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Deterrence and Tax Morale: how Tax Administrations and Taxpayers Interact

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Abstract

Tax compliance has been dealt with in the literature almost exclusively by studying the behavior of taxpayers. But important insights on tax compliance can be gained by looking at how the tax authority deals with taxpayers. Taxpayers' willingness to pay their taxes, or tax morale, is supported, or even raised, when the tax officials treat them with respect. In contrast, when the tax officials consider taxpayers purely as 'subjects' who have to be forced to pay their dues, the taxpayers tend to respond by actively trying to avoid taxation. Using data for Swiss cantons and five different years from the period 1970 to 1995, we establish a systematic relationship between external intervention (in this case, how the tax officials deal with taxpayers) and intrinsic motivation (in this case, individuals' tax morale).

We are grateful to Hannelore Weck-Hannemann for providing us with data on Swiss tax evasion and Reto Casserini for valuable research assistance. The paper also gained from discussions with Gebhard Kirchgässner and Jean-Robert Tyran. We are also grateful to Rosemary Brown for improving the English. Preliminary versions of the paper were presented at the 2nd International Conference on Taxation, organized by the Centre for Tax System Integrity of the Australian National University in Canberra, December 10 and 11, 2001.

I. Models of Tax Payer Compliance

Tax compliance and tax evasion have been analyzed in the literature almost exclusively by focusing on the behavior of taxpayers. Following the path-breaking approach by Allingham and Sandmo (1972), based on Becker's (1968) economic theory of crime, tax compliance is studied by using the subjective expected utility maximization calculus. In that model the extent of deterrence, in the form of the probability of being detected and the size of the fine imposed, determines the extent of tax evasion. This concentration on the taxpayers is well reflected, for instance, in the comprehensive survey on tax compliance by Adreoni, Erard and Feinstein (1998). In contrast, the behavior of the tax authority has been somewhat neglected.[1]

This paper argues that important insights on tax compliance and tax evasion can be gained by looking at how the tax authority interacts with the taxpayers. Taxpayers respond in a systematic way to how the tax authority treats them. In particular, the taxpayers' willingness to pay their taxes, or tax morale, is supported, or even raised, when the tax officials treat them with respect. In contrast, when the tax officials consider taxpayers as persons to be forced to pay their dues, the taxpayers tend to respond by actively trying to avoid taxation. The importance of tax morale has been realized by many scholars,[2] but to our knowledge has so far not been studied in the context of the tax authority's behavior.

This is a first attempt at analyzing the interaction between the tax authority and the taxpayers, affecting tax morale. A model of the behavior of the tax authority is developed, based on Crowding Theory, which establishes a systematic relationship between external intervention (in this case, how the tax officials deal with taxpayers) and intrinsic motivation (in this case, individuals' tax morale). The emphasis is placed on the empirical analysis of the theoretical propositions derived. With a sample of Swiss cantons for the years 1970, 1978, 1985, 1990 and 1995, it is shown that the tax authorities in Switzerland do indeed behave *as if* they were aware of the reaction of taxpayers to being treated with respect or not. This result offers a perspective rarely taken into consideration with regard to the issue of tax compliance: deterrence is only one of the motivational forces in getting people to pay their taxes. Quite another is the set of policies available to the tax authority to bolster taxpayers' tax morale.

Section II develops the theoretical considerations concerning the behavior of the tax authority and summarizes these arguments by proposing empirically testable hypotheses. Section III takes a step towards empirically identifying the relationship between the tax authority and taxpayers by describing the survey undertaken. The econometric model and the data are presented in section IV. Section V is devoted to the econometric tests and the discussion of the results. The final section VI evaluates and draws conclusions.

II. Tax Authorities' Behavior and Tax Morale

In line with much of the literature (Andreoni, Erard and Feinstein 1998: 826) we assume that the objective of the tax authority is to maximize expected net revenue, i.e. tax revenue less administration costs. In contrast to most other studies, the administrative costs do not solely consist of audit costs. Rather, the tax officials take into account that the way they treat the taxpayers systematically affects the latter's tax morale, and therefore their willingness to pay taxes, which in turn affects the cost of raising taxes. The tax authority optimally chooses that way of dealing with the taxpayers that maximizes net tax returns.

Two diametrically opposite ways of treating taxpayers can be distinguished:

(1) A respectful treatment supporting, and possibly even raising, tax morale.

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1. Most of the respective models focus on endogenizing the probability of audits, depending on whether the tax authority can, or cannot, announce and commit itself to a particular audit rule before taxpayers file their tax returns. See Andreoni et al. (1998: 824 – 835). Earlier surveys on tax compliance are e.g. Pyle 1990, Cowell 1990 and Slemrod 1992.

2. See e.g. Schwartz and Orleans 1967, Roth, Scholz and Witte 1989, Alm, McClelland and Schulze 1992, Cullis and Lewis 1997, Kucher and Goette 1998.

(2) An authoritarian treatment undermining tax morale.

The tax officials can choose between these two extremes in many different ways. The feeling of being controlled in a negative way, and being suspected of tax cheating, tends to crowd out the intrinsic motivation to act as an honorable taxpayer and, as a consequence, tax morale will fall. In contrast, if the tax official makes an effort to find out the reason for the error by contacting the taxpayer in an informal way (e.g. by phoning him or her), the taxpayer will appreciate this respectful treatment and tax morale will be upheld.

The relationship between taxpayers and tax authorities can be modeled as an implicit or relational contract (see e.g. Akerlof 1982). It then involves strong emotional ties and loyalties, and goes well beyond transactional exchanges (see e.g. Williamson 1985). Social psychologists (Schein 1965, Rousseau and McLean Parks 1993) have been using this concept for a long time, calling it a 'psychological' contract to set it clearly apart from formal contracts, which are obeyed because the parties respond to the explicit and material sanction previously agreed upon. Psychological contracts have been successfully used to analyze relationships within the firm (e.g. Osterloh and Frey 2000). The basic idea that external interventions, in the form of rewards or sanctions, may crowd out intrinsic motivation, has recently been introduced into economics and is supported by much empirical evidence (Frey 1997a, Frey and Jegen 2001).

Tax officials are assumed to be aware of the effects on taxpayers' behavior suggested by Crowding Theory. In order to maximize net tax revenue, they aim at minimizing the cost of collecting taxes. They know that a disrespectful treatment of taxpayers undermines their tax morale and therewith raises the cost of collecting taxes. Tax authorities will only behave in a respectful way towards taxpayers when there is a substantial extent of tax morale to begin with. Tax officials are at the same time well aware that tax payments do not solely depend on tax morale but that extrinsic incentives play a major role. In particular, deterrence for tax evasion has to be used to prevent taxpayers with low tax morale, or lacking tax morale altogether, from exploiting the more honest taxpayers and from escaping paying their due share. A combination of respectful treatment and deterrence is possible and, as will be demonstrated in the empirical part, is widely practiced.

Respectful treatment can be split into two different components. First, the procedures used by auditors in their contact with taxpayers are to be transparent and clear. In the case of arbitrary procedures, taxpayers feel helpless and get the impression that they are not taken seriously. Such behavior reduces their perception of being obligated to pay taxes. Second, respectful treatment has a direct personal component in the sense of how taxpayers' character is respected by tax officials. If they treat taxpayers as partners in a psychological tax contract, instead of inferiors in a hierarchical relationship, taxpayers have incentives to pay taxes honestly.

Deterrence has two different aspects as well. On the one hand, in order to keep up a psychological tax contract between the tax office and the taxpayers, honest taxpayers must be confident that they are not exploited by dishonest taxpayers. Thus, deterrence for major violations of the tax code reduces tax evasion. On the other hand, any taxpayer may make a mistake, so that minor offenses can be penalized less, without undermining the psychological tax contract. A non-linear punishment schedule, with low fines for minor tax evasion and high penalties for tax fraud, will thus serve the purpose of shaping tax morale. The following hypotheses can be derived from these considerations:

Hypothesis 1. The more fully the tax authority observes formal and informal procedural rules, the lower tax evasion is.

Hypothesis 2. The more the individual citizens' rights and character are respected, the lower tax evasion is.

Hypothesis 3. The less minor offenses are penalized, and the more taxpayers are given the benefit of the doubt, the lower tax evasion is.

Hypothesis 4. The more clearly the legal obligations and the penalty in case of evasion are indicated, the lower tax evasion is.

II. The Survey[3]

In order to investigate the relationship between taxpayers and tax authorities, a survey was sent to the tax authorities of the 26 Swiss cantons.[4] The survey asked detailed questions about the legal background of tax evasion and on the treatment of taxpayers by tax authorities in day-to-day audits.

The following questions serve to specifically identify the policy parameters mentioned above:

(a) The extent of *respectful treatment* of the taxpayers is captured by:

- Fully observing procedures based on formal and informal rules: What happens typically if a taxpayer does not declare taxable income at all (procedures, fines), if a tax declaration is mistakenly filled out or, in a second stage, if taxpayers do not react?
- Acknowledgment of individual citizens' rights: What does the tax administration do if taxpayers by mistake declared taxable income too high? Are there any differences in treatment whether these mistakes are formally wrong, e.g. mistakes in adding up columns of figures, or possibilities for legal tax avoidance, e.g. tax deductions, are not used? Are there attempts to find out whether taxpayers intentionally or mistakenly declare too low a taxable income? Are mistakes in the tax declaration to the advantage or to the disadvantage of *taxpayers*?
- Avoidance of high penalties for minor offenses and giving taxpayers the benefit of the doubt: What are the minimum, maximum and standard fines for tax evasion, and the fines for tax evasion in the case of legacies or self-declaration, as a multiple of the tax payment (or as a percentage of the tax payment)?

(b) *Deterrence* of tax evasion:

- Clearly establish taxpayers' legal duties and penalties for not complying: Is the criminal code applied in the case of tax fraud, i.e. is it possible to impose a prison sentence or a monetary fine? What is the maximum monetary fine in the case of tax fraud (maximum fine in thousands of Swiss Francs)? What is the average monetary fine for tax fraud? Are the monetary fines for tax fraud added to the fine for tax evasion if tax fraud is part of the criminal code? What is the maximum prison sentence for tax fraud? What is the average prison sentence for tax fraud?

The way taxpayers are treated by tax authorities reveals interesting differences between the Swiss cantons. Only 58 percent of Swiss cantonal tax authorities believe that mistakes in reported incomes are, on average, in favor of taxpayers. 31 percent believe that mistakes are neither to the advantage nor to the disadvantage of taxpayers, and 12 percent believe that mistakes are to the disadvantage of taxpayers. These answers indicate a general trust in taxpayers.

If a taxpayer does not report his or her true taxable income, the tax authorities can contact the person in several ways.[5] 54 percent of the cantons phone the person concerned and ask how the mistake(s) occurred

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3. The survey is an extension of the one that formed the basis of a former study on tax evasion in Switzerland by Pommerehne and Weck-Hannemann (1996). Their data cover the years 1965, 1970 and 1978. We extend that data set to the years 1985, 1990 and 1995. We are most grateful to Hannelore Weck-Hannemann for providing us with her data set.

4. It should be noted that the Swiss cantons have the basic power to tax personal and corporate income, while the local jurisdictions levy a surcharge on cantonal income taxes. Cantons can set tax rates and define tax bases autonomously. Both lead to a strong variation in (effective) tax rates among cantons and local jurisdictions. The federal level mainly raises indirect taxes, but also a highly progressive federal income tax. See Feld (2000) for a more detailed description of the Swiss fiscal system. Tax evasion laws form part of the legal power of the Swiss cantons as well. It also has to be noted that Swiss citizens and foreigners with a permanent residence permit are not taxed at source (with the exception of the federal source tax on interest and dividend incomes). Taxpayers declare their taxable income every two years and, from the year 2001 on, each year. The source tax on interest and dividend incomes can be deducted on the cantonal tax declaration.

5. The role of reminder letters has been analyzed in an experimental setting by Wenzel (2001), Taylor and Wenzel (2001) and Blumenthal, Christian and Slemrod (2001).

on the tax form and what explanation the taxpayer has. All of the cantons send a letter to the taxpayer, half of them with a standard formulation. Nearly 85 percent ask the taxpayer to pay a visit to the tax administration office, but only half of the cantons mention the possibility of punishment. Thus, tax authorities rarely adopt the strategy of explicit deterrence, but rather seek to gain additional information. 96 percent of the cantonal tax authorities correct reported incomes that are too high, i.e. reduce taxable incomes when taxpayers commit mistakes that are to their disadvantage. 27 percent of the tax authorities correct reported taxable income, even if taxpayers fail to profit from legal tax savings.

III. The Econometric Model and Data

The widely used Allingham and Sandmo (1972) model (see also Andreoni, Erard and Feinstein 1998: 823) serves as a reference. In their model, a taxpayer with exogenous income y faces an exogenous (marginal) tax rate t. This taxpayer is periodically asked to declare his or her true income, y^d. An honest taxpayer reports $y^d = y$; a dishonest taxpayer reports $y^d < y$. The person thus evades taxes corresponding to the amount of income $e = y - y^d$. The tax administration does not know the actual (true) income y and attempts to enforce tax compliance by a system of audits and penalties. The audits take the form of controls by the tax authority that entail a specific probability of detection, p, for each individual taxpayer. Penalties range from fines, f, often paid as a multiple of the amount evaded, to prison sentences, s. Using expected utility maximization calculus, Allingham and Sandmo (1972: 326) arrive at a first order condition, according to which the taxpayer will declare less than his or her true income if the expected fine (as a multiple of the undeclared income) is less than the marginal tax rate.

The conventional estimation equation thus takes the following form:

$$(1) \quad e_{it} = \beta_0 + \beta_1 \cdot p_{it} + \beta_2 \cdot f_{it} + \beta_3 \cdot t_{it} + \beta_4 \cdot y_{it} + \beta_5 \cdot PR_{it} + \beta_6 \cdot CP_{it} + \beta_7 \cdot X_{it} + \varepsilon_{it}$$

where e_{it} denotes the extent of tax evasion measured as the amount of actual (true) income not reported to the tax authority. It is computed by using the household income gap method.[6] It is based on the difference between adjusted gross household income reported in the tax authorities' statistics and gross household income according to national accounts (which is calculated independently of tax authority figures) as a percent of gross household income from the national accounts (see Pommerehne and Weck-Hannemann, 1996, p. 163).

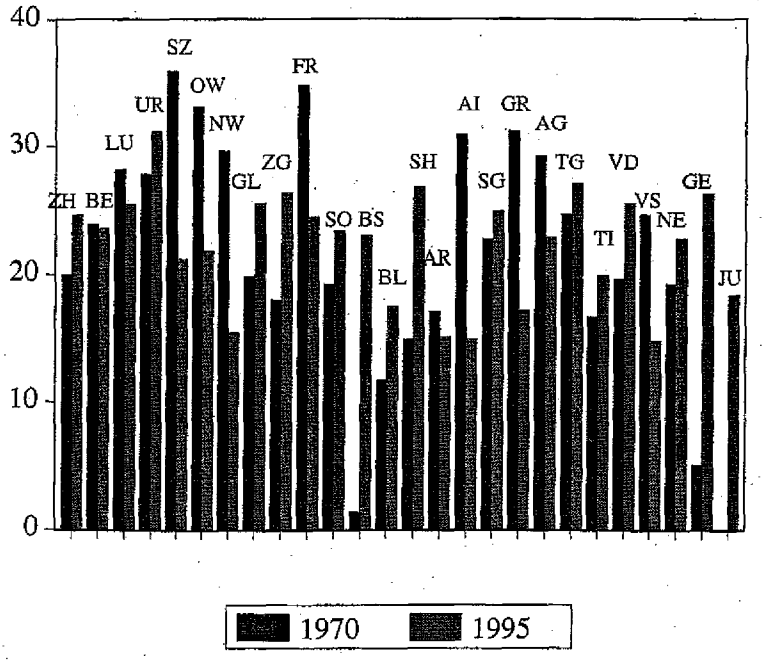

Figure 1: The Extent of Tax Evasion in the Swiss Cantons in 1970 and 1995 (in Percent of Gross Household Income).

6. For other methods of estimating tax evasion and the shadow economy, as well as for comparisons between these methods, see e.g. Frey and Pommerehne 1984, Cowell 1990, Pyle 1990 and Schneider and Enste 2000.

Figure 1 shows the estimates graphically for the first year (1970) and the last year (1995) of the observation period for each of the cantons. As can be seen, there is a substantial discrepancy between the 26 cantons.

In 1995, tax evasion was (with more than 25 percent of gross household income) highest in the cantons Uri, Thurgau, Schaffhausen, Zug and Geneva, and lowest (with less than 15 percent) in the cantons Appenzell i.Rh. and the Valais. The average for all the cantons in 1995 is 18.33 percent. It is important to note that tax evasion has changed considerably over time. While tax evasion decreased in some cantons, like in Schwyz, Obwalden, Nidwalden and Graubünden, it has risen sharply in some others, most notably in the two city cantons of Basle-City and Geneva. In both cantons, tax compliance declined steadily over time leading to a large difference between the first and last year of the observation period.

Proceeding further with equation (1), p_{it} is the probability of detection measured by the number of tax auditors as a percentage of the number of taxpayers. f_{it} is the fine for tax evasion approximated by the standard legal fine as a multiple of the tax amount evaded. t_{it} is the maximum marginal tax rate reported by the Swiss Federal Tax Administration. y_{it} is true income derived from the national accounts statistics, i.e. the gross effective primary income per capita of the population. p_{it} and f_{it} are hypothesized to have negative impacts on the share of income evaded, while the impact of t_{it} and y_{it} is supposed to be ambiguous. These variables correspond to the standard tax evasion model. In addition, the two variables PR_{it} and CP_{it} are introduced in the model capturing the treatment of taxpayers by tax authorities:

(1) The first, PR_{it}, is a vector of variables that measure whether tax authorities fully observe *procedures based on formal and informal rules*. These variables are constructed from the answers to our survey and are used to test *Hypothesis 1*. They reflect the typical procedure if a taxpayer does not declare any taxable income at all, if a tax declaration has a mistake or, at a second stage, if taxpayers do not react to the demands of the tax authority. The first variable in the vector measures the *typical procedure* if a taxpayer does *not declare any taxable income* at all. The variable takes the value 0 in the case of a reminder and a direct income assessment following, and 1 if a reminder is followed by a penalty and an assessment by the tax authority. It takes the value 2 in the case of a direct income assessment by the authority without any further contact with the taxpayers concerned, and 3 if a penalty and an official assessment are done without a reminder and without an attempt to check the situation in advance. This order of reaction by the tax authority reveals a decreasing reliance on the procedural obligation to give taxpayers a chance of reacting before the tax authority itself acts. According to our *Hypothesis 1*, it is expected that the higher the value of this variable, the higher is the amount of income evaded.

The second and third variables included in the vector of variables PR_{it} measure the *typical reaction* of the tax authority if a tax declaration is *wrongly filled out*. Tax authorities can follow a 'normal' procedure by first calling a taxpayer on the phone in order to find out whether the mistake is a serious attempt to evade taxes or simply an oversight, then sending a written reminder, and finally inviting the taxpayer to pay a visit to the tax administration, possibly also indicating potential fines. This 'respectful' procedure is captured by a dummy variable taking the value 1 if this procedure is followed and 0 otherwise. Tax authorities can however also invite taxpayers to pay a visit to the tax administration directly and additionally threaten them with potential fines, without first seeking a dialogue with the taxpayer. This 'authoritarian' procedure is captured by a dummy variable taking on the value of 1 if there is no attempt to call taxpayers or contact them in a letter, and 0 otherwise.

The *respectful* procedure is hypothesized to have a negative impact on the amount of evaded income. Tax authorities conform to a sequence of formal and informal procedures reflecting attempts to have a dialogue with taxpayers without threatening them in the first place. This is quite different in the case of the *authoritarian* procedure. The authoritarian procedure entails two opposite effects. On the one hand, the threat as such may remind taxpayers of the rules of the game and decrease tax evasion, similar to the deterrence effect of an expected fine. On the other hand, the authoritarian procedure may undermine tax morale as it indicates that the tax authority disregards formal and informal procedures of respectful treatment, which are appropriate for partners in a psychological tax contract.

A fourth variable in the vector PR_{it} measures the *typical procedure* if a taxpayer does *not react to the former procedure* just discussed. This ordinal variable is measured by the same four values ranging from 0 to 3 as the variable for the typical procedure in the case of non-declaration. This variable is hypothesized to exert a positive impact on tax evasion.

(2) The second vector of variables CP_{it}, measuring the treatment of taxpayers by the tax authority, captures how well the tax authority acknowledges *individual citizens' rights and character* (questions 41 to 44). These variables are used to test *Hypothesis 2*.

A central variable, capturing the acknowledgment of citizens' rights and character, reflects whether tax authorities believe that mistakes in the tax declaration are to the advantage or to the disadvantage of *taxpayers*. It takes the value of 1 if they believe it is to the advantage of taxpayers, -1 if they think it is to the disadvantage of taxpayers, and 0 if they think it is neither to their advantage or disadvantage. If tax authorities assume that mistakes in tax declarations are not necessarily an attempt to cheat in the first place, they can be perceived to act without prejudice. A prejudice is usually viewed as being less respectful of individual characters. Accepting that mistakes to the disadvantage of taxpayers are equally likely is giving taxpayers the benefit of the doubt. Taxpayers therefore perceive this behavior as acknowledgment of their rights and trust in their character. They respond to trust by behaving in a trustworthy way. This variable can therefore be expected to exert a positive impact on the amount of income evaded.

Hypotheses 3 and *4* are tested by distinguishing between tax evasion penalized by a standard fine as a multiple of the tax amount evaded, and tax fraud, penalized by a lump sum. Tax fraud may entail a prison sentence, depending on the severity of the fraud and the frequency with which a person was condemned for tax fraud in the past. Tax fraud is defined as tax cheating that is accompanied by the forgery of a document. According to *Hypotheses 3* and *4*, we expect the standard legal fine to have a minor impact on tax evasion compared with the penalty for tax fraud.

Finally, the variable X_{it} included in the model represents a vector of economic and demographic control variables: population size, the proportion of people over 65 and a dummy variable taking the value 1 if inflation is indexed in a canton's tax code. In addition, time fixed effects are included in all equations. β_0 to β_7 are vector valued coefficients to be estimated, while ε represents an error term (cf. the *Appendix* for a definition of all variables). The unit of observation is the cantonal level. The subscript $i = 1, ..., 26$ indicates cantons and $t = 1970, 1978, 1985, 1990, 1995$ indexes years (cf. the *Appendix* for summary statistics). It has to be noted that this is an unbalanced panel data set because the canton Jura peacefully seceded from the canton Bern in 1978. Thus, there are $i = 1, ..., 25$ for 1970 and 1978.

IV. Estimation Results.

The estimation strategy immediately follows from the econometric model. Since tax evasion, e, the probability of detection, p, and the fine for tax evasion, f, are determined simultaneously in the Allingham/Sandmo model, *equation (1)* was estimated by an instrumental variable approach (TSLS). As instruments, the amount of evaded income differs from true income, the probability of detection and the standard fine of the former period are used. An estimation by OLS is only provided for illustrative purposes. The OLS estimation is conducted for the five years under consideration between 1970 and 1995, while the TSLS estimations use the observations of 1970 for the instrumental variables and are thus only for the period 1978 to 1995.[7]

The basic Allingham/Sandmo mode is estimated first. It is subsequently augmented by variables capturing the treatment by the tax authority. The estimation results are presented in *Table 1*. Both the OLS and the TSLS regressions in *columns (1)* and *(2)* indicate that the basic tax evasion model is not performing in a satisfactory way. While about 60 to 70 percent of tax evasion in the cantons can be traced, the fine, the marginal tax rate and the number of older people are significant at the 5 and 10 percent significance level in the OLS equation, but partly lose significance in the TSLS equation. The fine for tax evasion is only significant at the 10 percent level, while the marginal tax rate falls short of significance at any conventional significance level. This is not due to outliers as the Jarque-Bera-test statistics indicate. In all equations, the

7. Panel regressions usually pose some problems because the cross section and time series domains are combined. In order to circumvent problems arising from heteroscedasticity, white corrected standard errors are computed for obtaining the t-statistics. Autocorrelation of the residuals cannot be corrected by using the usual methods, because the observations in the time domain are too little, given the fact that only four (five) points in time are used in the TSLS (OLS) models. In addition to the explanatory variables, time dummies are included in order to capture common shifts of tax evasion at the Swiss cantonal level across time.

hypothesis of normal distribution of the residuals cannot be rejected according to those test statistics. In addition, none of the other variables has a significant impact on tax evasion. This holds in particular for the probability of detection and income per capita.

The significant variables have nevertheless plausible signs. The higher the fine for tax evasion and the higher the marginal tax rate, the lower is the amount of taxes evaded. The first effect follows unambiguously from the Allingham/ Sandmo model. The second effect is theoretically plausible if a linear regressive tax schedule with diminishing absolute risk aversion is assumed. Moreover, older people appear to have less possibilities for tax evasion: the higher the number of people over 65 compared to the total population, the lower tax evasion is. The signs of the other variables, for example in the case of the probability of detection,[8] are not necessarily in line with the theoretical predictions. The fact that the remaining variables have essentially no impact is not disturbing. All in all, it has to be concluded that important explanatory variables appear to lack the basic specification of the tax evasion model.

A. Testing the Impact of Fair Procedural Rules

It thus appears to make sense that the PR_{it} is included in the estimation equation. It is a vector of variables that measure whether tax authorities fully observe procedures based on formal and informal rules. This vector consists of four different variables: the typical procedure if taxpayers do not declare their taxable income, the respectful and the authoritarian procedures if taxable income is incorrectly reported and the typical procedure if taxpayers do not react to the former action of the tax authority. These variables are designed to test *Hypothesis 1.*

The estimation results for these four variables in *column (3)* of *Table 1* indicate that they are indeed contributing to the explanation for tax evasion in the Swiss cantons. Including these variables, the adjusted R^2 increases from 0.72 to 0.74, while the Jarque-Bera test statistics again indicate that the null hypothesis of normal distribution of the residuals cannot be rejected at any conventional significance level. Three of the four variables are significant at the 1 percent significance level. Although the typical procedure if there is no reaction to the interference of the tax authority has no significant impact, the hypothesis that all the variables of a fair procedure have no impact on tax evasion can be rejected at the 1 percent significance level, according to a Wald-test on the joint significance of the four variables (F-statistics = 3.840).

The inclusion of these four variables improves the results of the tax evasion model in general. The standard fine for tax evasion keeps the negative impact on tax evasion, but is now significant at the 1 percent significance level. The marginal tax rate is again significantly positive at the 10 percent level. In addition, the probability of detection is significant at the 5 percent level, although it has a theoretically unexpected positive sign. Income per capita is affecting tax evasion in a significantly positive way, while the demographic variables do not have any significant impact. Neither does tax indexation.

The impact of the different variables capturing procedural rules is close to theoretical expectations. The less the tax authority relies on procedural rules in the case of no declaration, and the higher the values of the variable 'typical procedure if no declaration', the higher is the difference between evaded income and true income. If the cantonal tax authority follows a respectful procedure, that is the tax authority calls the taxpayer to query why taxable income appears to be reported too low, tax evasion is significantly lower as well. Moreover, tax evasion is also reduced if the tax authority follows an authoritarian procedure and deters the taxpayer already procedurally by a potential fine. The typical procedure in the case of no reaction to the interference of the tax authority has no significant impact on tax evasion in the Swiss cantons. According to a Likelihood Ratio test, the hypothesis that this variable is redundant in the tax evasion model cannot be rejected at any conventional significance level (F = 0.009). It is therefore excluded from

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8. Andreoni, Erard and Feinstein (1998: 841 – 843) discuss to what extent audit probabilities are found to have a deterrent effect on tax evasion in the existing field studies. It can be deduced from their rather benevolent assessment of the empirical findings that the results are quite mixed. The most striking result is obtained in the study by Dubin and Wilde (1988), according to which audit probabilities have ambiguous effects on compliance, depending on income class. In some income classes, there is a significant negative impact of audit probabilities on compliance results, which is qualitatively equivalent to our (sometimes) significant positive impact on the extent of tax evasion in Switzerland. Depending on the estimation method chosen, this result is however not robust, neither in the Dubin and Wilde study, nor in ours.

the subsequent equations. Hence, with the exception of the impact of the authoritarian procedure, the variables have the theoretically expected influence on tax evasion. The more fully the tax office observes formal and informal procedural rules, the lower tax evasion is. According to these results, *Hypothesis 1* cannot be rejected.

The question emerges why the authoritarian procedure has such a strong significantly negative impact on tax evasion. According to a Wald-test, the hypothesis that the impact of the authoritarian procedure is equal to the impact of the respectful procedure indeed cannot be rejected in all estimations in *Table 1* (second F-statistics). Including an interaction term of the authoritarian procedure with the expected fine in *column (4)* of *Table 1* reveals, however, that a credible deterrence in the authoritarian procedure that is supported by actual high levels of control and punishment does not have any significant impact on the difference between evaded income and true income. The authoritarian procedure as such keeps its significantly negative impact.

B. Testing the Acknowledgment of Citizens' Rights and Personality by Tax Authorities.

In order to test *Hypothesis 2*, CP_{it} as a vector to capture the acknowledgment of individual citizens' rights and character is introduced in addition to the variables of the augmented tax evasion model of the previous section. This vector consists of four variables: a variable on the ex ante mistrust bias of tax authorities, i.e. whether they think incorrect reporting on the tax forms is to the advantage of taxpayers; the typical reaction if declared income is too high; the different treatment of mistakes in a purely algebraic sense or in the sense of forgetting to deduct normal deduction amounts from gross income; and whether tax authorities try to find out whether taxpayers deliberately reported too low a taxable income. From these variables, only the mistrust bias variable has a marginally significant impact on tax evasion. The other three variables are insignificant.[9]

Unexpectedly, tax evasion is lower, the more tax authorities think that tax evasion is to the advantage of taxpayers. Based on these results, *Hypothesis 2* has to be rejected. It should be noted however that the impact of this variable is only significant at the 10 percent level and the other variables are not significant at any conventional significance level. Thus, the rejection of *Hypothesis 2* is on a relatively narrow statistical basis. Aside from the unexpected impact of the mistrust bias variable, the estimation results of the whole model are improved. The adjusted R^2 rises again and the impact of the covariates remains robust.

C. Testing the Differential Impact of Punishment for Minor and Major Tax Offenses.

Hypotheses 3 and *4* are jointly tested for by differentiating between fines for tax evasion and a penalty for tax fraud. The results of this specification are reported in *column (6)* of *Table 1*. Overall, the inclusion of the penalty for tax fraud to the model reported in the previous section strongly affects the estimation results of the whole model. Although the covariates keep their impact in qualitative terms, the size of the coefficients and their significance are at least in part markedly reduced. In addition, the adjusted R^2 drops by more than half. The penalty for tax fraud has however the expected negative sign and is significant at the 1 percent level, while the impact of the fine for tax evasion is decreasing to the 10 percent significance level. The hypothesis that the penalty for tax fraud is reducing tax evasion more strongly than the standard fine for tax evasion cannot be rejected at the 10 percent level (F = 3.202).

It appears that the penalty for tax fraud, in contrast to a fine for tax evasion, also implies that a previous conviction in legal terms has a quantitatively stronger impact on tax evasion. It restricts tax evasion all the more. This result is corroborated by a closer inspection of the expected fine and the expected penalty as the combined impact of each punishment variable with the probability of detection. While the hypothesis that the probability of detection and the standard fine for tax evasion do not have an impact on tax evasion jointly cannot be rejected at any conventional significance level (F= 0.562), the hypothesis that the penalty for tax fraud and the probability of detection have no impact can be rejected at the 10 percent significance level (F = 3.295).

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9. They are not reported in *column (5)* of *Table 1* because of expositional reasons. Tests on redundancy of these variables indicate that the hypothesis of redundancy of each single one of them, as well as combinations of them, cannot be rejected at any conventional significance level (F = 0.247 for the typical reaction if declared income is too high, F = 0.813 for the different treatments, F = 0.150 for the investigations of tax authorities as to the motivations behind mistakes and F = 1.355 for all three variables).

Table 1: Unbalanced Panel Regressions of Cantonal Share of Income Evaded in Percent of True Income to Treatment by the Tax Authority, 1970 - 1995

Variables	OLS (1)	TSLS (2)	TSLS (3)	TSLS (4)	TSLS (5)	TSLS (6)
Probability of Detection (in ‰)	0.015 (0.87)	0.012 (0.53)	0.055* (1.93)	0.046(*) (1.67)	0.062* (2.30)	0.088(*) (1.82)
Standard Fine (in %)	-0.042* (2.59)	-0.044(*) (1.94)	-0.063** (3.01)	-0.061** (3.20)	-0.063** (3.40)	-0.053(*) (1.81)
Penalty for Tax Fraud (in 1'000 SFr)	–	–	–	–	–	-0.445** (2.79)
Marginal Tax Rate (in %)	0.290(*) (1.78)	0.253 (1.60)	0.368(*) (1.96)	0.369* (2.50)	0.397** (2.71)	0.672* (2.19)
Income per Capita (in 1'000 SFr)	-0.105 (0.60)	0.027 (0.16)	0.410* (2.27)	0.421* (2.36)	0.518** (2.88)	0.749* (2.30)
Population (in 1'000)	-0.002 (1.16)	-0.002 (0.77)	-0.003 (0.93)	-0.002 (0.92)	-0.003 (1.12)	-0.003 (0.91)
Proportion of People older than 65 (in %)	-0.666* (2.51)	-0.702** (2.69)	-0.510 (1.31)	-0.483(*) (1.86)	-0.523* (2.01)	-0.436 (1.15)
Tax Indexation	-0.865 (0.74)	-0.556 (0.53)	-0.123 (0.12)	-0.146 (0.14)	0.034 (0.03)	0.025 (0.01)
Typical Procedure if No Tax Declaration	–	–	3.192** (2.81)	3.188** (2.79)	3.353** (3.01)	2.766(*) (1.89)
Respectful Procedure	–	–	-5.966** (3.52)	-6.069** (3.53)	-6.721** (4.10)	-5.935* (2.23)
'Authoritarian' Procedure	–	–	-5.235** (2.92)	-6.523* (2.39)	-6.521** (3.47)	-6.519* (2.30)
Typical Procedure if No Reaction	–	–	0.109 (0.08)	–	–	–
'Authoritarian' Procedure * Expected Fine	–	–	–	0.001 (0.70)	–	–
Mistrust Bias of Tax Authority	–	–	–	–	-1.333(*) (1.77)	-1.717 (1.47)
F: Time Dummies	48.518**	48.750**	49.604**	42.931**	50.391**	16.132**
F: 'Authoritarian' Equals Respectful Procedure	–	–	0.467	0.063	0.031	0.095
$\overline{R}^2$	0.610	0.715	0.744	0.747	0.750	0.348
SER	5.792	5.044	4.783	4.746	4.722	7.624
J.-B.	2.069	0.002	0.613	0.495	0.600	2.453

Notes: Instruments are the amount by which declared income differs from true income, the probability of detection and the standard fine referring to the former period; in column (6) also the penalty for tax fraud of the former period. OLS has 128, TSLS 102 observations. The numbers in parentheses are the t-statistics of the estimated parameters based on White corrected standard errors. The F-Test is a statistics on the joint significance of the mentioned variables. SER is the standard error of regression, J.-B. is the value of the Jarque-Bera-Statistic for normality of the residuals. '(*)', '*', or '**' denotes significance at the 10, 5, or 1 percent level, respectively. The computations were performed by EViews, Version 3.1.

Table 2: Unbalanced Panel Regressions (TSLS) of Cantonal Share of Income Evaded in Percent of True Income, Sensitivity Analysis, 1970 to 1995

Variables	(7)	(8)	(9)	(10)	(11)
Probability of Detection (in ‰)	0.066*	0.033	0.080**	0.085**	0.100*
	(2.38)	(1.27)	(2.85)	(3.44)	(2.17)
Standard Fine (in %)	-0.061**	-0.072**	-0.062**	-0.055*	-0.051(*)
	(2.96)	(3.50)	(3.00)	(2.57)	(1.68)
Penalty for Tax Fraud (in 1'000 SFr)	–	–	–	–	-0.414*
					(2.62)
Marginal Tax Rate (in %)	0.562**	0.647**	0.648**	0.780**	0.898**
	(3.53)	(4.28)	(4.25)	(5.01)	(3.16)
Income per Capita (in 1'000 SFr)	0.312(*)	0.462*	0.508**	0.561**	0.664*
	(1.89)	(2.59)	(2.96)	(3.25)	(2.14)
Dummy for French and Italian Speaking Cantons	-6.528**	-6.174**	-8.088**	-8.643**	-7.697*
	(3.10)	(3.26)	(3.93)	(4.09)	(2.31)
Index of Direct Democracy	-1.709*	-0.995	-2.627**	-2.028**	-1.996(*)
	(2.49)	(0.74)	(3.61)	(2.83)	(1.73)
Typical Procedure if No Tax Declaration	4.119**	2.223*	4.404**	3.833**	3.906*
	(3.39)	(2.12)	(3.91)	(3.69)	(2.64)
Respectful Procedure	-7.218**	0.583	-9.124**	-9.602**	-7.704**
	(4.89)	(0.09)	(6.07)	(6.59)	(2.69)
'Authoritarian' Procedure	-7.831**	-15.709*	-10.982**	-11.337**	-10.082**
	(4.06)	(2.08)	(4.62)	(4.87)	(2.87)
Mistrust Bias of Tax Authority	–	–	-2.468*	5.342	-2.372(*)
			(2.62)	(1.66)	(1.95)
Respectful Procedure * Direct Democracy	–	-1.740	–	–	–
		(1.41)			
'Authoritarian' Procedure * Direct Democracy	–	2.615(*)	–	–	–
		(1.68)			
Mistrust Bias * Direct Democracy	–	–	–	-1.806*	–
				(2.43)	
F: Direct Democracy	–	9.601**	–	10.378**	–
F: Respectful Procedure	–	26.395**	–	–	–
F: 'Authoritarian' Procedure	–	2.743(*)	–	–	–
$\bar{R}^2$	0.766	0.793	0.781	0.795	0.421
SER	4.566	4.299	4.422	4.276	7.185
J.-B.	1.038	0.066	0.280	1.087	3.792

For notes, see Table 1. All equations contain time dummies which have a jointly significant impact. For the sake of saving space, estimated parameters of demographic variables and tax indexation are not reported. Both demographic variables are consistently negative and significant across all equations with reasonably sized coefficients, while tax indexation does not have any significant impact.

According to these results, *Hypothesis 4* cannot be rejected. The more clearly the legal obligations and the penalty in the case of tax fraud are indicated, the lower tax evasion is. In addition, the penalty for tax fraud has a stronger deterring effect than the standard legal fine. This also gives some indirect evidence for *Hy-*

pothesis 3. Further support for *Hypothesis 3* can be derived if the minimum fine for tax evasion is additionally introduced. It has no significant impact at all and a positive sign (t-statistics = 0.96).[10]

D. Robustness Tests.

Our analysis of the relationship between the tax authorities' treatment of taxpayers and tax evasion provides quite encouraging results. It remains to be tested however whether these results are robust to the inclusion of additional explanatory factors. Tax evasion at the Swiss cantonal level has been systematically analyzed in the empirical studies by Weck-Hannemann and Pommerehne (1989), Pommerehne and Weck-Hannemann (1996), Pommerehne and Frey (1992) and Frey (1997b). The focus in these studies is on the impact of constitutional differences of the cantons on tax evasion. The more directly democratic the political decision-making procedures of a canton are, the lower tax evasion is, according to those studies. In addition, Feld and Frey (2002) have found that the treatment of taxpayers by the tax authority can also in part be explained by these constitutional differences between the Swiss cantons.

The estimation results presented in the previous sections on the impact of tax authorities' treatment of taxpayers may thus simply reflect the impact of direct democracy on tax evasion. The estimates may be biased due to the omission of this relevant variable. This bias may arise from two effects of direct democracy: first, a direct effect of direct democracy on tax evasion is observed, as discussed by Pommerehne and Weck-Hannemann (1996); second, an indirect effect occurs due to the impact of direct democracy on the tax authorities' treatment of taxpayers, as established by Feld and Frey (2002). A necessary robustness test of the relationship between tax authorities' treatment of taxpayers and tax evasion is therefore the inclusion of direct democracy as an explanatory variable.

In order to measure direct democracy, we use an index proposed by Stutzer (1999) and successfully used by Frey and Stutzer (2002) in an analysis of subjective well-being of citizens, and Schaltegger and Feld (2001) in an analysis of government centralization in Switzerland. All Swiss cantons have mandatory constitutional referendums, but already in the case of an optional constitutional referendum, the number of signatures and the time span in which they have to be collected differ. The variation between the cantons is even higher in the cases of constitutional and statutory initiatives, mandatory and optional statutory referendums, and fiscal referendums.

In addition to the index of direct democracy, a regional dummy variable is included that measures whether a canton has a majority of German, French or Italian speaking citizens. It has often been argued that the cultural differences between Swiss cantons, most visible in the language differences among the Swiss population, are strongly reflected in politics, including fiscal affairs as well.

The estimation results of the TSLS model of cantonal tax evasion augmented by these two variables are presented in *Table 2*. Compared to the models discussed in the previous sections, in particular to *column (5)* in *Table 1*, the augmented tax evasion model performs slightly better. The adjusted R^2 increases from 0.75 to at least 0.77. The Jarque-Bera test statistics indicate that the hypothesis of normal distribution of the residuals cannot be rejected at any conventional significance level (with the exception of the last column in *Table 2* with an additional robustness test). The results of the tax evasion model remain robust to the inclusion of the additional variables. This holds despite the fact that both the index of direct democracy and the dummy for French and Italian speaking cantons have significantly negative impacts on the difference between declared income and true income, at least at the 5 percent significance level. The hypothesis that both variables together, and each of them separately, are redundant, can be rejected at the 1 percent significance level (F-statistic = 5.017 for both variables, 6.404 for the index of direct democracy and 10.035 for the regional dummy). While the effect of the regional dummy is somewhat surprising, that of the direct democracy index is qualitatively corroborating the results of Pommerehne and Weck-Hannemann (1996).

10. These results can be obtained from the authors upon request.

The results for the variables of the baseline tax evasion model are in line with those *in Table 1*.[11] The fine for tax evasion has a significant negative impact on tax evasion, and the probability of detection, the marginal tax rate and primary household income per capita are significantly positive. With the exception of the probability of detection, these results are as theoretically expected. In addition, the variables measuring the treatment of taxpayers are robust to the inclusion of the direct democracy index and the regional dummy. The more the tax authority follows formal rules, in the sense of a typical procedure if taxpayers do not declare any income, the lower tax evasion is. The impact even increases in quantitative terms and significance compared to the model where direct democracy and the regional dummy are excluded. The same holds with regard to informal procedures measured by the dummy variables for the respectful and the 'authoritarian' procedures in the case of incorrect income reporting. Both variables remain statistically negative and their quantitative and statistical impact increases. The hypothesis that both variables have the same impact on tax evasion cannot be rejected at any conventional significance level (F-statistic = 0.226).

The consideration of direct democracy allows for the investigation of the question why both the respectful and the 'authoritarian' procedures have an equally sized negative impact on the extent of tax evasion in the cantons. It could be argued that direct democratic decision-making procedures rely more strongly on the quality of citizens' discussions so that the development of a discussion culture leads to a stronger positive impact of the tax authorities' respectful procedure on tax evasion than in more representative democratic cantons. It could thus be expected that the interaction term of the direct democracy index with the respectful procedure indicates the stronger impact of this procedure in direct democratic cantons. In addition, the interaction term of direct democracy and the authoritarian procedure has to be included to test the opposite hypothesis that 'authoritarian' bureaucratic procedures are more successful in restraining tax evasion in representative democracies.

The estimation results in *column (8)* of *Table 2* corroborate this conjecture. The respectful procedure has indeed a negative impact on tax evasion in more direct democratic cantons while it increases tax evasion in more representative democratic cantons. And vice versa for the 'authoritarian' procedure: it has a dampening effect on tax evasion in more representative democratic cantons and increases tax evasion in more direct democratic cantons. While the single effects of the interaction terms with the respectful procedure do not reach any conventional significance level, they are individually significant in the case of the interaction terms with the 'authoritarian' procedure. Nevertheless, the tests on the joint significance of the respectful procedure variables, the 'authoritarian' procedure variables and the direct democracy variables, reported at the bottom of *Table 2*, each indicate that these variables have significant impacts on tax evasion, although that of the 'authoritarian' procedure is only significant at the 10 percent level, according to the Wald test. These results may be interpreted such that the dampening effect of the 'authoritarian' procedure on tax evasion mainly arises in representative democracies, while the dampening effect of the respectful procedure occurs in direct democracies. The deliberative culture in direct democracies appears to be carried over to the relationship between tax authorities and taxpayers. In a way, the deliberative culture of direct democracy is thus a kind of social capital. On the basis of these results, *Hypothesis 1* cannot be rejected.

With respect to *Hypothesis 2*, acknowledgment of citizens' rights and character, *column (9)* in *Table 2*, also indicates some robustness to the inclusion of the direct democracy variable and the regional dummy. The adjusted R^2 increases in comparison to *column (7)* and all explanatory variables (except tax indexation) are significant at the 1 percent significance level. Again, the mistrust bias variable has an unexpected significantly negative impact on tax evasion. The higher the mistrust of tax authorities is, the lower tax evasion is. As before, an interaction variable of direct democracy and the mistrust bias variable is included additionally. The results are reported in *column (10)*. Interestingly enough, the dampening effect of a mistrust bias of tax authorities on tax evasion occurs in direct democratic cantons. The respective interaction variable has a significantly negative impact on tax evasion. In more representative democracies, i.e. the remaining effect of the mistrust bias variable, a positive impact of a mistrust bias on tax evasion results, although this effect falls slightly short of conventional significance levels. Nevertheless, both mistrust bias

11. The results for the demographic variables and tax indexation are not reported in *Table 2* in order to save space. Both demographic variables are consistently negative and significant across all equations with reasonably sized coefficients, while tax indexation does not have any significant impact. The results can be obtained from the authors upon request.

variables are jointly significant at the 1 percent significance level (F-statistic = 5.894) and both direct democracy variables are jointly significant as well at the 1 percent level (F-statistic = 10.378).

According to these results, the higher the mistrust of tax authorities in direct democracies, i.e. the more they believe that mistakes in the tax declarations are to the advantage of taxpayers, the lower is tax evasion in a canton. If they mistrust taxpayers in more representative democratic cantons, tax evasion is higher. These results are most interesting because Feld and Frey (2002) find that the mistrust bias is significantly higher in more representative democratic cantons. If tax authorities in direct democratic cantons are mistrustful, they appear to be so with good reason. It thus only pays for tax authorities to mistrust citizens in direct democracies, which can be explained by the fact that individual character and citizens' rights are already fairly well respected by the very fact of direct participation in political decision-making. In a jurisdiction without direct democracy, the treatment of taxpayers by the tax authorities is an institutional substitute for acknowledgment of citizens' rights that is honored by taxpayers by evading less income. On the basis of these results, *Hypothesis (2)* cannot be rejected either.

Column (11) indicates that the results testing *Hypothesis (3)* and *(4)* obtained in the previous sections remain robust as well to the inclusion of direct democracy and the regional dummy. Again, the negative impact of severe punishment in the case of tax fraud on tax evasion is significantly higher than that of the fine for normal tax evasion.

V. Concluding Remarks

One of the basic mysteries of the tax evasion literature is why people pay taxes, given the rather low levels of fines and auditing probabilities. The deterrence model of tax evasion cannot explain the high tax compliance rates without referring to an exogenously given tax morale. Based on Crowding Theory, it is argued in this paper that a psychological tax contract between taxpayers and tax authorities explains the high extent of tax morale that helps solve the tax compliance mystery. Tax payment is taken to be a 'quasi-voluntary' act.

The tax authority takes into account that the way it treats the taxpayers systematically affects the latter's tax morale, and therefore their willingness to pay taxes, which in turn affects the costs of raising taxes. When the auditors detect incorrectly reported income in the tax declaration, they can immediately be suspicious of an intention to cheat, and impose legal sanctions. Alternatively, the auditors may give the taxpayers the benefit of the doubt and inquire into the reason for the mistake. If the taxpayer in question did not intend to cheat but simply made a mistake, he or she will most likely be offended by the disrespectful treatment of the tax authority. The feeling of being controlled in a negative way, and being suspected of tax cheating, tends to crowd out the intrinsic motivation to act as an honorable taxpayer and, as a consequence, tax morale will fall. In contrast, when the auditor makes an effort to locate the reason for the error by contacting the taxpayer in an informal way (e.g. by phoning him or her), the taxpayer will appreciate this respectful treatment and tax morale is upheld.

According to our empirical findings, the hypothesis that tax evasion is lower, the more fully the tax office observes formal and informal procedural rules, cannot be rejected. The observation of procedural rules is indicated by a distinction between benevolent treatments, for example a respectful procedure, and unfriendly treatment, like an authoritarian procedure or the tax authorities' direct deterrence with a fine. The friendly treatment has a stronger dampening effect on tax evasion, particularly in cantons using referendums and initiatives in political decision-making, while the authoritarian procedure, the threat of deterrence, is particularly reducing tax evasion in representative democracies, but counter-productive in direct democracy.

The hypothesis that tax evasion is lower, the more the individual citizens' rights and character are observed, cannot be rejected in general, but only for directly democratic cantons. If tax authorities think that mistakes in tax declarations are to the advantage of taxpayers and are therefore having a mistrust bias, tax evasion is lower in representative democracies, but higher in direct democracies. Since the mistrust bias is significantly lower in direct democracies, this result makes sense: if tax authorities in direct democratic cantons mistrust taxpayers, they have good reasons for it. The constitutional regime already signals the acknowledgment of individuals' rights and character. The tax authorities need not extend it beyond a reasonable caution towards taxpayers.

In addition, we are able to establish that the punishment of minor offenses has a smaller negative impact on tax evasion than the penalty in the case of tax fraud. Depending on the indicator, minimum, standard or maximum fines, the punishment of minor offenses does not have any significant effect on tax evasion, while the penalty for tax fraud does. In addition, expected fines, i.e. the product of punishment and intensity of control, only has a significant negative impact for the penalty of tax fraud and does not have one for any measure of fines. This evidence indicates that the punishment of minor offenses is of less importance, whereas it appears to increase tax morale when legal obligations are clearly indicated.

The evidence provided in this paper clearly indicates that the way tax authorities interact with taxpayers has an impact on the intrinsic motivation to pay taxes. A respectful treatment of taxpayers by the tax authorities and its interaction with institutional factors, such as direct democracy, contribute to the social capital of a jurisdiction. They create an environment in which it pays for citizens to follow their civic duty. It is not merely a matter of Swiss culture that tax evasion is relatively low, but a characteristic that can be attributed to the existence of a psychological tax contract between tax authorities and taxpayers.

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Appendix

Table A1: Data Description

Variable Name	*Description*	*Source*
Tax Evasion	The difference between adjusted household income reported in the tax authorities' statistics and gross household income on a national accounts' basis (in percent).	Own calculations and those of Pommerehne and Weck-Hannemann (1996) based on unpublished data of the Swiss Federal Tax Administration and on data by the Swiss Federal Statistical Office (personal correspondence).
Probability of Detection	Number of tax auditors as a percentage of the total number of taxpayers.	Own calculations and those of Pommerehne and Weck-Hannemann (1996) based on questionnaire data (Appendix A, Q. 22).
Fine for Tax Evasion	Standard legal fine as a multiple of the evaded tax amount (in percent).	Own calculations and those of Pommerehne and Weck-Hannemann (1996) based on questionnaire data (Appendix A, Q. 3).
Penalty for Tax Fraud	Maximum penalized lump sum in Sfr.	Own calculations and those of Pommerehne and Weck-Hannemann (1996) based on questionnaire data (Appendix A, Q. 8).
Marginal Tax Rate	Maximum marginal tax rate.	Swiss Federal Tax Administration and Pommerehne and Weck-Hannemann (1996).
Income per Capita	Gross effective primary income per capita (in 1'000 Sfr).	Swiss Federal Statistical Office (personal correspondence) and Pommerehne and Weck-Hannemann (1996).
Population	Cantonal population (in 1'000).	Swiss Federal Statistical Office.
Older Population	The percentage of people over 65 in the population.	Swiss Federal Statistical Office (personal correspondence) and Pommerehne and Weck-Hannemann (1996).
Tax Indexation	Dummy = 1 if there is an indexation to inflation, and 0 otherwise.	Own calculations and those of Pommerehne and Weck-Hannemann (1996) based on questionnaire data (Appendix A, Q. 37).
Index of Direct Democracy	Index designed to reflect the extent of direct democracy within a range between 1 (lowest) and 6 (highest degree).	Own calculations for an index proposed by Frey and Stutzer (2000) on the basis of Stutzer (1999).
Regional Dummy	Dummy = 1 for French and Italian speaking cantons, and 0 otherwise	Own calculations

Table A1 (cont.): Data Description

Variable Name	*Description*	*Source*
Typical Procedure if No Tax Declaration	Ordered variable = 0 if a reminder is sent and direct income assessment follows; 1 if a reminder followed by a penalty and an assessment by the tax authority; 2 if a direct income assessment by the authority without any other contact to taxpayers; 3 if there is a penalty and an official assessment without a reminder and without an attempt to check out the situation.	Own calculations based on questionnaire data (Appendix A, Q. 38).
Respectful Procedure	Dummy = 1 if 'normal' procedure by first calling a taxpayer on the phone, then sending a written reminder, and finally inviting the taxpayer to pay a visit to the tax administration; 0 otherwise.	Own calculations based on questionnaire data (Appendix A, Q. 39).
'Authoritarian' Procedure	Dummy= 1 if 'authoritarian' procedure by first inviting taxpayers directly to pay a visit to the tax administration and additionally threaten them with potential fines; 0 otherwise.	Own calculations based on questionnaire data (Appendix A, Q. 39).
Typical Procedure if No Reaction	Ordinal variable with the same coding as in the case of the typical procedure with non-declaration.	Own calculations based on questionnaire data (Appendix A, Q. 40).
Mistrust Bias	Ordinal variable = 1 if tax authorities believe mistakes are to the advantage, -1 to the disadvantage, 0 if neither to the advantage or disadvantage of taxpayers.	Own calculations based on questionnaire data (Appendix A, Q. 44).
Typical Reaction if Declared Taxable Income Too High	Dummy = 1 if the tax authority corrects income independently, and 0 otherwise.	Own calculations based on questionnaire data (Appendix A, Q. 41).
Difference in Treatment Depending on Type of Mistake	Dummy = 1 if the treatment of taxpayers differs according to whether mistakes are formally wrong or possibilities for legal tax avoidance are not used, and 0 otherwise.	Own calculations based on questionnaire data (Appendix A, Q. 42).
Investigation of Intentions of Taxpayers	Dummy = 1 if the tax authority attempts to find out whether taxpayers declare too low a taxable income intentionally or mistakenly, and 0 otherwise.	Own calculations based on questionnaire data (Appendix A, Q. 43).
Indication of Relationship between Government Services and Tax Payment	Dummy = 1 if it is mentioned in the information on the tax declaration that taxes are needed to finance government services, 0 otherwise.	Own calculations based on questionnaire data (Appendix A, Q. 20).

Table A2: Descriptive Statistics

Variable	*Mean*	*Median*	*Maximum*	*Minimum*	*Std Dev.*
Tax Evasion (in %)	23.48	24.54	43.27	0.76	9.27
Probability of Detection (in %)	55.23	44.99	188.98	3.14	35.61
Fine for Tax Evasion(in %)	96.97	100.00	200.00	0.00	36.82

Penalty for Tax Fraud	23601.56	22500.00	50000.00	0.00	14861.75
Marginal Tax Rate (in %)	24.35	23.60	34.80	12.90	5.19
Income (in 1000 Sfr per Capita)	25.32	25.86	47.96	8.41	10.48
Population (in 1000)	256.06	192.12	1175.46	12.77	271.31
Older Population (in %)	18.96	18.90	26.82	12.30	2.74
Tax Indexation	0.50	0.50	1.00	0.00	0.50
Index of Direct Democracy	4.05	4.17	6.00	1.67	1.26
Dummy for French and Italian Speaking Cantons	0.26	0.00	1.00	0.00	0.44
Typical Procedure if No Tax Declaration	1.69	2.00	3.00	0.00	0.67
Respectful Procedure	0.55	1.00	1.00	0.00	0.50
'Authoritarian' Procedure	0.30	0.00	1.00	0.00	0.46
Typical Procedure if No Reaction	1.76	2.00	3.00	1.00	0.58
Mistrust Bias	0.47	1.00	1.00	-1.00	0.70
Typical Reaction if Declared Taxable Income Too High	0.96	1.00	1.00	0.00	0.19
Difference in Treatment Depending on Type of Mistake	0.26	0.00	1.00	0.00	0.44
Investigation of Intentions of Taxpayers	0.92	1.00	1.00	0.00	0.27
Indication of Relationship between Government Services and Tax Payment	0.23	0.00	1.00	0.00	0.43

Note: For a detailed description of the variables, see Appendix B. All statistics are computed for 128 observations.