

**DIVISION OF THE HUMANITIES AND SOCIAL SCIENCES
CALIFORNIA INSTITUTE OF TECHNOLOGY**

PASADENA, CALIFORNIA 91125

EQUILIBRIUM ENFORCEMENT AND COMPLIANCE
IN THE PRESENCE OF TAX PRACTITIONERS

Jennifer F. Reinganum
University of Iowa

Louis L. Wilde
California Institute of Technology



SOCIAL SCIENCE WORKING PAPER 744

July 1990

Abstract

We develop a game-theoretic model in which taxpayers, tax practitioners and a tax agency all interact to determine the extent of tax compliance. The model focuses exclusively on the service aspects of third-party assistance. We characterize four types of equilibria, depending on whether taxpayers prefer to use tax practitioners and whether the tax agency prefers them to use tax practitioners. In the empirically relevant case, which occurs when tax practitioner penalties for noncompliance are sufficiently low and the efficiency gains from using practitioners are sufficiently high, the tax agency prefers taxpayers to prepare their own returns, but taxpayers prefer to use a tax practitioner. In this case, the use of a tax practitioner is associated with lower compliance and higher audit rates.

EQUILIBRIUM ENFORCEMENT AND COMPLIANCE

IN THE PRESENCE OF TAX PRACTITIONERS*

Jennifer F. Reinganum**

and

Louis L. Wilde**

1. Introduction

Professional income tax preparers account for over half of all individual income tax returns filed and an even greater proportion of complex returns filed (Jackson and Milliron, 1987). Of these preparers, a significant proportion are qualified to represent clients before the Internal Revenue Service. The American Bar Association Commission on Taxpayer Compliance (1987) refers to these individuals as tax practitioners: "Like preparers, practitioners can prepare and sign returns, but the term is used to distinguish them from preparers who cannot represent clients during Internal Revenue Service audits and other enforcement actions" (p. 56). Practitioners can provide a variety of services in addition to tax preparation; they "are often consulted by taxpayers facing audits, may accompany or represent clients during the audit itself, may participate in appeals of audit decisions within the IRS and in court, and may negotiate tax payment arrangements" (Kinsey, 1987, p. 1). Practitioners can also play a role in identifying strategies for minimizing tax liability (Klepper and Nagin, 1988).

There is no question that tax preparers are a significant presence in the revenue collection process. Certainly preparers and practitioners help their clients to understand the tax system and meet their legal obligations. In the event of an audit, practitioners may also be more "efficient" than their clients in dealing with the IRS, lowering costs to both their clients and the IRS. At the same time, "practitioners often challenge the tax agency's interpretation and application of tax laws" (Kinsey, 1987, p. 2), and may even induce their clients to adopt more aggressive tax avoidance strategies than the clients would use on their own.

Crude evidence suggests a linkage between taxpayer use of preparers or practitioners and noncompliance. IRS data indicates that 44.2 percent of the

individual returns filed in 1979 were self-prepared, and that these returns accounted for 22.8 percent of detected noncompliance. Returns prepared with third-party assistance accounted for 55.8 percent of filings and 77.2 percent of the detected noncompliance. Among returns prepared with third-party assistance, however, underreported tax was not uniformly distributed. Only 10.6 percent of all taxpayers used a tax practitioner, yet their returns accounted for 32.5 percent of underreported tax; 34.7 percent used other paid preparers accounting for 40.9 percent of underreported tax; and the remaining 10.4 percent used non-paid assistance accounting for 3.7 percent of underreported tax.¹

With regard to penalties, "Section 6694(a) of the Internal Revenue Code provides penalties of up to \$100 for an understatement of taxpayer liability resulting from the failure of a tax return preparer to exercise due diligence in applying income tax laws². In addition, in order to enforce stricter standards of diligence, the IRS has recently proposed amending the regulations governing tax practitioners who are eligible to practice before the IRS" (Coyne, 1987, p. 1). And, while the IRS's Office of Practice does not directly regulate return preparation, it can (and does) secure court injunctions to keep some ~~individuals from preparing returns (Kinsey, 1987, p.3).~~³

There is a small but growing literature on tax practitioners. This literature emphasizes two general roles for practitioners in the revenue collection process: practitioners as providers of services and practitioners as providers of information. Scotchmer (1989a,1989b) and Beck, Davis and Jung (1989) provide examples of the latter. Klepper and Nagin (1989) develop several hypotheses about practitioner effects on compliance and examine empirical evidence related to them. Their findings "suggest that preparers play a mixed role in the compliance process. On the one hand they appear to contribute to noncompliance by helping taxpayers exploit ambiguous features of the tax code. On the other hand, however, they appear to enforce legally unambiguous features of the tax code and also to be important conduits for communicating tax agency enforcement priorities" (p. 1). Erard (1990), using a random sample of the 1979 TCMP individual records, finds that the probability of using a practitioner relative to self-preparation increases with increases in the IRS district audit rate. Dubin, et. al. (1989), working with district level aggregates of the 1979 TCMP individual records, confirm the latter finding but also find that increases in the IRS district level audit rate have no effect on the demand for other third-party assistance, whether paid (e.g., preparers) or non-paid (e.g., IRS

assistance).

Our model focuses on tax practitioners as providers of services. Our typical taxpayer knows the law and is, in principle, capable of preparing his own return in an optimal fashion, allowing for audit rates and audit costs, the latter both in terms of direct penalties and opportunity costs. He may prefer to use a practitioner, though, because it can reduce the costs of return preparation and, in case of enforcement proceedings, provide an alternative to self-representation. In this setting the taxpayer first chooses whether to prepare his own tax return or to use a practitioner. Next returns are filed, either directly by taxpayers or by practitioners on behalf of taxpayers. Finally, the tax agency decides how much enforcement effort to devote to a given return; this decision may be contingent upon whether the return was filed by the taxpayer or by a practitioner on behalf of the taxpayer.

Assuming a quadratic enforcement cost function and an objective of expected net revenue maximization for the tax authority, we characterize the equilibrium reporting behavior of taxpayers (with and without a practitioner) and the enforcement behavior of the tax agency (with respect to taxpayer-filed and practitioner-filed returns). We describe circumstances under which each of the following equilibrium situations arises: (a) the tax agency and the taxpayer both prefer that the taxpayer use a practitioner; (b) the tax agency and the taxpayer both prefer that the taxpayer file his own return; (c) the tax agency prefers that the taxpayer use a practitioner, but the taxpayer prefers to file his own return; and finally, (d) the tax agency prefers that the taxpayer file his own return, but the taxpayer prefers to use a practitioner. When the tax agency prefers that the taxpayer file his own return (cases (b) and (d) above), the taxpayer would file a more compliant return than would have been filed had he used a practitioner. However, when the tax agency prefers that the taxpayer use a practitioner, it need not follow that the practitioner-filed return is more compliant than that which the taxpayer would have filed without a practitioner. In some cases, the tax agency prefers a practitioner-filed return, even though it is less compliant. This is because of the additional penalty revenue to be had from noncompliant practitioners.

When practitioner penalties are sufficiently low and gains to the taxpayer from using a practitioner are sufficiently high, the tax agency will prefer that the taxpayer file his own return, but the taxpayer will prefer to use a practitioner (case (d) above). Compliance falls and audit rates rise (relative

to self-preparation). This is precisely the empirically relevant case, however, and is consistent with the limited data now available. In other words, the results of this paper show that the service aspects of tax practitioners alone are enough to explain the existing stylized facts regarding the relationship between practitioners, noncompliance and enforcement.

We also consider the possibility that the tax agency cares only about expected tax revenue net of enforcement costs⁴ (that is, it does not include penalty revenue in its objective function). When penalty revenue is irrelevant to the tax agency, the optimal enforcement functions for taxpayer-filed and practitioner-filed returns coincide, but practitioner-filed returns are always less compliant than taxpayer-filed returns. Thus, conditional only on the use of a practitioner, audit rates are higher.

In Section 2 we describe our basic model. Section 3 contains a statement of equilibrium conditions, and Section 4 presents an extended algebraic example. Section 5 summarizes the impact of omitting penalty revenue from the tax authority's objective function. Section 6 presents a brief conclusion including suggestions for future research.

2. The Model

The three types of participants in our compliance game are (1) taxpayers, (2) tax practitioners and (3) the tax agency.⁵ Because we are not explicitly concerned with the effects of taxpayer risk aversion, we assume that each taxpayer maximizes expected net income. Tax practitioners are assumed to form a monopolistically competitive industry. They exchange their services for a fixed fee, with price competition constraining equilibrium profits to a normal level. Finally, we assume the tax agency's objective is to maximize revenue net of audit costs, taking as given the tax and penalty schedules and taxpayers' reported incomes. Thus, we assume that it is net revenue, rather than welfare, which motivates the tax agency. This is largely consistent with actual audit policy, which is based upon a "yield" criterion (the "DIF" score); that is, a return is more likely to be audited the greater the additional taxes and penalties it is expected to yield.⁶ In addition, the IRS permits taxpayers certain nominal deviations from known tax liability; pursuing small evaders is simply not cost-effective (Reinganum and Wilde, 1988). Finally, since most noncompliance takes the form of under- rather than over-reporting, the tax agency's self-professed objective -- to "encourage and achieve the highest

possible degree of voluntary compliance in accordance with the tax law and regulations" (American Bar Association Commission on Taxpayer Compliance, 1987) - comes close to revenue maximization. The key difference is that the pure compliance objective ignores penalty revenue. Maximizing tax revenue alone net of audit costs, while perhaps less realistic than maximizing total revenue net of audit costs, may be the objective function which comes closest to the stated objective of the IRS. It is considered in Section 5.

We assume that the tax agency takes taxpayer reports as given and behaves optimally in response to these reports, rather than choosing a policy which is designed to induce truthful reporting.⁷ There are several reasons for making this assumption. First, the logical order of play involves the tax agency moving last; any attempt to commit ex ante to an enforcement policy is not credible, because it is known that the tax agency's ex post incentives will generally dictate a different policy. Moreover, since an optimal policy will typically involve probabilistic enforcement and unobservable effort by the tax agency, taxpayers will have difficulty verifying whether an ex ante announced policy has been carried out. This makes it difficult to establish commitment via a reputation mechanism. Second, the formula for scoring returns and selecting them for routine audits -- the DIF -- is constructed on the basis of a large set of especially comprehensive audits, and then applied to the remaining returns. Again this suggests that enforcement efforts respond to taxpayer reports, rather than vice versa.⁸

Let I denote a taxpayer's true gross income. We assume that I is common knowledge (due, for example, to employer reporting of earnings).⁹ Let x denote the taxpayer's reported taxable income; that is, the taxpayer understates taxable income by the amount $I-x$ (as will be seen, it is never in the taxpayer's interest to over-report). Let t and π_T denote the tax and penalty rates for the taxpayer, respectively, where the penalty rate π_T is applied to unpaid tax. Let u_T denote the taxpayer's perceived cost of preparing his own tax return, and let v_T denote the taxpayer's perceived cost of complying with the tax agency's enforcement action. These represent the money values associated with the disutility of effort involved in tax preparation and in dealing with the tax agency in enforcement proceedings, respectively. Let π_P represent a penalty rate to which practitioners are subject; that is, a practitioner whose client is assessed additional taxes and penalties is subject to a fine at the rate π_P times the unpaid tax.¹¹ Let u_P and v_P denote the practitioner's costs of tax preparation

and compliance with enforcement action. Finally, let F denote the practitioner's fee. We assume that the costs to the taxpayer of (1) complying with enforcement proceedings and (2) preparing the return exceed the analogous costs for the practitioner.

Assumption 1. $v_T \geq v_P$ and $u_T \geq u_P$.

Enforcement is assumed to be both costly and stochastic; that is, costly effort must be devoted to enforcement and detection may be uncertain. Following Reinganum and Wilde (1986), we assume that a level of examiner effort e (which is expended on scrutinizing a return) generates a probability of detection $p(e)$ with $p'(e) \geq 0$ and $p''(e) < 0$. Alternatively, one could invert this function to obtain the level of effort needed to generate a given probability of detection $e(p)$ on each return, with $e'(p) \geq 0$ and $e''(p) > 0$. In this spirit, we let $c(p)$ denote the cost (per return) of the effort level required to generate p . Then $c'(p) \geq 0$ and $c''(p) > 0$. Note that we are not assuming that $c'(p)$ approaches infinity as p nears 1; it is not infinitely costly at the margin to guarantee that an audit will be perfect, so this choice is feasible.

The tax agency's expected net revenue from a taxpayer who files his own return and reports income x , given that the probability of detection is p , can be written

$$R_T(p, x) = p[tI + t\pi_T(I - x)] + (1 - p)tx - c(p). \quad (1)$$

The tax agency's expected net revenue from a taxpayer who uses a practitioner and reports income x , given that the probability of detection is p , can be written

$$R_P(p, x) = p[tI + t(\pi_T + \pi_P)(I - x)] + (1 - p)tx - c(p). \quad (2)$$

In each case, the tax agency is assumed to choose a probability of detection function (or, alternatively, an "enforcement function") $p(x)$ so as to maximize its expected net revenue. When $\pi_P > 0$, the tax agency may choose to devote a different level of effort to the examination of taxpayer-filed and practitioner-filed returns. Let $p_T(x)$ and $p_P(x)$ denote the optimal enforcement functions for taxpayer-filed and practitioner-filed returns, respectively.

Since the taxpayer is assumed to be risk-neutral, his payoff is expected income net of tax-related payments. Given that true income is I , reported taxable income is x , and the tax agency uses the optimal enforcement function $p_T(x)$, if the taxpayer elects to prepare his own return, expected net income is

$$N_T(x, p_T(x)) = p_T(x)[I - tI - t\pi_T(I - x) - v_T] + [1 - p_T(x)](I - tx) - u_T. \quad (3)$$

The taxpayer is assumed to choose $x \leq I$ so as to maximize this expression, and we let x_T denote the optimal report for a taxpayer who files his own return.

We assume that practitioners offer two services to taxpayers. First they prepare the taxpayer's return, which relieves the taxpayer of the expense u_P . Second, they represent the taxpayer in enforcement proceedings, significantly reducing or even, as we shall assume, eliminating the cost v_T . The practitioner is assumed to exchange this bundle of services for the fee F .¹²

Given that true income is I , reported taxable income is x , and the tax agency uses the optimal enforcement function $p_P(x)$, if the taxpayer uses a practitioner who charges the fee F , expected net income (gross of the practitioner's fee) is

$$N_P(x, p_P(x)) = p_P(x)[I - tI - \tau\pi_T(I - x)] + [1 - p_P(x)](I - tx). \quad (4)$$

The taxpayer is assumed to choose $x \leq I$ so as to maximize $N_P(x, p_P(x)) - F$, and we let x_P denote the optimal report for the taxpayer who uses a practitioner.

Finally, profits to the practitioner are the product of the number of returns prepared and the profit margin on each. Let $n(F; \underline{F})$ denote an indicator function which takes on the value $n(F; \underline{F}) = 1$ if the taxpayer elects to use this practitioner at the fee F when the minimum of all other practitioners' fees is \underline{F} , and $n(F; \underline{F}) = 0$ otherwise. The taxpayer will choose not to use this particular practitioner whenever either the fee leaves the taxpayer with negative net income or some other practitioner is charging a lower fee. Then expected profits to the practitioner (per return filed) can be written

$$\Pi(F; \underline{F}) = n(F; \underline{F})[F - u_P - p_P(x_P)(\tau\pi_P(I - x_P) + v_P)]. \quad (5)$$

3. Subgame Perfect Equilibrium

Before proceeding, it is worthwhile to restate and clarify the assumed order of play. First, practitioners set a fee. Next, taxpayers decide whether to use a practitioner (and which one). Then returns are filed, either by the taxpayer himself or by the practitioner on behalf of the taxpayer. Finally, the tax agency chooses its enforcement function.

Thus a strategy for the practitioner is a fee, F . A strategy for the taxpayer consists of two levels of reported income x_T and x_P (the first is used if the taxpayer files his own return and the second is used if a practitioner files on behalf of the taxpayer) and a decision about whether to use a practitioner (and which one). A strategy for the tax agency is an enforcement function for taxpayer-filed returns, $p_T(x)$, and another (possibly different)

enforcement function for practitioner-filed returns, $p_P(x)$.

Definition. A subgame perfect equilibrium consists of: a decision regarding the use of a practitioner and a pair of scalars (x_T, x_P) ; a pair of functions $(p_T(x), p_P(x))$; and a scalar F^0 , such that:

- (a) $p_i(x)$ maximizes $R_i(x, p)$, $i = T, P$.
- (b) x_i maximizes $N_i(x, p_i(x))$, $i = T, P$.
- (c) The taxpayer uses a practitioner if and only if $N_P(x_P, p_P(x_P)) - F^0 > N_T(x_T, p_T(x_T))$.
- (d) F^0 maximizes $\Pi(F; F^0)$.

Given the assumed order of play, a subgame perfect equilibrium for the model can be characterized using backward induction. Given that income x is reported on a taxpayer-filed return, the tax agency chooses p so as to maximize $R_T(x, p)$. Because $R_T(x, p)$ is strictly concave in p , the optimal value of p , $p_T(x)$, is characterized as follows:

- if $t(1+\pi_T)(I-x) > c'(1)$, then $p_T(x) = 1$;
- if $t(1+\pi_T)(I-x) < c'(0)$, then $p_T(x) = 0$;
- otherwise $p_T(x) \in [0, 1]$ and is given implicitly by

$$t(1+\pi_T)(I-x) = c'(p_T(x)). \quad (6)$$

Similarly, if income x is reported on a practitioner-filed return, the tax agency chooses p so as to maximize $R_P(x, p)$. The optimal value of p , $p_P(x)$, is characterized as follows:

- if $t(1+\pi_T+\pi_P)(I-x) > c'(1)$, then $p_P(x) = 1$;
- if $t(1+\pi_T+\pi_P)(I-x) < c'(0)$, then $p_P(x) = 0$;
- otherwise, $p_P(x) \in [0, 1]$ and is given implicitly by

$$t(1+\pi_T+\pi_P)(I-x) = c'(p_P(x)). \quad (7)$$

It is clear that when $x = I$, $p_T(x) = p_P(x) = 0$; that is, it never pays to allocate enforcement effort to a return which reports taxable income equal to gross income I . From equations (6) and (7), it is also straightforward to show that for $p_i(x) \in (0, 1)$, $p_i(\cdot)$ is a decreasing function of reported income x ($i = T, P$). In addition, the functions $p_i(x)$ shift upward with an increase in t , π_T or I (and $p_P(x)$ shifts upward with an increase in π_P). That is, an increase in taxes, penalties, or taxable income results in greater enforcement effort for any level of reported income. Finally, a comparison of (6) and (7) yields the following result.

Proposition 1. So long as practitioner penalties π_p are strictly positive, greater enforcement effort will be devoted to a practitioner-filed return than to a taxpayer-filed return which reports the same level of income. That is, $p_p(x) > p_T(x)$ (unless both equal 0 or 1).

This is because the tax agency expects a greater return from detecting noncompliance on a practitioner-filed return, since it collects penalty revenue from both the taxpayer and the practitioner in the event that noncompliance is detected.

A taxpayer who elects to file his own return chooses reported income x so as to maximize $N_T(x, p_T(x))$ as given above in equation (3). First- and second-order necessary conditions for an interior optimum x_T are

$$p_T'(x)[-t(1+\pi_T)(I-x) - v_T] + p_T(x)t(1+\pi_T) - t = 0 \quad (8)$$

and

$$p_T''(x)[-t(1+\pi_T)(I-x) - v_T] + 2p_T'(x)t(1+\pi_T) \leq 0. \quad (9)$$

It follows from (8) that if $x_T < I$, then $p_T(x_T) < t/(1+\pi_T)$. Otherwise it is preferable to report $x = I$. Assuming $x_T < I$ is uniquely defined by (8), and that the second-order condition (9) holds with a strict inequality, it is straightforward to show that x_T increases with the parameter v_T ; the taxpayer reports more income the greater his disutility of being involved in enforcement proceedings.

If the taxpayer uses a practitioner, he avoids the cost u_T and the expected cost $p_T(x)v_T$, but he pays the fee F and faces a uniformly higher enforcement function, $p_p(x)$. This results in the payoff function $N_p(x, p_p(x)) - F$, where $N_p(x, p_p(x))$ is given in equation (4). This yields the following first-order condition describing x_p .

$$p_p'(x)[-t(1+\pi_T)(I-x)] + p_p(x)t(1+\pi_T) - t = 0. \quad (10)$$

Assuming that equation (10) yields a unique value for x_p , the taxpayer can then decide whether or not to use a practitioner charging the fee F by comparing $N_T(x_T, p_T(x_T))$ and $N_p(x_p, p_p(x_p)) - F$: the taxpayer uses a practitioner charging F if and only if $N_p(x_p, p_p(x_p)) - F > N_T(x_T, p_T(x_T))$.

Our last equilibrium condition follows from the assumption that the practitioner industry is monopolistically competitive. Each practitioner, in order to keep his clients, must charge no more than the minimum fee being offered in the industry. However, by slightly undercutting the existing minimum

fee, the practitioner can steal clients from competitors. This results in a Bertrand-like competition in fees, with the equilibrium fee given by

$$F^o = u_p + p_p(x_p)[t\pi_p(I-x_p) + v_p]. \quad (11)$$

4. An Example

Since our model involves sequential moves, there is no guarantee that the problems of the taxpayer and the tax practitioner are well-behaved. Consequently, it is difficult to derive completely general results, since conclusions based on an examination of general first-order conditions might well be invalid. Instead we explore in some detail an illustrative example which shows that the theory is not vacuous and which allows us to characterize equilibrium behavior fully.

Let the enforcement cost function be $c(p) = cp^2$. In this case perfect enforcement is possible, and at finite cost (and finite marginal cost). However, perfect enforcement is not optimal for all values of reported income. Maximizing $R_T(x,p)$ yields $p_T(x) = \min \{ 1, t(1+\pi_T)(I-x)/2c \}$.

Under the following assumption, the taxpayer's optimal report will be strictly less than his income; if this assumption does not hold, then optimal enforcement results in perfect compliance. The perfect compliance case is obviously the less interesting one, so we will focus on the case of imperfect compliance.

Assumption 2. $2c > v_T(1+\pi_T)$.

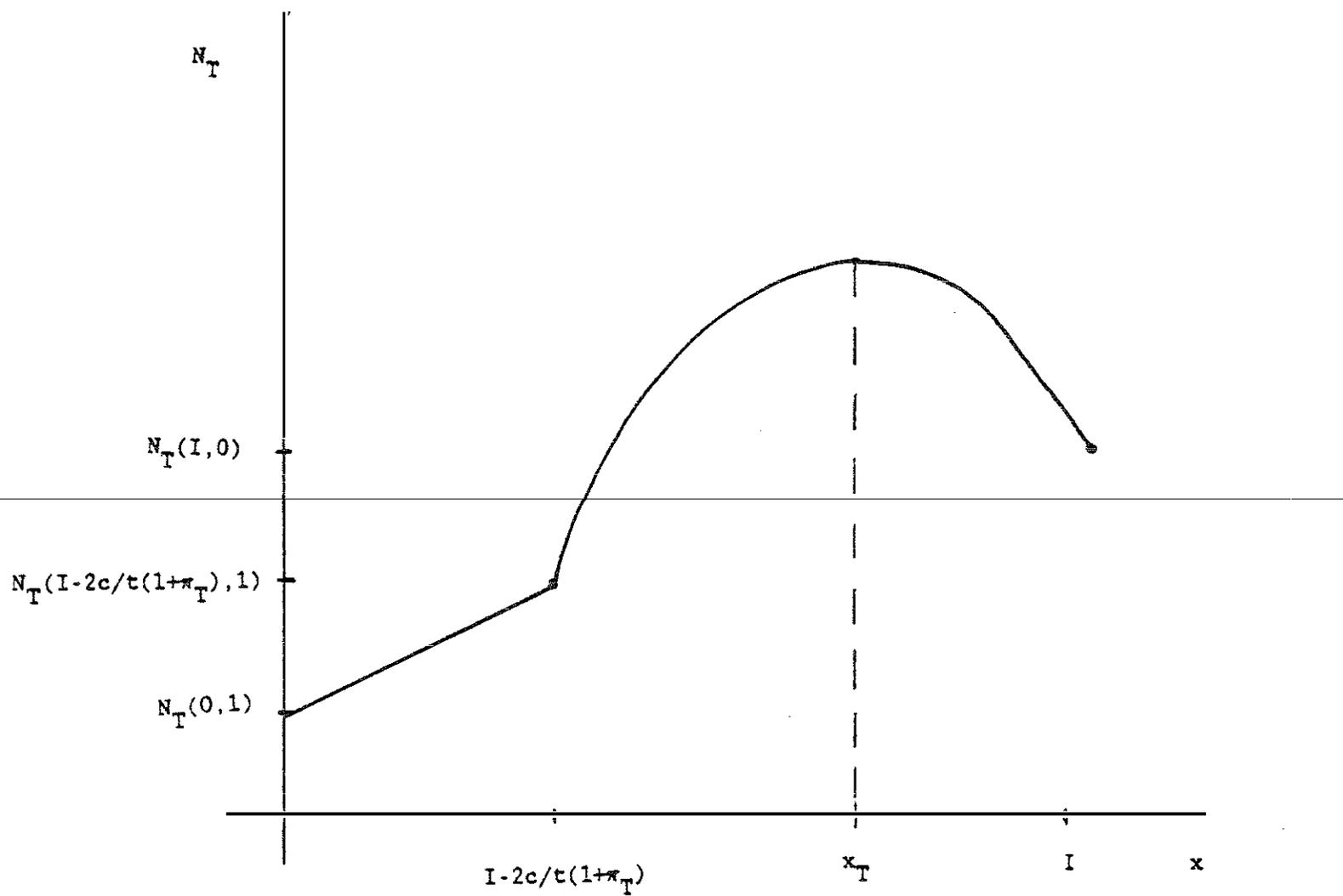
Under Assumptions 1 and 2, expected net income to the taxpayer who files his own return (and faces the enforcement function $p_T(x)$) can be described as a function of reported income x as shown below in Figure 1.

Insert Figure 1 here

Given the enforcement policy $p_T(x)$ for the tax agency, the taxpayer's expected net income function has a unique maximum, with the optimal amount of noncompliance given by $I-x_T = [2c - v_T(1+\pi_T)]/2t(1+\pi_T)^2$. Thus, there is no incentive for the taxpayer to randomize his report.

Maximizing $R_P(x,p)$ yields $p_P(x) = \min \{ 1, t(1+\pi_T+\pi_P)(I-x)/2c \}$. Recall from Proposition 1 that a revenue-maximizing tax agency will devote more effort

FIGURE 1



to a practitioner-filed return. This difference in treatment by the tax agency will feed back into the taxpayer's reporting decision.

Given the enforcement policy $p_p(x)$ for the tax agency, the taxpayer's expected net income function has a unique maximum, with the optimal amount of noncompliance given by $I - x_p = c/t(1+\pi_T+\pi_P)(1+\pi_T)$. Expected net income to the taxpayer who uses a practitioner (and faces the corresponding enforcement function $p_p(x)$) is illustrated below in Figure 2.

Insert Figure 2 here

It is straightforward to characterize when compliance is higher with a practitioner than without. Define $\phi(\pi_T) = v_T(1+\pi_T)^2/[2c - v_T(1+\pi_T)]$.

Proposition 2. Compliance is higher, the same, or lower with a practitioner than without as the practitioner penalty exceeds, equals, or is less than $\phi(\pi_T)$. That is, $x_p (>, =, <) x_T$ as $\pi_p (>, =, <) \phi(\pi_T)$.

The function $\pi_p = \phi(\pi_T)$ is positive, increasing and convex in π_T . This is illustrated below in Figure 3. Assumption 2 limits the domain of π_T to $[0, (2c - v_T)/v_T)$.

Insert Figure 3 here

Thus one could have either higher or lower compliance with a practitioner. The existence of practitioner penalties makes detection more likely for a given report (because greater examiner effort is devoted due to the potential for higher penalty revenue), which tends to increase compliance; on the other hand, the taxpayer is effectively "insured" against the loss v_T , which will tend to decrease compliance.

We next compare $p_p(x_p)$ and $p_T(x_T)$ to obtain the combined effect of practitioners on the equilibrium likelihood of detection. Substituting the taxpayer's optimal reports into the agency's optimal enforcement functions yields $p_p(x_p) = 1/2(1+\pi_T)$ and $p_T(x_T) = [1/2(1+\pi_T)] - v_T/4c$.

Proposition 3. Assuming that the taxpayer reports optimally in each case, a taxpayer who uses a practitioner will face a higher

FIGURE 2

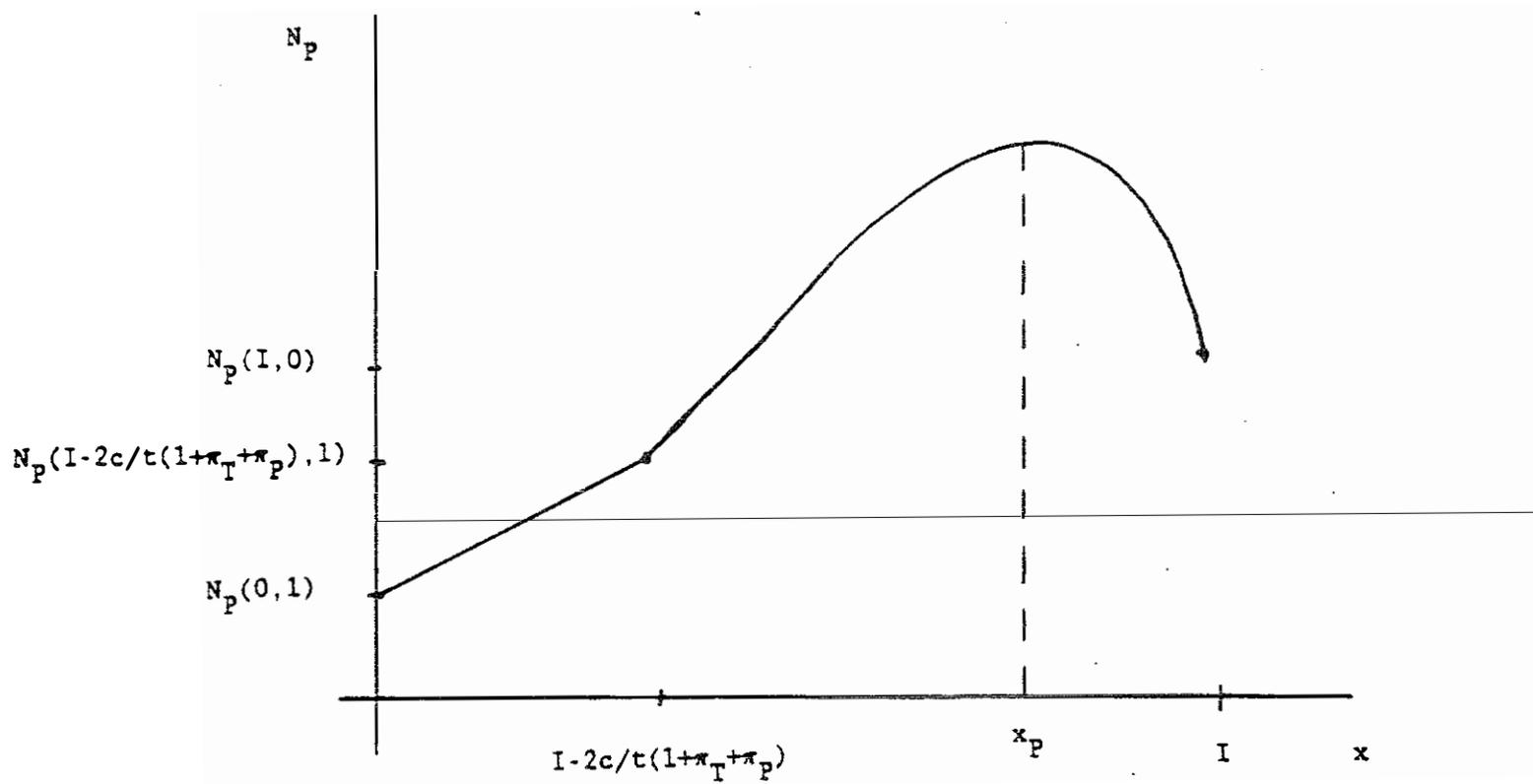
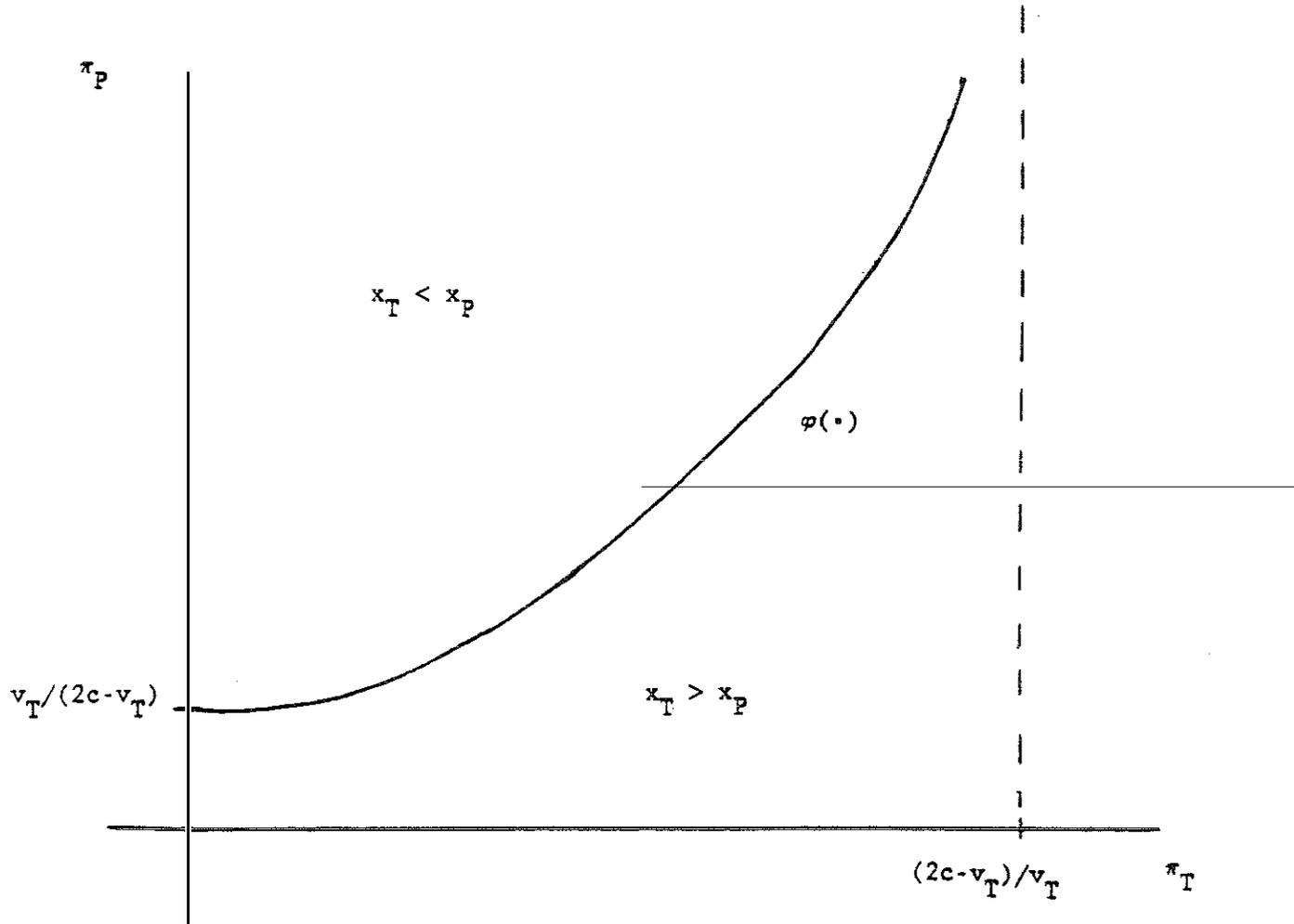


FIGURE 3



likelihood of detection than a taxpayer who files his own return. That is, $p_P(x_P) > p_T(x_T)$.

To determine whether the tax agency would prefer taxpayer-filed or practitioner-filed returns, we first observe that equilibrium revenue from a practitioner-filed return is

$$R_P(x_P, p_P(x_P)) = tI + c/4(1+\pi_T)^2 - c/(1+\pi_T)(1+\pi_T+\pi_P)$$

while equilibrium revenue from a taxpayer-filed return is given by

$$R_T(x_T, p_T(x_T)) = tI + [2c - v_T(1+\pi_T)]^2/16c(1+\pi_T)^2 - [2c - v_T(1+\pi_T)]/2(1+\pi_T)^2.$$

Define $\psi(\pi_T) \equiv (1+\pi_T)A/(16c^2 - A)$, where $A \equiv 4cv_T(1+\pi_T) + (v_T)^2(1+\pi_T)^2 < 16c^2$ under Assumption 2.

Proposition 4. The tax agency prefers a practitioner-filed return, is indifferent, or prefers a taxpayer-filed return as the practitioner penalty exceeds, equals, or is less than $\psi(\pi_T)$. That is, $R_P(x_P, p_P(x_P)) (>, =, <) R_T(x_T, p_T(x_T))$ as $\pi_P (>, =, <) \psi(\pi_T)$.

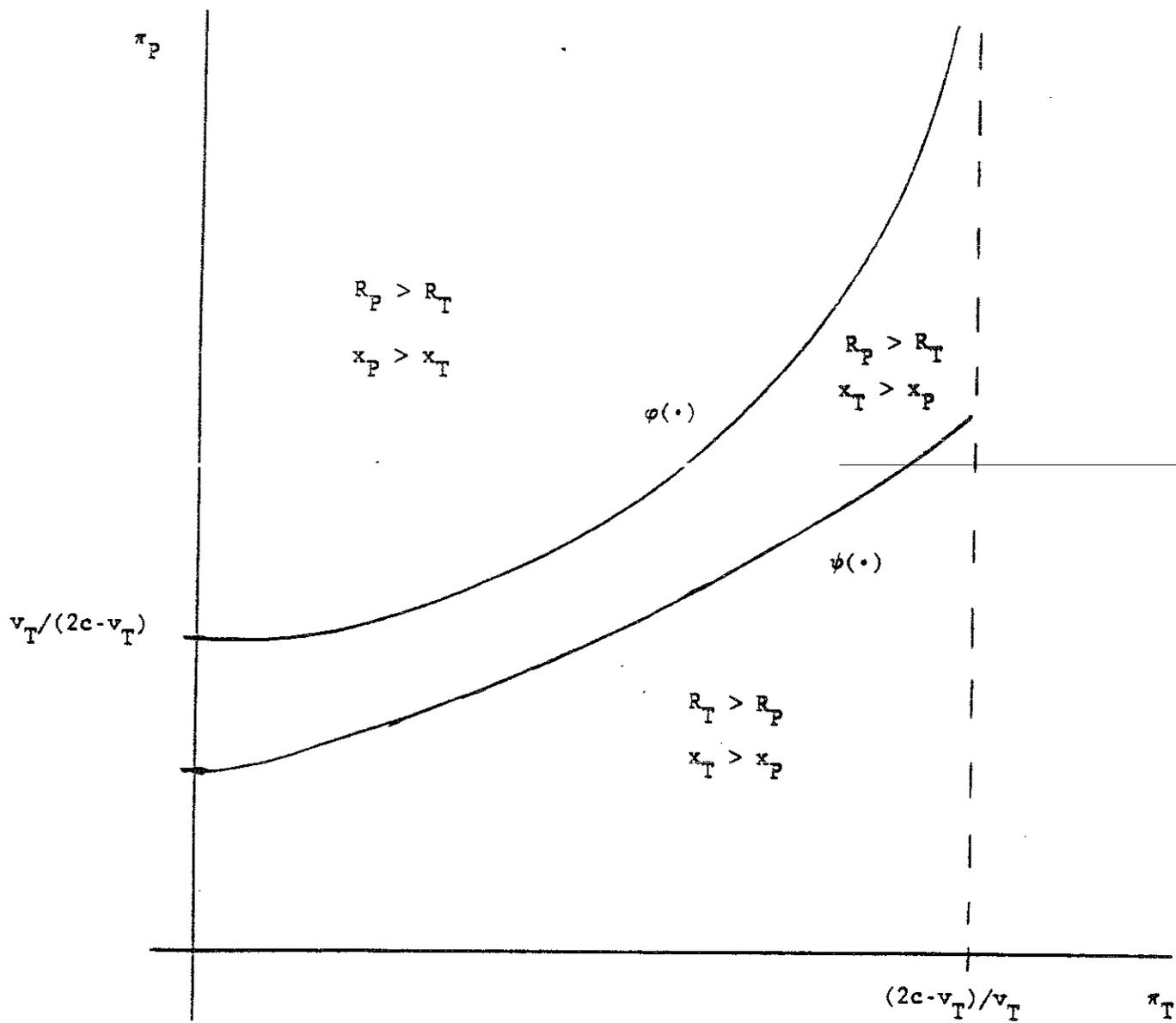
The function $\psi(\pi_T)$ is positive, increasing and convex, with $\psi(\pi_T) < \phi(\pi_T)$; that is, the "equal reporting" line lies everywhere above the "equal revenue" line as shown below in Figure 4. Intuitively, along the curve $\pi_P = \psi(\pi_T)$, practitioner-filed returns and taxpayer-filed returns are equally noncompliant, but taxpayer-filed returns are more heavily audited and generate penalty revenue from both taxpayers and practitioners. Thus along this curve, $R_P > R_T$; lowering π_P lowers R_P until the equality $R_P = R_T$ (i.e., $\pi_P = \psi(\pi_T)$) is reached.

Insert Figure 4 here

This permits us to make the following comparison.

Proposition 5. Whenever the tax agency prefers taxpayer-filing to practitioner-filing, taxpayer-filing results in greater compliance than does practitioner-filing. However, the converse is not true; for some (π_T, π_P) combinations, taxpayer-filing results in greater compliance than practitioner-filing yet the tax agency prefers practitioner-filing to taxpayer-filing. That is, sometimes the tax agency prefers the less compliant return.

FIGURE 4



Finally, we need to determine when taxpayers will choose to use a practitioner. Monopolistic competition in the practitioner industry implies that fees are bid down until the practitioner just breaks even:

$$F^{\circ} = u_P + v_P/2(1+\pi_T) + c\pi_P/2(1+\pi_T+\pi_P)(1+\pi_T)^2.$$

Substituting this value into $N_P(x_P, p_P(x_P)) - F$ yields equilibrium expected net income to a taxpayer who uses a practitioner:

$$N_P(x_P, p_P(x_P)) - F^{\circ} = I - tI - u_P - v_P/2(1+\pi_T) + c(1+\pi_T-\pi_P)/2(1+\pi_T+\pi_P)(1+\pi_T)^2.$$

This value is then compared with equilibrium net income to a taxpayer who files his own return:

$$N_T(x_T, p_T(x_T)) = I - tI - u_T + [2c - v_T(1+\pi_T)]^2/8c(1+\pi_T)^2.$$

Then $N_P(x_P, p_P(x_P)) - F^{\circ}$ ($>, =, <$) $N_T(x_T, p_T(x_T))$ as

$$(1 + \pi_T)B(\pi_T) (>, =, <) \pi_P(8c^2 - B(\pi_T)),$$

where $B(\pi_T) \equiv 8c(u_T - u_P)(1+\pi_T)^2 + 4c(v_T - v_P)(1+\pi_T) - (v_T)^2(1+\pi_T)^2$. This yields three possible cases.

Proposition 6.

- (a) If $B(\pi_T) < 0$, then $N_P - F^{\circ} < N_T$ and the taxpayer will file his own return.
-
- (b) If $B(\pi_T) > 8c^2$, then $N_P - F^{\circ} > N_T$ and the taxpayer will use a practitioner.
- (c) If $B(\pi_T) \in (0, 8c^2)$, then $N_P - F^{\circ}$ ($>, =, <$) N_T as π_P ($<, =, >$) $\mu(\pi_T)$, where $\mu(\pi_T) \equiv (1+\pi_T)B(\pi_T)/[8c^2 - B(\pi_T)]$.

A sufficient condition for $B(\pi_T) < 0$ is that the practitioner is no more efficient than the taxpayer at preparation or at representing the taxpayer before the tax agency; that is, $u_T = u_P$ and $v_T = v_P$. On the other hand, a sufficient condition for $B(\pi_T) > 8c^2$ is that these efficiencies (that is, $u_T - u_P$ and $v_T - v_P$) are sufficiently large. When case (c) arises, it follows that $\mu(\pi_T) > 0$.

Due to the large number of parameters in this problem, it is extremely tedious to characterize the equilibrium associated with each combination of parameter values, and the problem does not seem to lend itself to a comprehensive graphical summary. However, given any set of parameters of interest, the Propositions above will fully describe the equilibrium behavior of taxpayers, tax practitioners and the tax agency.

By combining Propositions 4 and 6, we are able to describe sufficient conditions for the equilibrium to take on a given configuration in terms of preferences regarding practitioner use. In each case, practitioners just break even and are thus indifferent about whether or not a taxpayer uses a practitioner.

Proposition 7. Each of the following cases arises for some set of parameters.

- (a) the tax authority and the taxpayer both prefer that the taxpayer use a practitioner. This case arises when $\pi_p > \psi(\pi_T)$ and $B(\pi_T) > 8c^2$. In this case, practitioner efficiencies are large, and the taxpayer's return is more or less compliant than it would have been (had he filed it himself) as $\pi_p (>, =, <) \phi(\pi_T)$. Thus for $\pi_p < \phi(\pi_T)$, the taxpayer is less compliant due to the use of a practitioner, but this is preferred by the tax agency. For $\pi_p > \phi(\pi_T)$, the taxpayer prefers to use a practitioner despite the fact that this results in greater compliance and a greater likelihood of detection.
- (b) the tax agency and the taxpayer both prefer that the taxpayer file his own return. This case arises when $\pi_p < \psi(\pi_T)$ and $B(\pi_T) < 0$. In this case, practitioner efficiencies are small, and the taxpayer's return is more compliant than it would have been had he used a practitioner.
- (c) the tax agency prefers that the taxpayer use a practitioner, but the taxpayer prefers to file his own return. This case arises when $\pi_p > \psi(\pi_T)$ and $B(\pi_T) < 0$. In this case, practitioner efficiencies are small, and the taxpayer's return is more or less compliant than it would have been (had a practitioner been used) as $\pi_p (>, =, <) \phi(\pi_T)$. For $\pi_p > \phi(\pi_T)$, the less compliant practitioner-filed return is preferred by the tax agency, but the taxpayer elects to file his own return.
- (d) the tax agency prefers that the taxpayer file his own return, but the taxpayer prefers to use a practitioner. This case arises when $\pi_p < \psi(\pi_T)$ and $B(\pi_T) > 8c^2$. In this case, practitioner efficiencies are large and taxpayer compliance is lower than it would have been had the taxpayer filed his own return.

Recent discussion of the effect of tax practitioners has suggested that the use of practitioners results in less compliant returns and lower revenues to the tax agency. This has resulted in increased practitioner penalties. If we assume that the "empirically relevant case" involves (1) practitioner penalties which are quite low, and (2) practitioner efficiencies sufficient to induce taxpayers to use practitioners, then we can associate the regime of the recent past with case (d) above. When practitioner penalties are negligible ($\pi_P = 0$), the use of practitioners results in lower revenues to the tax agency (since $\pi_P = 0 < \psi(\pi_T)$) and less compliant returns (since $\pi_P < \psi(\pi_T)$ implies $\pi_P < \phi(\pi_T)$). Moreover, increasing practitioner penalties (while remaining in this regime) increases both compliance and expected net revenues.

5. The Pure Compliance Objective Function

Assuming that the tax code itself embodies any welfare-maximizing principles of government, one plausible alternative objective for the tax agency is simply to enforce that code when it is cost-effective to do so (i.e., ignoring any additional revenue which penalties might generate, but still remaining cognizant of enforcement costs). This implies that the tax agency's objective is to maximize expected tax revenue net of enforcement costs (since over-reporting is a dominated strategy, we need not worry about this aspect of improper payment). Let $R_T(x,p)$ denote the tax agency's payoff from a return filed by the taxpayer and reporting income x , if the probability of detection is given by p . Let $R_P(x,p)$ denote the analogous payoff from a practitioner-filed return. Then

$$R_i(x,p) = ptI + (1-p)tx - cp^2,$$

for $i = T, P$. Thus when penalty revenue is ignored, the tax agency's objective is independent of who filed the return. Consequently, so is the optimal enforcement function: $\tilde{p}_P(x) = \tilde{p}_T(x) = t(I-x)/2c$. The taxpayer's expected net income function is as previously described by $N_i(x, p_i(x))$, resulting in equilibrium noncompliance of $I - \tilde{x}_T = (2c - v_T)/2t(1 + \pi_T)$ and $I - \tilde{x}_P = c/t(1 + \pi_T)$ for the cases of taxpayer-filed and practitioner-filed returns, respectively. Notice that now practitioner-filed returns are always less compliant than taxpayer-filed returns, since no extra effort is devoted to enforcement on practitioner-filed returns (as was the case in Sections 3 and 4). The equilibrium payoffs to the tax agency are now

$$R_T = tI + (2c - v_T)^2/16c(1 + \pi_T)^2 - (2c - v_T)/2(1 + \pi_T)$$

and

$$R_p = tI + c/4(1+\pi_T)^2 - c/(1+\pi_T).$$

A comparison of these two implies that the tax agency always prefers that a taxpayer file his own return, rather than using a practitioner. Finally, equilibrium expected net income for taxpayer-filed and practitioner-filed returns are now given by, respectively:

$$N_T = I - tI - u_e + (2c - v_T)^2/8c(1+\pi_T)$$

and

$$N_P - F^o = I - tI - u_P - v_P/2(1+\pi_T) + c(1+\pi_T - \pi_P)/2(1+\pi_T)^2,$$

where the latter incorporates the equilibrium fee $F^o = u_P + v_P/2(1+\pi_T) + c\pi_P/2(1+\pi_T)^2$.

Comparing net incomes under the two filing methods yields:

$$N_T (>, =, <) N_P - F^o \text{ as } \pi_P (>, =, <) B(\pi_T)/4c^2, \text{ where}$$

$B(\pi_T) = 8c(u_T - u_P)(1+\pi_T)^2 + 4c(v_T - v_P)(1+\pi_T) - (v_T)^2(1+\pi_T)$. Thus for sufficiently large practitioner efficiencies, practitioners will be used, despite the tax agency's preference for taxpayer-filed returns. For sufficiently small practitioner efficiencies, practitioners will be eschewed.

It is possible to compare the equilibrium outcomes under these alternative objective functions. Relative to the regime in which penalty revenue is included in the objective function, the regime which excludes penalty revenue involves: (1) a lower probability of detection (for a given level of reported income), for both types of return; (2) greater noncompliance, for both types of return; (3) a higher equilibrium probability of detection for taxpayer-filed returns, and the same equilibrium probability of detection for practitioner-filed returns (note: this probability is the composition of items (1) and (2)); (4) higher equilibrium expected net income for taxpayers, for both types of return; and (5) higher equilibrium practitioner fees. These results follow from the fact that the tax agency follows a less aggressive enforcement policy when penalty revenue is excluded from its objective function.

6. Conclusion

The model we have developed in this paper emphasizes the pure service aspects of tax practitioners -- their potential for lowering the costs to taxpayers of filing returns and facing the risk of detection. We have ignored therefore any purely informational role practitioners might play, for example, by providing expertise on legal requirements or identifying strategies for

minimizing tax liability. In fact, we have assumed away all informational asymmetries. Nevertheless we find that the effect of practitioners on the voluntary reporting behavior of taxpayers, and on the enforcement behavior and expected net revenues of the tax agency, can be quite complex. For the tax agency objective of expected net revenue maximization, the use of practitioners results in greater efforts at detection by the tax authority. However, depending on a variety of parameters, the use of practitioners can result in more or less compliance in equilibrium, and higher or lower expected net revenue to the tax agency.

When penalty revenue is excluded from the tax agency's objective function, the optimal enforcement functions for taxpayer-filed and practitioner-filed returns coincide, and practitioner-filed returns are less compliant than taxpayer-filed returns. The tax agency always prefers that taxpayers prepare their own returns, but when practitioner efficiencies are sufficiently large, taxpayers will engage a practitioner instead.

A great deal of scope remains for future research, much of it associated with the incorporation of informational asymmetries into the model, either between taxpayers and the practitioner or between taxpayers and the tax agency. For example, if some characteristic of taxpayers is unobservable to the tax agency but affects the decision to use a practitioner, then the observation that a practitioner was used could convey useful information to the tax agency. See Graetz, Reinganum and Wilde (1989) and Beck, Davis and Jung (1989) for contributions along these lines.

Endnotes

- * This paper is a revision, extension and substantial re-direction of "Tax Practitioners and Tax Compliance," Social Science Working Paper No.666, California Institute of Technology, March 1988.
- ** We gratefully acknowledge the financial support of National Science Foundation Grants SES-8903157 and SES-8902545 for Reinganum and Wilde, respectively, and thank two referees for helpful comments.
1. These estimates are based on the Special Academic Research File of the 1979 Individual Return Taxpayer Compliance Measurement Program (TCMP). See Dubin, et. al. (1989) for details.
 2. Stiffer penalties apply if the understatement is "willful" (\$500), or for "aiding and abetting" an understatement (\$1000).
 3. In a recent article in the Los Angeles Times (Jan. 23, 1988), it was reported that a California tax preparer was sentenced to five years probation, ordered to pay \$10,000 to compensate the state for investigation costs in addition to a \$20,000 fine, and to do 500 hours of community service work after pleading guilty to four felony counts associated with filing false state income tax returns. The preparer had claimed \$800,000 in fraudulent refunds on 500 state income tax returns.
 4. For a more extensive discussion of IRS objectives, see Graetz, Reinganum and Wilde (1986). Dubin, Graetz and Wilde (1990) provide data on recent trends in civil penalty rates and criminal enforcement.
 5. The classic economic approach to tax compliance dealt primarily with the behavior of the individual taxpayer when faced with probabilistic audit (e.g., Allingham and Sandmo, 1872; Srinivasan, 1973). More recently a tax agency has been added as an active participant (e.g., Landsberger and Meilijson, 1982; Greenberg, 1984; Graetz, Reinganum and Wilde, 1986; Reinganum and Wilde, 1986; Border and Sobel, 1987; Reinganum and Wilde, 1988; Melumad and Mookherjee, 1989; Mookherjee and P'ng, 1989; Beck and Jung, 1989; Beck, Davis and Jung, 1989; and Scotchmer and Slemrod, 1989).
 6. For a more extensive discussion of tax agency objectives see Graetz, Reinganum and Wilde (1986). For models in which the tax agency's objective is to maximize expected welfare subject to a revenue constraint, see Melumad and Mookherjee (1989) and Mookherjee and P'ng (1989).
 7. For models which allow the tax agency to precommit to an audit strategy see Reinganum and Wilde (1985), Border and Sobel (1987), Melumad and

- Mookherjee (1989), and Mookherjee and P'ng (1989).
8. For a more extensive discussion of the no-precommitment assumption, see Graetz, Reinganum and Wilde (1986) and Reinganum and Wilde (1986). See also Melumad and Mookherjee (1989), who argue that despite a lack of precommitment ability on the part of the tax agency, if there is a higher governing body which can precommit, then this body can (by altering the tax agency's incentive scheme) induce the tax agency to choose the "precommitment-optimal" policy without the tax agency itself being able to precommit. We consider the likelihood that such optimal incentives have been provided to be sufficiently low that a thorough examination of the no-precommitment case is of interest.
 9. Recent work by Graetz, Reinganum and Wilde (1986), Reinganum and Wilde (1986), Beck and Jung (1989) and Beck, Davis and Jung (1989) has modeled equilibrium compliance and enforcement under the assumption of asymmetric information. We use here the common knowledge assumption in order to focus on issues other than incomplete information, in particular, the service role of practitioners. This necessitates that $c(p)$ be nonlinear in order to obtain a well-behaved problem. However, this combination of assumptions is equivalent, from a modeling perspective, to assuming asymmetric information with respect to true gross income and constant audit costs, since the associated equilibrium will typically involve perfect signalling, as shown in Reinganum and Wilde (1986). The latter model, however, involves a substantial increase in technical complexity, so parsimony argues in favor of the combination of assumptions used in this paper. For a more extensive discussion of the assumption that $c(p)$ is nonlinear, see Reinganum and Wilde (1986).
 10. The penalty rate π_T is assumed to be independent of whether a practitioner is used. For a model in which the use of a practitioner shields the taxpayer from some penalties, see Graetz, Reinganum and Wilde (1989).
 11. Actual practitioner penalties do not vary as smoothly with unpaid taxes as do taxpayer penalties; rather they tend to be lumpy, depending on the extent of underpayment and the degree of "intent" involved (see footnotes 2 and 3). On the other hand, taxpayer penalties are not perfectly proportional either; they, too, typically involve lumpiness involving "willful" noncompliance. We will use a smooth approximation in both cases in order to ease calculation.

12. We assume that the practitioner charges a flat fee whether or not the taxpayer suffers enforcement action; thus the taxpayer buys full insurance against the cost of complying with enforcement action (denoted v_T). However, most CPA's and tax attorneys charge an additional fee for representation. In order to attract any customers (especially in the presence of competition), this fee would have to be less than v_T , and might possibly be as low as v_p . Thus even under the assumption of separate fees, the taxpayer who uses a practitioner buys partial insurance against the cost of complying with enforcement action. Completely separate markets for preparing returns and representing taxpayers in audit proceedings are difficult to sustain for several reasons -- in audit proceedings the practitioner is defending himself as well as his client and he holds a cost and informational advantage over other practitioners. We have considered the case in which competition among practitioners drives the representation fee to v_p ; the qualitative results of the model (as summarized in Figures 3 and 4) remain unchanged, though the algebraic expressions (such as $\phi(\pi_T)$ and $\psi(\pi_T)$) are somewhat more complex.

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