XIII CONFERENZA

STATO O MERCATO?
Intervento pubblico e architettura dei mercati
Pavia, Università, 5 - 6 ottobre 2001

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DISCRETION IN TAX ENFORCEMENT

pubblicazione internet realizzata con contributo della COMPAGNIA di San Paolo

Società italiana di economia pubblica

Dipartimento di economia pubblica e territoriale – Università di Pavia

Discretion in tax enforcement

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Preliminary version,
Riunione SIEP, 6 ottobre 2001, Pavia

Abstract

This paper contrasts the standard criticism to discretion in (tax) enforcement by considering the case where the agency has access to unverifiable information concerning the merit of individual cases. By "unverifiable information" we mean all kinds of evidence available to the agency that cannot be used to prove taxpayers' position in court (non-judicial evidence). Needless to say, the borderline between judicially relevant and judicially irrelevant evidence is a often a blurred one. However, for analytical purposes we assume that this line is clearly marked: the former kind of evidence impacts adjudication, the latter defines officers' "professional judgement."

In the model, taxpayers' report their liability, which can either be "high" or "low". The tax agency picks out taxpayers for examination (possibly on the basis of a signal). Prior to adjudication, the two parties engage in a settlement negotiation. The bargaining power (i.e. the faculty to make a take-it-or-leave-it offer) is randomly allocated to one of the parties. The agency's stance is guided by a (second) signal providing unverifiable information. If the case is not settled, the case is deferred to a perfect tax court. We fully solve the game and show how the unverifiable signal reduces the probability of (wasteful) adjudication in conjunction with the allocation of the bargaining power. We prove that discretionary settlements allow the agency to net the greatest benefit from the signal.

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†I am gratefult to the participats to the IIPF Conference in Linz for helpful comments. Comments welcome.

This model shows that officers' "professional judgement" serves a fundamental role in tax enforcement, and that "discretion" entails hitherto unexplored advantages.

JEL Nos: K26, H42 .

Keywords: discretion, settlement, tax enforcement.

1 Introduction

Regulatory discretion has many facets. This paper focuses on one of the most important ones, and namely the faculty of agencies to use their "judgement" to make decisions. We concentrate on the tax agency (TA) and its ability to use unverifiable information to settle individual cases. The term "unverifiable information" should be broadly understood to encompass any kind of idiosyncratic information affecting inspectors' professional judgement, but not admitted in court. Needless to say, the borderline between legally admissible and inadmissible evidence is a often a blurred one. Yet, this distinction serves a major role in the legal system and is the subject of lengthy regulations.[1] In fact, there is much more to professional judgement than the access to inadmissible evidence. IRS officers' evaluation of cases is pegged to their capacity to discern the strong from the weak case, on the basis of a comprehensive assessment of taxpayers' position and the likely chances of favorable adjudication. We define as "unverifiable information" all evidence available to the expert inspector on top of legal (documentary) evidence, and building his/her belief about the merits of the case.

This paper investigates the impact of professional judgement on the performance of the enforcement system. We concentrate on the case where inspectors' assessment is the result of the scrutiny of individual files, after cases a selected for examination and prior to settlement. Inspectors' professional judgement will thus dictate the agency stance in the settlement process, and their ability to dispose of cases in a cost-effective way.

[1] The IRS handbook, for instance, clearly states which audit methods are permitted. The Federal Rules of Evidence circumscribe the kind of evidence admitted in court.

Our aim is twofold: first, we want to extend the current literature and develop model of tax enforcement including the possibility of settlement and providing scope for professional judgement; second, we use the results to evaluate whether "discretion" is socially desirable.

The latter problem has many ramifications. One basic issue is whether enforcers should be allowed to engage into settlement negotiations with indicted individuals. This is a complex problem, that has received considerable attention in the literature.[2] The likely reduction in adjudication costs resulting from settlements has to be contrasted with the reduction in the effective penalty for noncompliers. Here, the allocation of the bargaining power between the parties can make a difference. A possible concern is that settlement negotiations carried out by a "weak" agency may ultimately undermine the deterrent effect of the enforcement process and foster noncompliance ("**penalty discount effect**").[3]

A related concern relates to the "**loss of strategic leadership**" associated with discretionary disposition of cases. It is known that policies based on a strict definition of the enforcement procedure ("rules") outperform enforcement policies dictated by the agency (short term) revenue objectives ("discretion")[4]. In fact, rules can be better used to guide taxpayers behavior ex ante, whereas discretion inevitably leads the agency to respond ex post to taxpayers' decisions, thereby yielding a loss in strategic leadership (i.e. the loss of the first mover advantage). When unverifiable information becomes available, the situation may revert. Discretion allows the agency to bene-

[2] See Duaghety (1998) for an excellent survey of the literature on settlements and pretrial bargaining.

[3] A subtler issue is whether the settlement procedure should allow similar cases to be treated in a different way. In a classic paper, Reinganum (1989) shows that discretion may have undesirable consequences as the prosecutor's offer may reveal the strength of the case to the defendant. In this paper, we take an alternative view and consider the case where the private information available to the enforcer, though defining her convictions about the merits of the case, is of no use to the indicted to anticipate the outcome of the trial. In fact, we assume that taxpayers can anticipate with certainty the decision of the tax court when the IRS challenge their position. But even if this decision were open to errors, the unverifiable information available to the enforcer would be of no use to predict the outcome of the trial. By assumption, unverifiable information has no impact on the judicial decision.

[4] See the classic article by Kydland and Prescott (1977).

fits ex post from officers' professional judgement. Thus, from a general viewpoint, the cost of discretion (loss of leadership) has to be pitted against its benefits (fine tuned/idiosyncratic administration).

In the model, taxpayers report their liability, which can either be "high" or "low." The tax agency picks out taxpayers for examination. Unverifiable information about the merits of the case becomes available and a settlement negotiation takes place. The bargaining power (i.e. the faculty of making a take-it-or-leave-it offer) is randomly allocated to one of the parties. If the no agrement is reached, the case is deferred to a perfect tax court.[5]

We fully solve the game and show how the net revenue to the TA is affected by the precision of the information available to the TA and the allocation of the bargaining power between the parties. At the equilibrium, a fraction of high liability taxpayers reporting a low liability are selected for examination; depending on the allocation of the bargaining power, they end up paying a higher or lower settlement amount. In some cases, negotiation fails and the case is decided in court.

It turns our that unverifiable information displays the greatest efficacy when the TA is allowed to engage in a settlement negotiation (even if they have no bargaining power). Although settlements reduce noncompliers' expected penalty, they effectively increase the net expected yield per file to the TA and make them more aggressive. Thus, the overall impact of the settlement procedure is positive and the concern about "penalty discount" is unwarranted.

Finally, we compare the performance of the discretionary policy with an audit policy where the TA proceed mechanically and audit a fixed fraction of taxpayers (full commitment). We show that the discretionary policy can outperform the full commitment policy when the unverifiable information available the TA is sufficiently precise and the bargaining power is allocated the TA. We thus provide a justification

[5] "The courts are the apex of the controversy resolution structure within the IRS, which is very much geared to settlement if at all possible. Thus, settlement is a primary function of the Appeals Offices, and Appeals settles close to 90% of the cases it considers." (US Dep. Just. 2000). Over 80% of cases ending in Tax Courts are deemed to settle without ever seeing a judge (Daily 1999).

to the discretionary practices currently adopted by most TAs.

This paper builds on the contributions of many authors. Graetz, Reinganum and Wilde (1986) classic article provides the first analysis of the TA as a strategic actor. This model extends their analysis to include the possibility of a negotiated settlement and the use of unverifiable information. Settlement models like ours are commonly employed in the literature on pre-trial bargaining (see Daughety 1998), but with no accounting for unverifiable information .

Full fledged models of tax enforcement with settlement can also be found in Chu (1990) and Franzoni (2000). The first considers the case where the settlement amount if fixed in advance, the latter assumes that the audit rate is fixed in advance. In the present model, both the settlement amount and the examination rate are endogenously determined. In Franzoni (2000), I prove that settlements may improve the ex-ante payoff to the TA when the enforcement system presents "inefficiencies" like an excessive tax differential and an unrefunded defence cost to honest taxpayers. If these inefficiencies can be directly fixed, settlements lose their desirability. In the present model, settlements allow the TA to better exploit the unverifiable information they have access to, thereby providing a definite role to discretion in enforcement.

Finally, Scotchmer (1990) and Macho Stadler (2000) develop models of auditing with signals, where the TA can commit itself to the optimal audit policy and signals are used to pick out taxpayers for auditing. The first author focuses on signals based on taxpayers' observable features, the latter on generic random signals. They prove that signals can greatly improve the enforcement policy and the vertical equity of the tax system.

Section 2 introduces the model, while Sections 2.1 and 2.2 solve the settlement game for the case where the taxpayer and the TA, respectively, have the bargaining power. In Section 3, the model is closed with the analysis of the examination policy of the TA and the compliance decision of the taxpayer. Section 4 assesses the impact of discretion in enforcement; Section 5 concludes.

2 The model

In this model, true liability of taxpayers is their private information. To simplify, we assume that taxpayers' liability is either "high" or "low". The ex-ante probability that each taxpayer's liability is high is denoted by q. Taxpayers may report a "high" liability or a "low" liability, possibly understating taxable income, overstating expenses or claiming undue deductions. Clearly, low liability taxpayers have no incentive to report "high," whereas high liability taxpayers decide what to report on the basis of the expected costs and benefits. If they report correctly, they pay their tax T in full; if they underreport, they save the tax T, but face the risk of being selected for examination and sanctioned. If their real liability is ascertained, they are liable for an additional payment f, including taxes and penalties due.

A fraction a of taxpayers reporting a low liability are selected for examination. For the time being, we assume that this selection process is purely random (see the Appendix). The TA examine selected taxpayers' files and acquire taxpayer-specific unverifiable information.[6] Without loss of generality, this information is condensed in a signal, which may either be "Red" or "Green." A Red signal suggests that the taxpayers is actually noncompliant and that the case has merit. Conversely, a Green signal is indicative of compliance. The precision of the signal is measured by the parameter $\sigma \in [1/2, 1]$, where $\sigma = \Pr(RED \mid noncompliance) = \Pr(GREEN \mid noncompliance)$. When $\sigma = 1/2$, the signal is non informative; when $\sigma = 1$, it is perfectly informative.

Let μ^R define the TA's belief of prevailing in court given a "low" report and a Red signal, and μ^G the belief of prevailing in court given a "low" report a Green signal, with $\mu^R \geq \mu^G$. Given the belief that a taxpayer reporting a low liability is noncompliant, μ, we have $\mu^R = \frac{\sigma\mu}{\sigma\mu+(1-\sigma)(1-\mu)}$ and $\mu^G = \frac{(1-\sigma)\mu}{(1-\sigma)\mu+\sigma(1-\mu)}$.

[6] A more complex model would entail the possibility that the TA finds both "hard" (i.e. verifiable) and "soft" (i.e. unverifiable) evidence upon examination. This would not significantly alter the qualitative results of the paper.

Note that the use of unverifiable "loose" evidence does not damage honest taxpayers: they can always skip the settlement process and apply for a fair trial. This would not hold true if unverifiable evidence were used in trial.

After the signal has been gleaned, a negotiation takes place between the TA and the taxpayer, with the former aiming at the maximization of net revenue (from settlement or adjudication), and the latter aiming at the minimization of expected payment. If no agreement is reached, the case is deferred to a (perfect) tax court. Noncompliers are liable for the amount f and foot their own defense costs; honest taxpayers are found not liable and are refunded their defense costs[7].

In the settlement stage, bargaining power is randomly allocated. With probability π all bargaining power rests in the hands of the taxpayer (Section 2.1); with the complementary probability it rests in the hands of the TA (Section 2.2).

2.1 Taxpayer has bargaining power

Let us consider the settlement stage. The taxpayer has all the bargaining power and makes a take-it-or-leave-it settlement offer to the TA. If the offer is rejected, the case is adjudicated.

The equilibrium strategies define the amount offered both by compliant and non-compliant taxpayers, the beliefs hold by the TA upon observing any particular offer, and the rejection probabilities.

Under the assumption that the signal is sufficiently informative [i.e. $\sigma > (f - c)/(f + d)$] and that the noncompliance probability is not too low [i.e. $\mu^R f - c - \left(1 - \mu^R\right) d > 0$, that is $\mu > \frac{(1-\sigma)(c+d)}{(1-\sigma)(c+d)+\sigma(f-c)}$], the unique equilibrium satisfying the divinity requirement is as described below (proof and unrestricted case in the appendix).[8]

Proposition 1 *Suppose that the bargaining power is assigned to the taxpayer. At the divine equilibrium, noncompliers offer* $Q^{tp} = f - c$ *with probability* $1 - \tau$, *and* $Q^{tp} = 0$ *with probability* $\tau = \frac{1-\mu}{\mu}\frac{1-\sigma}{\sigma}\frac{c+d}{f-c}$. *Compliers offer* $Q^{tp} = 0$ *with certainty. The TA believes any offer with* $Q^{tp} > 0$ *to be made by noncompliers. Independently of the*

[7] This assumption is largely in line with the US practice. The 1998 Tax Code Reform imposes a rule awarding litigation and administrative costs to taxpayers when the amount recovered in court is less than the amount offered by taxpayer in the settlement stage and turned down by the IRS.

[8] Unicity through Divinity was first derived by Reinganum and Wilde (1986).

signal observed, the TA accepts with certainty any offer with $Q^{tp} = f - c$, *and rejects with certainty any offer with* $Q^{tp} \in (0,\, f - c)$. *Offers with* $Q^{tp} = 0$ *are rejected with probability* $\rho^R = \frac{f-c}{\sigma(f+d)}$ *if the signal is RED.*

At the equilibrium, noncompliers either take an "aggressive" or a "give-in" stance: under the "aggressive" stance, they pretend to be compliant and offer zero; under the "give-in" stance they offer the smallest amount bound to be accepted. In turn, the TA's reply depends on the signal received: if it is Green, then any offer is accepted. If it is Red, then only offers with $Q^{tp} = f - c$ are accepted for sure. Offers with $Q^{tp} \in (0,\, f - c)$ are rejected (as they come from noncompliers), while offers with $Q^{tp} = 0$ are accepted with positive probability (as they come both from compliant and noncompliant taxpayers).

Unless all uncertainty is resolved, there is a chance that the case is deferred to the tax court. This chance is smaller if the signal is more informative. In fact, the probability that the negotiation fails and the case is adjudicated is

$$\Pr(adj)^{tp} = [\mu\sigma\tau + (1-\mu)(1-\sigma)]\,\rho^R = (1-\mu)\,\frac{1-\sigma}{\sigma}, \tag{1}$$

where the apex "*tp*" reminds us that the bargaining power is assigned to the taxpayer.

At the equilibrium, the expected payment for noncompliers is $f - c$; the expected payment for compliers is zero.

The expected revenue to the TA is

$$R^{RED} = \mu^R(1-\tau)(f-c) = \mu^R f - c - \left(1-\mu^R\right)d, \qquad \text{when the signal is RED,}$$

$$R^{GREEN} = \mu^G(1-\tau)(f-c) = \mu^G\,\frac{\mu^R f - c - \left(1-\mu^R\right)d}{\mu^R}, \quad \text{when the signal is GREEN.}$$

Prior to the observation of the signal, the expected revenue is thus

$$\begin{aligned} R^{tp} &= [\mu\sigma + (1-\mu)(1-\sigma)]\,R^{RED} + [\mu(1-\sigma) + (1-\mu)\sigma]\,R^{GREEN} = \\ &= \mu(f-c) - (1-\mu)\,\frac{1-\sigma}{\sigma}\,(c+d), \end{aligned}$$

which is clearly increasing in σ.

For $\sigma \to 1$, we have $R^{tp} = \mu(f-c)$; for $\sigma \to 1/2$, we have $R^{tp} = \mu(f+d) - (c+d)$.

2.2 TA has the bargaining power

What if the bargaining power rests in the hands of the TA?

The amount demanded by the TA will (optimally) either be $Q^{TA} = f + d$ (the highest amount noncompliers are willing to pay to avoid adjudication) or $Q^{TA} = 0$ (the highest amount compliers are willing to pay to avoid adjudication).

The net intake for the TA when it demands $Q^{TA} = f + d$ and has observed RED is:

$$R\left(Q^{TA} = f \mid RED\right) = \mu^R (f + d) - \left(1 - \mu^R\right)(c + d).$$

Thus the optimal amount is $Q^{TA} = f + d$ only if $\mu^R \geq \frac{c+d}{(f+c)+(c+d)}$.

Similarly, given a GREEN signal, the optimal amount is $f + d$ only if $\mu^G \geq \frac{c+d}{(f+c)+(c+d)}$.

Proposition 2 *Suppose that the bargaining power is assigned to the TA. The amount demanded by the TA upon observation of the RED signal is* $Q^{TA} = f + d$ *if* $\mu > \frac{(1-\sigma)(c+d)}{\sigma(f+d)+(1-\sigma)(c+d)}$, *and* $Q^{TA} = 0$ *otherwise. The amount demanded by the TA upon observation of the GREEN signal is* $Q^{TA} = f + d$ *if* $\mu > \frac{\sigma(c+d)}{(1-\sigma)(f+d)+\sigma(c+d)}$, *and* $Q^{TA} = 0$ *otherwise.*

At the equilibrium, the TA either takes an "aggressive" or a "give-in" stance: under the aggressive strategy it demands the highest amount that a noncomplier is willing to pay to avoid adjudication; under the give-in strategy, the TA demands zero and effectively drops the case. Noncompliant taxpayers accept any offer; compliant taxpayers accept only offers with $Q = 0$. The TA adopt the aggressive strategy when they are convinced that they have good chances of prevailing in court, and this is most likely to occur when the signal is Red.

Let $\bar{\sigma}^R(\mu)$ be the precision level that triggers a zero settlement offer by the TA upon observation of a RED signal. In other words, if $\sigma > \bar{\sigma}^R(\mu)$, the red TA is confident of facing a noncompliant taxpayer and takes a strong stance.

We have

$$\mu^R \geq \frac{c+d}{(f+c)+(c+d)} \Leftrightarrow \sigma \geq \bar{\sigma}^R(\mu) \equiv \frac{(1-\mu)(c+d)}{\mu(f+d)+(1-\mu)(c+d)}.$$

Similarly, we have

$$\begin{aligned} \mu^G &\geq \frac{c+d}{(f+c)+(c+d)} \Leftrightarrow \\ \sigma &\leq \bar{\sigma}^G(\mu) \equiv \frac{\mu(f+d)}{\mu(f+d)+(1-\mu)(c+d)} = 1-\bar{\sigma}^R(\mu). \end{aligned}$$

Thus, $\bar{\sigma}^R(\mu) > 1/2$ if, and only if, $\bar{\sigma}^G(\mu) < 1/2$. This implies that the case cannot arise, where the TA are tough upon observing Green and weak upon observing Red.[9]

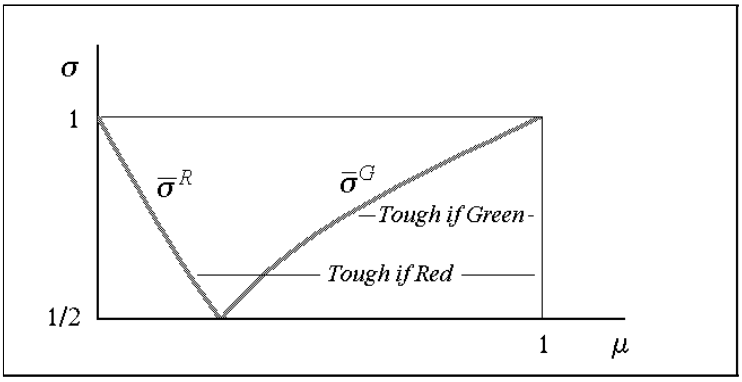

Figure 1:

Given any precision level $\sigma \geq 1/2$, let μ^{TA-R} and μ^{TA-G} be the probabilities of prevailing in court that trigger a tough stance on the TA' side, i.e. $\mu^{TA-R} \equiv \frac{(1-\sigma)c}{(1-\sigma)c+\sigma(f+d)}$, $\mu^{TA-G} \equiv \frac{\sigma c}{(1-\sigma)(f+d)+\sigma c}$.

Prior to the observation of the signal the expected revenue is

$$R^{TA}(\mu) = \begin{cases} 0 & \text{if} \quad \mu < \mu^{TA-R} \\ \sigma\mu(f+d) - (1-\sigma)(1-\mu)(c+d) \equiv R^{TA-R}(\mu) & \text{if} \quad \mu^{TA-R} < \mu < \mu^{TA-G} \\ \mu(f+d) - (1-\mu)(c+d) \equiv R^{TA-G}(\mu) & \text{if} \quad \mu^{TA-G} < \mu, \end{cases}$$

which is weakly increasing in σ.

[9] This would require $\sigma < \bar{\sigma}^G(\mu) < \bar{\sigma}^R(\mu)$, that is $\bar{\sigma}^R(\mu) > 1/2$ and $\sigma < \bar{\sigma}^G(\mu) < 1/2$.

For $\sigma \to 1$, we have $R^{TA} = \mu(f+d)$ [as $\mu^{TA-R} \to 0$, $\mu^{TA-G} \to 1$]; for $\sigma \to 1/2$, we have $R^{TA} = \mu(f+d) - (1-\mu)(c+d)$ [as $\mu^{TA-R} \to \mu^{TA-G}$]]

At the equilibrium, the expected payment of noncompliant taxpayers is

$$\textit{Noncompliers' exp. payment} = \begin{cases} 0 & \text{if} \quad \mu < \mu^{TA-R}, \\ \sigma(f+d) & \text{if} \quad \mu^{TA-R} < \mu < \mu^{TA-G}, \\ f+d & \text{if} \quad \mu^{TA-G} < \mu. \end{cases}$$

The probability of a negotiation failure is

$$\Pr(adj)^{TA} = \begin{cases} 0 & \text{if} \quad \mu < \mu^{TA-R}, \\ (1-\mu)(1-\sigma) & \text{if} \quad \mu^{TA-R} < \mu < \mu^{TA-G}, \\ (1-\mu) & \text{if} \quad \mu^{TA-G} < \mu. \end{cases}$$

Figure 2 shows the probability of negotiation failure (i.e. adjudication) when the bargaining party is assigned to any of the two parties.

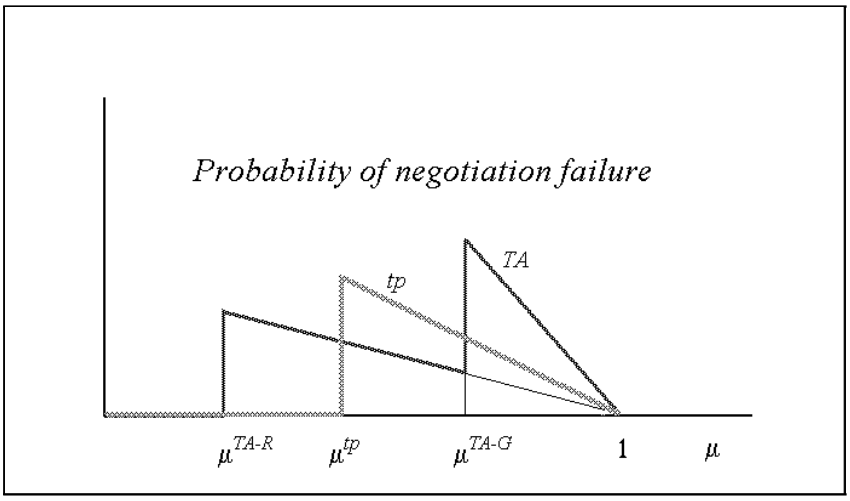

Figure 2:

It is interesting to note that assigning the bargaining power to any specific party will not unambiguously decrease the probability of a negotiation failure. In contrast, when the signal is not informative ($\sigma = 1/2$), negotiation is definitely more likely to fail when the TA has bargaining power (as $\mu^{TA-G} \to \mu^{TA-R} < \mu^{tp}$).[10] When the

[10] This applies to general pre-trial bargaining models. See Daughety (1998).

signal is informative, it impacts the negotiation outcome in a complex way, which is highly dependent on the allocation of the bargaining power.

Figure 3 depicts the net revenue as a function of the noncompliance probability μ.

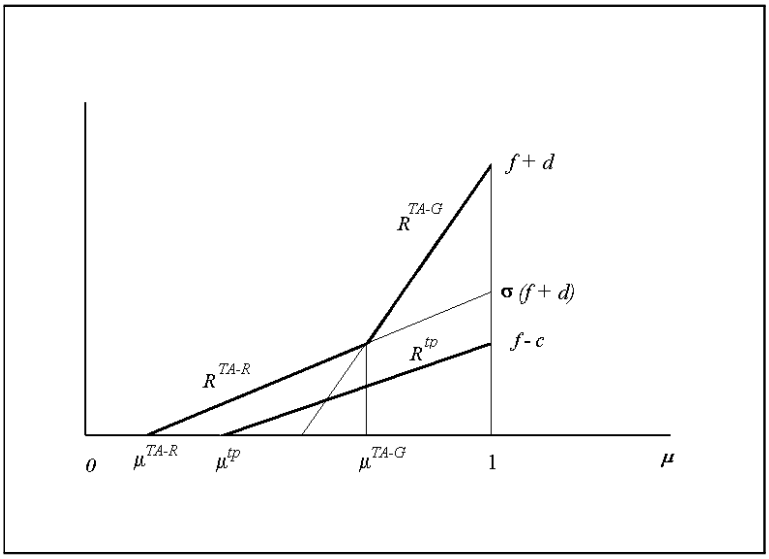

Figure 3:

Let π be the probability that the TA is assigned the bargaining power. Supposing that $\mu^{tp} < \mu^{TA-G}$, we have

$$R(\mu) = \begin{cases} 0 & \text{if} \quad \mu < \mu^{TA-R}, \\ \pi R^{TA-R} & \text{if} \quad \mu^{TA-R} < \mu < \mu^{tp}, \\ \pi R^{TA-R} + (1-\pi) R^{tp} & \text{if} \quad \mu^{tp} < \mu < \mu^{TA-G}, \\ \pi R^{TA-G} + (1-\pi) R^{tp} & \text{if} \quad \mu^{TA-G} < \mu. \end{cases} \tag{2}$$

In turn, noncompliers' expected payment is

$$p(\mu) = \begin{cases} 0 & \text{if} \quad \mu < \mu^{TA-R}, \\ \pi\sigma(f+d) & \text{if} \quad \mu^{TA-R} < \mu < \mu^{tp}, \\ \pi\sigma(f+d) + (1-\pi)(f-c) & \text{if} \quad \mu^{tp} < \mu < \mu^{TA-G}, \\ \pi(f+d) + (1-\pi)(f-c) & \text{if} \quad \mu^{TA-G} < \mu, \end{cases} \tag{3}$$

which is stepwise increasing in μ. See Figure 4.

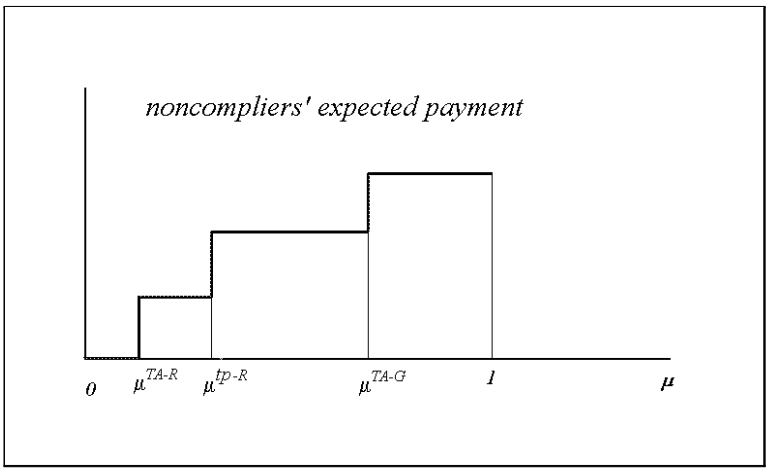

Figure 4:

3 Examination

Let us now consider the TA's problem at the selection stage.

For each file, the TA compares the net revenue it can get to the relevant costs. These include all costs associated with filing and handling the case (and acquiring specific information). The overall filing cost for each case is denoted by s.

Let a be the probability that the taxpayer is selected for examination. The optimal selection policy is

$$a = \begin{cases} 0 & \text{if } R(\mu) < s, \\ \in [0,1] & \text{if } R(\mu) = s, \\ 1 & \text{if } R(\mu) > s, \end{cases}$$

where $R(\mu)$ denotes the expected net revenue at the settlement stage (see eq. 2)

At the other end of the table, we have the taxpayers, who have to decide whether to report their liability correctly or incorrectly.

The expected payment of a high liability taxpayer who decides to underreport is equal to $ap(\mu)$, i.e. the expected payment upon selection (see eq. 3) scaled down by the probability of examination. Thus, high-liability taxpayers decide to underreport only if $T \geq ap(\mu)$. Let β be the probability that a high-liability taxpayer underreports.

In order to characterize the equilibrium, we start with a simple remark. Given

our assumptions, we can both exclude that $a^* = 0$ and $\beta^* = 1$. If $a = 0$, then high income taxpayers would choose not to comply with probability one: the net revenue form the settlement stage would be very large and a should not be set to zero (this is true as far as $qf > d + c$) . Similarly, if $\beta = 1$, the TA would extract a large amount at the settlement stage and noncompliance would not be a profitable strategy.

The equilibrium values will depend on the configuration of the parameters.[11]

Proposition 3 *Let $\bar{\mu}$ be such that $R(\bar{\mu}) = s$.*

1. Let $\bar{\mu} > \mu^{tp}$. At the equilibrium we have $\mu^* = \bar{\mu}$ and $a^* p(\bar{\mu}) = T$: high income taxpayers are noncompliant with probability $\beta^* = \frac{\mu^*}{1-\mu^*}\frac{1-q}{q}$ and they are selected for examination with probability $a^* = T/p(\bar{\mu})$. Upon selection, the settlement stage proceeds as described in Propositions 1 and 2, respectively, depending on whether the bargaining power is allocated to the taxpayer or the TA.

2. Let $\bar{\mu} < \mu^{tp}$.

If $p(\bar{\mu}) = \pi\sigma(f + d) > T$, then at the equilibrium, we have $\mu^* = \bar{\mu}$ and $a^* p(\bar{\mu}) = T$ as before. If $p(\bar{\mu}) = \pi\sigma(f + d) < T$, then at the equilibrium, we have $\mu^* = \mu^{tp}$, $a^* = 1$ and $p(\mu^{tp}) = T$. In other words, high income taxpayers are noncompliant with probability $\beta^* = \frac{\mu^*}{1-\mu^*}\frac{1-q}{q}$ and they are all selected for examination. When the bargaining power is allocated to the taxpayer, all taxpayers offer $Q = 0$. The TA accepts the offer if the signal is Green, while it accepts the offer with probability $1 - \frac{T}{\sigma(f+d)}$ if the signal is Red. When the bargaining power is allocated to the TA, the settlement stage proceeds as described in Propositions 2 (demand $Q = f + d$ if Red signal, demand 0 if Green signal).

If the intake obtained by the TA from the examination is sufficiently high (case 1), the equilibrium strategy entails underreporting with probability β^* by high-liability taxpayers. A fraction a^* of taxpayers reporting a low liability are selected for examination. The negotiation outcome depends on the allocation of the bargaining power:

[11] Note: for $\bar{\mu} > \mu^{tp}$, we have $p(\bar{\mu}) \geq \pi\sigma(f + d) + (1 - \pi)(f - c) \geq f - c$ since $\sigma \geq \frac{f-c}{f+d}$. Thus, $p(\bar{\mu}) \geq T$ as far as $f - c > T$.

if the bargaining power is assigned to the TA, taxpayers will face a higher expected payment.

Case 2 is close to Case 1, apart from the possibility that *all* taxpayers reporting a low liability are selected for examination (when the expected payments associated with the audit process are particularly low).

In the following, we will concentrate on Case 1 ($\bar{\mu} > \mu^{tp}$).

Let us now consider the net tax and penalty intake to the TA

$$\Omega^* = q\left(1-\beta^*\right)T + \left[1-q+q\beta^*\right]\, a^* \underbrace{\left[R\left(\mu^*\right)-s\right]}_{0} = \frac{q-\mu^*}{1-\mu^*}T,$$

which is clearly decreasing in μ^*.

Recall that at the equilibrium, $R\left(\mu^*\right) = s$. Since $\frac{\partial R(\mu)}{\partial \sigma} > 0$, $\frac{\partial R(\mu)}{\partial \pi} > 0$, $\frac{\partial R(\mu)}{\partial f} > 0$ and $\frac{\partial R(\mu)}{\partial c} < 0$, we must have $\frac{\partial \mu^*}{\partial \sigma} < 0$, $\frac{\partial \mu^*}{\partial \pi} < 0$, $\frac{\partial \mu^*}{\partial f} < 0$ and $\frac{\partial \mu^*}{\partial c} > 0$. Thus

Remark 1 *The net tax revenue is larger when the penalty for misreporting is higher, the TA has more bargaining power, the signal available to the TA is more precise, adjudication costs for the TA are lower, and the defense cost for the taxpayer is lower (the latter, only if the noncompliance rate is relatively high*[12]*.)*

4 Discretion?

In this section, we want to investigate the impact of "discretion" on the enforcement process. In particular, we want to determine under which conditions discretionary settlements have a positive impact on the enforcement system.

One could think of at least two reasons why discretionary settlements may be undesirable. We consider them in turn.

■ *Penalty discount.* First, settlements endow the taxpayer with bargaining power, thus providing leeway for large "discounts" at the negotiation stage. This may

[12] The defence cost acts as a supplement to the sanction with respect to noncompliers, and as an increase in enforcement costs with respect to compliers. The first aspect fosters compliance, the latter noncompliance.

ultimately boost noncompliance and/or weaken enforcer's incentives.[13]

In the present model, this concern is not warranted. Even if the negotiated penalty is effectively lower than the stipulated one (see Fig. 5a) , the *expected* penalty for noncompliance, $a^*p^*(\mu^*)$, remains unchanged: the TA saves on enforcement costs and affords to examine a larger fraction of taxpayers.

Let us compare the net revenue (per examination) in the case where the TA can settle the case and has no bargaining power, R^{tp}, with the case where settlements are not allowed, R^{NS} :

$$R^{tp} - R^{NS} =$$
$$= \begin{cases} 0 & \text{for } \mu < \mu^{tp} \\ \frac{1-\sigma}{\sigma}\left[\mu\sigma\left(f-c\right) - \left(1-\mu\right)\left(1-\sigma\right)\left(c+d\right)\right] & \text{for } \mu^{tp} \leq \mu < \mu^{NS-G} \\ \left(1-\mu\right)\left(c+d\right)\frac{2\sigma-1}{\sigma} & \text{for } \mu^{NS-G} \leq \mu, \end{cases}$$

where $\mu^{NS-G} = \frac{\sigma(c+d)}{(1-\sigma)(f-c)+\sigma(c+d)}$ is the noncompliance level that induces the TA not to drop the case upon observation of a Green signal (when settlements are not allowed). See Fig. 5b.

Note that the settlement negotiation does not increase the net revenue to the TA if the signal is not informative (for $\sigma \to 1/2$,we have $\mu^{NS-G} \to \mu^{tp}$and $R^{tp} = R^{NS}$).

For $\sigma > 1/2$,the increase in the net revenue associated to each examination makes the TA more aggressive and induces a lower noncompliant rate.

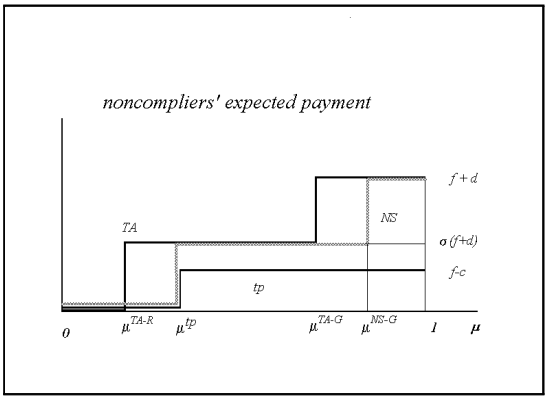

Fig. 5a

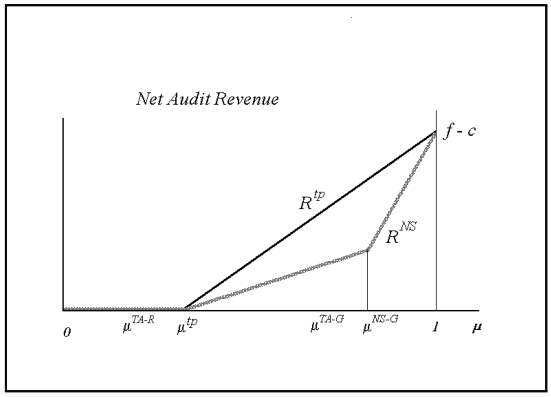

Fig. 5b

Thus,

[13]This first argument is advanced, with respect to settlements in civil liability cases, by Polinsky and Rubinfeld (1988). The latter is advanced by myself in a general law enforcement model (Franzoni 1999).

Proposition 4 *Settlements reduce the expected payment of noncompliers selected for examination and curtail enforcement costs. The latter effect allows the TA to implement a tougher audit policy, reduce the noncompliance rate and increase net tax revenue.*

In view of Remark 1, the beneficial impact of the settlement stage is greater when the TA has more bargaining power.

Note that if $\sigma = 1/2$, the settlement stage does not provide any benefit to the TA ($\mu^{NS-G} \to \mu^{tp}$). Thus,

Remark 2 *Settlements are desirable if, and only if, the TA has access to unverifiable information or it is endowed with some bargaining power.*

■ *Loss of strategic leadership.* The second reason why discretion may result undesirable is because it undermines TA's ability to commit to specific audit policies. In other words, an enforcement process not bridled with strict rules cannot be used to guide (ex-ante) taxpayers' behavior: taxpayers know that the TA has an incentive to deviate ex post from the policy announced ex-ante (Graetz, Reinganum, and Wilde 1986). Yet, only discretion allows the TA to benefit from officers' professional judgement. One then has to contrast the strategic costs of discretion (**loss of leadership**) with its advantages (**professional judgement**).

Let us consider the net tax revenue under a policy of perfect leadership (full commitment). Here audits are used as a pure threat: all taxpayers comply and settlements are ruled out. We have $\hat{a} = \frac{\Delta T}{f+d}$ and

$$\Omega^{\text{full comm.}} = qT - (1-q)(c+s+d)\hat{a} = qT - (1-q)(c+s+d)\frac{T}{f+d}.$$

Simple calculations show that $\Omega^*_{\sigma \to 1/2} < \Omega^{\text{full comm.}}$. Thus, Ω^* can be greater that $\Omega^{\text{full comm.}}$ only if σ and π are large.

Take the extreme case where discretion displays its greatest efficacy, i.e. where the unverifiable signal is perfectly informative. With $\sigma \to 1$, we have $R(\mu)_{\sigma \to 1} = \mu f + \pi \mu d - (1-\pi)\mu c$, $\mu^*_{\sigma \to 1} = \frac{s}{f + \pi d - (1-\pi)c}$, and

$$\Omega^*_{\sigma\to 1} = \frac{q\left(f+\pi d-(1-\pi)\,c\right)-s}{f+\pi d-(1-\pi)\,c-s}T.$$

Note that $\Omega^*_{\sigma\to 1}$ converges to the First Best only if $s \to 0$.

We have

$$\begin{aligned}\Omega^*_{\sigma\to 1} &> \Omega^{\text{full comm.}} \Leftrightarrow \\ &\Leftrightarrow \pi > \bar{\pi} = \frac{s\,(1-q)\,(c+s+d)-q\,(f+d)\,(s-c)}{d\,(1-q)\,(c+s+d)+qc\,(f+d)},\end{aligned}$$

where $\bar{\pi} > 0$ only if $s\,(1-q)\,(c+s+d) > q\,(f+d)\,(s-c)$, and $\bar{\pi} < 1$ only if $(d-s)\,(1-q)\,(c+s+d)+q\,(f+d)\,s > 0$. Thus, if $d > s$, then $\bar{\pi} < 1$, and $\Omega^*_{\sigma\to 1} > \Omega^{\text{full comm.}}$ whenever the TA is assigned the bargaining power with high probability.

We can then conclude that

Proposition 5 *The optimal enforcement policy entails discretion (i.e. it allows for the use of the unverifiable signal) only if σ and π are sufficiently high.*

This result provides a theoretical argument in favor of discretionary settlements: despite their adverse strategic effect, they allow unverifiable information to display its greatest efficacy. Thus, standard enforcement procedures, usually aiming at the maximization of the post-selection intake, are not "irrational:" they are just based on the assumption that professional judgement is one of the most valuable forces in law enforcement.

5 Final remarks

In this model, law enforcement is guided by three types of information: equilibrium beliefs, nonverifiable evidence, and legal/documentary evidence. The first type of information, which is usually of statistical nature ("x% of population are likely to cheat") guides the TA's selection decision: how many people to select and, possibly, which categories first. The second, jointly with the first (and often the third), shapes

the TA's stance in the settlement process. Finally, the latter type alone guides the court's decision. This distinction - although somewhat artificial - captures some important features of the enforcement process.

The emphasis on nonverifiable information has allowed us to shed light on the impact of officers' professional judgement on the performance of the enforcement system. In particular, it was shown that professional judgement yields the greatest benefits when the agency enjoys the power to make discretionary settlments.

Our analysis, however, sets aside other important issues, that might have a bearing on the enforcement process. First, contaminations between the different types of evidence is likely to occur. The most serious problems arise when loose "statistical" evidence or unsubstantiated opinions affect adjudication. Here, the increased likelihood of erroneous decisions is likely to adversely affect individuals' behavior, as well as the integrity of the enforcement process.[14] A second complication arises when the enforcer's incentives are ill specified, i.e. when it pursues private goals (an extreme example would involve corruption). Discretion magnifies the power of the enforcer, for good and evil. It is thus a priority for the government to make sure that the good prevails.

[14] See Schrag and Scotchmer (1994) for an important contribution to this point. Overviews of the economics of evidence law can be found in Posner (1998) and Packer and Kobayashi (1998).

Appendix

■ Signal prior to selection

Let us briefly consider the possibility that an informative signal is used by the TA for the selection of taxpayers for examination.

Let σ_s be the precision of this signal.

Clearly, the agency will first select taxpayers whose signal is adverse (see Macho Stadler ...). Let $\widetilde{\mu}^R$ be the probability that a taxpayer with a Red signal is noncompliant. The expected revenue upon selection is $R\left(\widetilde{\mu}^R\right)$ (see eq. 2). The solution to the game is as before, with the substitution of $\widetilde{\mu}^R$ for μ, with $\widetilde{\mu}^R > \mu$. In fact, the more precise the signal, the larger the expected net yield of each examination.

At the equilibrium (case 1), we will have $R\left(\widetilde{\mu}^{R*}\right) = s$, and

$$\begin{aligned}\widetilde{\Omega}^* &= q\left(1-\widetilde{\beta}^*\right)T + \left[(1-q)(1-\sigma_s) + \left(q\widetilde{\beta}^*\right)\sigma_s\right] a^* \underbrace{\left[R\left(\widetilde{\mu}^{R*}\right) - s\right]}_{0} = \\ &= q\left(1-\widetilde{\beta}^*\right)T,\end{aligned}$$

with $\widetilde{\beta}^* = \frac{(1-\sigma_s)}{\sigma_s}\frac{(1-q)}{q}\frac{\left(1-R^{-1}(s)\right)}{R^{-1}(s)} < \beta^* = \frac{(1-q)}{q}\frac{\left(1-R^{-1}(s)\right)}{R^{-1}(s)}$, and $lim_{\sigma_s \to 1}\widetilde{\beta}^* = 0$.

Thus, first best is achieved when the signal is perfect.

The continuation of the game remains as described in Sections 2 and 3.

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