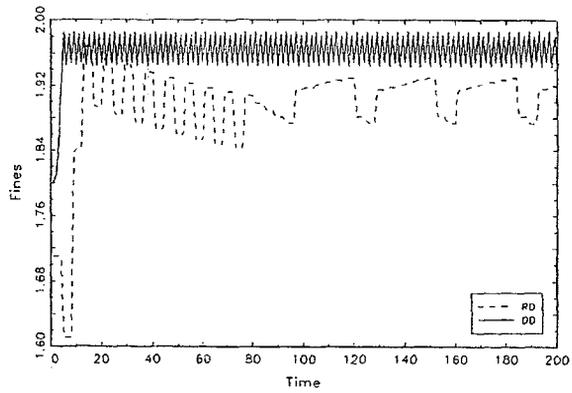
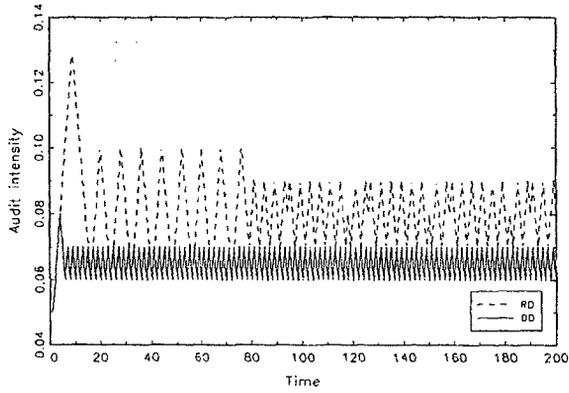
In more detail, for representative democracies we observe in most cases more tax evasion, a higher number of dissatisfied citizens and higher average audit intensities

Figure 3 a+b



over time in comparison to direct democracies. This suggests that in representative democracies average welfare might be lower than in direct democracies. In addition, we observe these differences in average levels not only for the time span as a whole, but also for the last twelve years prior to the cutoff period.²³ Hence, it is not merely a matter of initial conditions, since the findings also apply to long-run conditions of near-stability. The values in representative democracies appear to converge to normatively

Figure 3 c-e



worse levels. As for fines, averages are higher in direct democracies, both over time and in the long run. Fines are relatively more relied upon in direct democracies.

As a second possibility, both direct and representative democracies collapse, because the erosion of tax morale is not reverted. Revenue collection through tax controls proceeds too slowly to catch up with revenue leakage. Aggregate payments converge to zero over time. An important factor in the workings of the model is decreasing marginal returns. Since the lowering of public revenue is slowed down but not brought to a halt through tax control, disappointment is growing incessantly. Hence, at one point in time, the median voter becomes a tax evader himself, which means that the majority of citizens no longer demands any fine on tax evasion. This is the effect of adaptive egoism.

The emphasis will then be put on audit intensity completely, but this might be an inferior composition of control instruments in purely fiscal terms due to decreasing marginal returns. Put differently, at any point in time, auditing might involve such heavy resource costs that the revenue collected is at maximum at a point where not even all the evaders are controlled.²⁴ If that is not sufficient to reach a sustainable path which would be guaranteed by a good mix of controls and audits, we have a situation where due to natural factors, namely decreasing marginal returns, attempts to avoid collapse remain futile.

Next, we are left with two more possibilities: What if the evolutionary paths in both systems are divergent? Can it be the case that representative democracies exhibit sustainability, whereas direct democracies collapse, given the same parameter values and strategies, or vice versa? Here, the findings of our simulation runs yielded highly interesting results: In several cases we observe sustainable paths for direct democracies, while representative democracies were collapsing under the same conditions. The general patterns of our results are presented in Figure 4.

Figure 4
Summary of the simulation results on sustainability
for various given starting conditions

		representative democracy	
		stable	unstable
direct	stable	(1) prevailing result	(3) in specific cases
democracy	unstable	(4) not obtained	(2) in specific cases

Although we should stay away from drawing strong conclusions, we should notice that at least for some strategies, cost structures and parameter values, direct democracy might be a more sustainable way of organizing society under aspects of tax morale. On the average, direct democracies should display a higher average level of fines and a lower average level of audit intensity.

Two remarks can be made in terms of welfare implications: First, the lower, on the average, ultimate dissatisfaction and hence tax evasion, the smaller the deviation from an agreed-upon societal welfare maximum. Second, the higher the average audit level, the higher resource costs, and the lower public welfare.

Our results reveal the merits of a dynamic approach: Sustainability is crucially determined by the ability to raise revenue quickly enough to revert the ongoing dynamic process of the erosion of morale and hence tax payments. Reforming the political sector and fighting corruption might not suffice to prevent collapse, since this can happen even in direct democracies, i.e. in systems *without any system-inherent corruption*. Thus, it is not only structural long-run measures such as fighting corruption in politics which are important, but also the ability to counter dynamic processes in the relevant period. Historical time matters, and the side effects of the erosion of morale cannot be grasped by a simple neoclassical time-invariant model. In a sense, sustainability depends to a certain extent, as we see, on chance, i.e. choosing appropriate dosages for audits, e.g. All in all, we can say that piece meal attempts to enhance the performance of administrations are not a very promising strategy. Institutional changes matter, and they have to come in time.

VI. Concluding Remarks

In this paper, our main concern is with the interaction between tax morale and the performance of different political systems. We present a stylized model of an economy which enables us to trace the action/reaction pattern of tax payment/tax evasion on the one hand and tax control on the other hand in a dynamic setting, in which allowance is made for the possibility of erosion of moral or ethical standards. The use of this total approach for simulating different policies permits us to study the effects of tax control instruments in a general context and depending on political-economic features, a point where particularly neoclassical theories based on the idea of simple evasion prevention are failing.

Simulations in a stylized total model over a good many periods provide us with interesting insights in the conditions under which a political system is able to survive. Central to this point is the fact that the political sector, in order to remain intact, needs supplies from the citizens in the form of tax payments. Under the realistic premise that perfect monitoring is impossible due to prohibitive resource costs, the implicit message which comes out of our simulation runs is the need to adjust the output of the political sector to the needs of the population. The less severe the principal agent problems due to appropriate choice of political framework, the better the outlook for survival of the system and the better the performance of the political system under general conditions of sustainability. Our model which, as we think, depends on fairly realistic assumptions, enables us to identify characteristic behavioral patterns both on the part of the private sector and on the part of the public sector. Private morale or, if you like, commitment, and hence, tax payments are higher in a direct democratic framework. Public audit intensity, which is costly to the society, is higher in stylized representative democracies, while fines on tax evasion are higher in direct democracies. These results are obtained both as averages over a long time and as averages for later periods. Given convergence to a stable pattern, the performance of direct democratic systems might thus be better

than that of representative democratic systems. In addition, the chance of avoiding collapse is greater for direct democracies. Our analysis also casts doubts on the potential for enhancing performance in representative systems through fighting corruption within the political sector.

In general, opportunities for participation are more frequent in direct democracies. People can, for example, influence the magnitude of fines more often in this type of system. While some authors are skeptical about enhanced possibilities for citizens to participate in decisionmaking and "fiddle around" with instruments, in our simulation this is obviously not an obstructive factor. Although politicians in a representative democracy do not have to follow the demands of the population over extended periods of time, and although they can possibly enjoy levels of fines higher than desired by the population and hence higher revenues, this feature does not affect the unambiguous outcome of simulation runs. In that respect, on the basis of our study, we are in a position to state that participation might not be a bad thing.²⁵ The empirical fact (cf. Frey, 1981, pp. 62ff.) that, for example, co-determination of workers enhances rather than lowers the efficiency of enterprises is less of a puzzle once you subscribe to the assumptions of the present paper.

Notes

1. See, e.g., Kirchgässner and Pommerehne (1993) for illustrations.
2. Our view is thus in stark contrast to Olson's (1965, pp. 99ff.) view of the public sector. He claims that a public sector may only exist for technical reasons (scale economy e.g.).
3. It is understood that in modelling strategies as fixed, we are still somewhat restrictive in our approach.
4. Axelrod (1984), Mueller (1986) or Vanberg and Congleton (1992), e.g., employ the same assumption. It is an open question whether rational maximization generated those strategies or not (cf. Axelrod, 1984, p. 18). We consider this openness an attractive feature, and will work with corresponding reaction functions.
5. This touches on the question of why people pay taxes at all (given that universal control is not possible or not practiced). In that respect, even Macchiavelli thought that nobody can remain in power unless most subjects willingly obey the laws (cf. Roth, Scholz and Witte, 1989, p. 118).
6. Thus, we subscribe to Rousseau's (1977, p. 212) viewpoint rather than to that of Hobbes (1962/1651, pp. 142, 144).
7. The relevance of promise giving as a moral standard, provided a majority adheres to it, is developed explicitly by Harsanyi (1969), Buchanan (1975, pp. 117ff.) and Brennan and Buchanan (1985, pp. 100f.).
8. Margolis (1982, p. 60) alludes to a sense of 'duty', Wilson (1993) calls it 'moral sense'.
9. To tackle this question, our flow approach to the problem appears particularly useful. A very insightful remark comes from Easton (1965, p. 19) when he states: "It is a major form of shortcoming of the ... prevalent ... equilibrium analysis .. that it neglects .. variable capacities for systems ...".
10. Vanberg and Congleton (1992, p. 419) relate behavioral programs and general disposition to the 'character' of an individual.
11. Axelrod (1984), Pommerehne and Zweifel (1991), Vanberg and Congleton (1992) as well as Marchese and Cassone (1992, p. 3) work with discrete alternatives, too. This allows us to draw a neat distinction between different types of situational behavior, which turns out to be very convenient to work with in an aggregate framework. But besides being convenient, this specification captures real world behavior very well. Frey summarizes his observations as follows: "... tax morality .. does seem to be an issue not open to marginal evaluation but rather an issue of principle among taxpayers" (p. 203).
12. This concept of a "loss function" corresponds to Riker and Ordeshook's (1973, pp. 330ff.) "summary of the preferences of citizens", a concept originally developed in Downs (1957, pp. 116ff.). Like Downs, we

leave aside taxes as a determinant of individual satisfaction, since it can be argued that tax duty is laid down in the constitution (corresponding to the "ideal" level of the public sector in the eyes of the median voter). Thus, taxes are "sunk" regarding individual satisfaction.

13. To assume only fiscal motives corresponds very well to citizens' complaints about traffic control: People usually criticize that these controls are motivated mainly by fiscal purposes, not by necessity regarding accident frequency. This is demonstrated by the fact that traffic controls often are carried out in areas where people are tempted to drive quickly, and where the police can hide their presence, although accident frequency itself might be rather low despite the high driving speeds. Kolm (1973, pp. 265) puts it that way: "... the collector, and his boss, the Minister of Finance, are not really interested in an individual taxpayer's expected tax yield. ... they are interested in the total yield of the tax ...". Specifically with regard to fines, he writes: "... their augmentation increases revenue" (1973, p. 266).

14. In making this assumption, we rely mainly on empirical results. See Avio (1992) and Cameron (1988) based on a number of empirical studies on criminal behavior in the United States; similar evidence in the case of tax evasion is compiled in Pommerehne and Weck-Hannemann (1992). See also Roth, Scholz and Witte (1989, p. 96).

15. The event that a ruling party is replaced by another one is of no interest in our study. It could happen either due to endogenous failure or to exogenous adverse shocks. What is essential is the fact that outcomes in terms of system performance do not depend on which party is currently in office.

16. Lewis (1979, p. 250), who did some factor analytic studies, provides evidence of the relevance of citizens' desire to see tax evaders punished.

17. Only in the very early periods of a state, where tax evasion arises for the first time as a problem, the politicians have a reason to set fines according to their own discretion. Two possibilities can be imagined: First, politicians do not set any fines discretely and will await the next election, where this issue is determined by the population. Rather, they will just try to recapture the due amount of taxes from tax evaders. Second, and alternatively, politicians might set initial fines in reaction to this new problem. Since especially during early periods of a state, politicians can be thought of as a random draw from the population, the median politician's idea of justice more or less coincides with the median citizen's. This means that - if politicians set the initial fines on tax evasion in representative democracies, the magnitude, on average, will not be different from direct democracies *ceteris paribus*.

18. In the short run, however, the government in representative democracies can exploit fines for a longer time before being sanctioned in the election.

19. See e.g. Cyert and March (1963, pp. 149ff.) or Witt (1980, pp. 184ff.).

20. We implicitly assume that tax evasion is an unexpected outcome at the constitutional level, so there will be no *a priori* provisions for this event.

21. In our model there is certainly political competition. The problem, however, consists in the fact that there are always politicians who act "uncooperatively" and are hard to control. Thus, the phenomenon of leakage in the political sector is inherent to the system and cannot be altered by interparty competition.

22. In a first version, a simple Goldfeld-Quandt-like (1972, p. 16) step algorithm of equal increments is used; in a second version, a somewhat Cyert-March-like (cf. 1963, pp. 121ff.) procedure is modelled, allowing for increases in step length in case of success (i.e. having raised net revenues by auditing if this was necessary); a third version contains a partially Rosenbrock-like (Bazaraa and Shetty, 1979, pp. 285ff.) procedure which exactly doubles step length after each success.

23. Which was always the 200th period.

24. The well-known Laffer effect comes to mind.

25. In an empirical study on Swedish communities, Birgersson (1977, pp. 243ff.) comes to the result that in direct participatory democratic communities, citizen satisfaction is much higher on average than in representative democratic communities. This result can be interpreted as a good example of the validity of the predictions our model allows for.

References

- Avio, K.L., (1992), *Economic, Retributive and Contractarian Conceptions of Punishment*, Unpublished Manuscript, University of Victoria.

- Axelrod, R., (1984), *The Evolution of Cooperation*, New York, Basic Books.
- Bazaraa, M.S., and Shetty, M.C., (1979), *Nonlinear Programming*, New York et al., John Wiley.
- Birgersson, B.O., (1977), "The Service Paradox: Citizen Assessment of Urban Services in 36 Swedish Communities", in V. Ostrom and F.P. Bish (Eds.), *Comparing Urban Service Delivery Systems*, Beverly Hills and London, Sage Publications.
- Brennan, G., and Buchanan, J.M., (1985), *The Reason of Rules*, Cambridge, University of Cambridge Press.
- Buchanan, J.M., (1975), *The Limits of Liberty*, Chicago, University of Chicago Press.
- Cameron, S., (1988), "The Economics of Crime Deterrence: A Survey of the Theory and Evidence", *Kyklos*, Vol. 41, pp. 301-323.
- Cyert, R.M., and March, J.G., (1963), *A Behavioral Theory of the Firm*, Englewood Cliffs, N.J., Prentice-Hall.
- Downs, A., (1957), *An Economic Theory of Democracy*, New York, Harper and Brothers.
- Easton, D., (1965), *A Systems Analysis of Political Life*, New York, John Wiley & Sons.
- Frey, B.S., (1981), *Theorie demokratischer Wirtschaftspolitik*, München, Vahlen.
- , (1992), *Economics as a Science of Human Behavior: Towards a New Social Science Paradigm*, Boston, Dordrecht, London, Kluwer Academic Publishers.
- , (1993), *Explaining Preferences: How Intrinsic Motivation is Crowded out and in*, Unpublished Manuscript, University of Zürich.
- Goldfeld, S.M., and Quandt, R.E., (1972), *Nonlinear Methods in Econometrics*, Amsterdam and London, North-Holland.
- Harsanyi, J., (1969), "Rational Choice Models of Political Behavior versus Functionalist and Conformist Theories", *World Politics*, Vol. 21, pp. 513-538.
- Heiner, R., (1986), "The Economics of Information when Decisions are Imperfect", in A.J. and H.W. MacFadyen (Eds.), *Economic Psychology*, Amsterdam, New York, Oxford, Tokyo, Elsevier Science Publishers, pp. 293-350.
- Hobbes, T., (1662/1651), *Leviathan*, Glasgow, William Collins.
- Kirchgässner, G., and Pommerehne, W.W., (1993), "Low Cost Decisions as a Problem of Public Choice", *Public Choice*, Vol. 77, pp. 107-115.
- Kolm, S., (1973), "A Note on Optimal Tax Evasion", *Journal of Public Economics*, Vol. 2, pp. 265-270.
- Lewis, A., (1979), "An Empirical Assessment of Tax Mentality", *Public Finance*, Vol. 34, pp. 245-257.
- Lindblom, C.E., (1959), "The Science of Muddling Through", *Public Administration Review*, Vol. 19, pp. 79-88.
- Marchese, C., and Cassone, A., (1992), *Tax Amnesty as Price-Discriminating Behaviour by a Monopolistic Government*, Unpublished Manuscript, University of Torino.
- Margolis, H., (1982), *Selfishness, Altruism, and Rationality*, Cambridge, Cambridge University Press.
- Mueller, D.C., (1986), "Rational Egoism Versus Adaptive Egoism as Fundamental Postulate for a Descriptive Theory of Human Behavior", *Public Choice*, Vol. 51, pp. 3-23.
- Nordhaus, W.D., (1992), "Lethal Model 2: The Limits to Growth Revisited", *Brookings Papers on Economic Activity*, Vol. 2, pp. 1-59.
- Olson, M., (1965), *The Logic of Collective Action*, Cambridge, Mass., Harvard University Press.
- Pommerehne, W.W., and Weck-Hannemann, H., (1992), "Steuerhinterziehung: Einige romantische, realistische und nicht zuletzt empirische Befunde", *Zeitschrift für Wirtschafts- und Sozialwissenschaft*, Vol. 112, pp. 433-466.
- Pommerehne, W.W., and Zweifel, P., (1991), "Success of a Tax Amnesty: At the Polls, for the Fisc?", *Public Choice*, Vol. 72, pp. 131-165.
- Riker, W.H., and Ordeshook, P.C., (1973), *Positive Political Theory*, Englewood Cliffs, N.J., Prentice-Hall.
- Roth, F.A., Schoiz, J.T., and Witte, A.D., (1989), *Taxpayer Compliance*, Philadelphia, University of Pennsylvania Press.
- Rousseau, J.-J., (1977), *Politische Schriften*, Band 1, Paderborn, Schöningh.
- Schmölders, G., (1951/52), "Finanzpsychologie", *Finanzarchiv*, Vol. 13, pp. 1-36.
- Vanberg, V.J., and Congleton, R.D., (1992), "Rationality, Morality, and Exit", *American Political Science Review*, Vol. 86, pp. 418-431.
- Wilson, J.Q., (1993), "The Moral Sense", *American Political Science Review*, Vol. 87, pp. 1-11.
- Witt, U., (1980), *Marktprozesse*, Königstein (Taunus), Athenäum.