Alm, J., Cherry, T., Jones, M., & McKee, M. (2010). Taxpayer information assistance services and tax compliance behavior. *Journal of Economic Psychology, 31*(4), 577-586. Publisher's version available from www.elsevier.com (ISSN: 0167-4870). DOI: 10.1016/j.joep.2010.03.018

Taxpayer information assistance services and tax compliance behavior

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Abstract

The traditional "enforcement" paradigm of tax administration views taxpayers as potential criminals, and emphasizes the repression of illegal behavior through frequent audits and stiff penalties. However, an important trend in tax administration policies in recent years is the recognition that this paradigm is incomplete. Instead, a revised "service" paradigm recognizes the role of enforcement, but also emphasizes the role of tax administration as a facilitator and a provider of services to taxpayer-citizens. This research utilizes laboratory experiments to test the effectiveness of such taxpayer service programs in enhancing tax compliance. Our basic experimental setting mimics the naturally occurring environment: subjects earn income, they must choose whether to file a tax return, and they then must choose how much of their net income to report to a tax authority that may audit the subject. To investigate the effects of taxpayer services, we "complicate" these compliance decisions of subjects, and then provide "services" from the "tax administration" that allow subjects to compute more easily their tax liabilities. Our results indicate that uncertainty reduces both the filing and the reporting compliance of an individual. However, we also find that agency-provided information has a positive and significant impact on the tendency of an individual to file a tax return, and also on reporting for individuals who choose to file a return.

Keywords

Tax evasion; Tax compliance; Behavioral economics; Experimental economics

1. Introduction

In the traditional "enforcement" paradigm often used to analyze tax compliance behavior, taxpayers are viewed and treated as potential criminals, and the emphasis is on repression of illegal behavior through frequent audits and stiff penalties (Allingham and Sandmo, 1972 and Yitzhaki, 1974). More recently, many have come to realize that this paradigm is incomplete. An expanded "service" paradigm recognizes the role of enforcement, but also emphasizes the role of tax administration as a facilitator and a provider of services to taxpayer-citizens.[1] Indeed, many recent tax administration reforms around the world have embraced this new service paradigm, generally with significantly positive effects on citizen perception of the tax administration.

However, while such "kinder, friendlier" provisions may improve the image of the tax authority, their actual effect on tax compliance has not, to our knowledge, been systematically examined. In this paper, we utilize laboratory experiments to test of the effectiveness of taxpayer service programs both in encouraging an individual to file a return ("filing" compliance) and in increasing the individual's subsequent level of reported income ("reporting" compliance). Our results indicate that uncertainty reduces both the filing and the reporting compliance of an individual. However, we also find that agency-provided information has a positive and significant impact on the tendency of an individual to file a tax return, and also on reporting for individuals who choose to file a return.

The laboratory offers several advantages over empirical investigations based on field data, not the least of which is having a true measure of individual reporting behavior. In the field it is difficult to measure – and to measure accurately – something that by its very nature people want to conceal; in the laboratory we know the exact levels of compliance of all participants in the experiment. It is also difficult to control in econometric work using field data for the many factors that may affect the compliance decision and to identify their separate effects on compliance; in the laboratory we can alter policy parameters in an orthogonal fashion, so that we are better able to attribute behavioral changes to particular policy changes.[3] Particularly relevant here is the potential tradeoff between enforcement effort and service provision, as emphasized by Alm and Martinez-Vazquez, 2003, McBarnet, 2003, McBarnet, 2004, Kirchler et al., 2008, Braithwaite, 2003a and Braithwaite, 2009. Measuring and identifying their separate effects with field data are quite difficult; however, we are able to do so in the laboratory by introducing enforcement and services in separate treatments. Finally, it is necessary in compliance work to account for the heterogeneity of individual motivations across the taxpaying population and for the possible differential effects of tax agency practices that might shift some individuals from one class of behavior (e.g., non-compliant) to another (e.g., compliant) rather than making all individuals more compliant. Picciotto (2007) discusses a taxonomy of behaviors that is particularly relevant to our investigation; see also Kirchler et al. (2008). If the rules of compliance are ambiguous or subject to interpretation, an individual may intend to comply but may still be seen as non-compliant by the tax agency, and a taxpayer who expects to be misinterpreted by the agency may well feel justified in being intentionally non-compliant. These types of individuals are particularly interesting to examine because they may

view ambiguity of the rules as a justification for tax evasion and so may respond positively to the provision of assistance services. However, identifying these individuals with field data is problematic; in contrast, we are able to do so in the laboratory.

Our primary focus is on how an individual's tax reporting decisions are affected by tax agency provision of information (e.g., reporting compliance), in an environment in which individuals do not know with certainty their "true" tax liability. Our design allows us to study the decision to file as well (e.g., filing compliance), although this is not our primary focus. The basic experimental setting mimics the naturally occurring environment. In each tax period, subjects earn income, they must choose whether to file a tax return, and (conditional upon filing) they must choose how much of their net income to report to a tax authority that may audit the return. To investigate the effect of providing taxpayer information services, we "complicate" the filing/reporting decisions of subjects though multiple entries on the tax form and also through uncertainty regarding the subject's true tax liability. As a treatment variable, we then provide information services from the tax administration that allow subjects to compute more easily and accurately their tax liabilities. As noted, we find that the uncertainty reduces filing and reporting compliance, but that tax agency provision of information on an individual's tax liability is able to reverse – indeed, more than offset – these effects.

In the next section we discuss the theory underlying the individual filing and reporting compliance decision. We then present our experimental design, followed by the experimental results. We conclude in the final section.

2. Tax compliance as a behavioral phenomenon

At its most elemental level, the tax compliance decision can be cast in the economics-of-crime approach pioneered by Becker (1968) and first applied to compliance by Allingham and Sandmo, 1972 and Yitzhaki, 1974. Here the taxpayer is seen as facing a gamble between two states of the world: in one state the individual reports income (and so pays taxes), and in the other state the individual does not report income (and so evades taxes). The individual compares the expected utility from reporting (the safe option) with the expected utility of evading (the risky option).

More precisely, suppose an individual receives an income I, and must choose how much to report to the tax authorities. Reported income R is taxed at the rate t. Unreported income is not taxed; however, the individual may be audited with a fixed and known probability p, at which point all unreported income is discovered and a fine f is imposed on each dollar of unpaid taxes. The individual's income I_C if caught underreporting is

(1) $$I_C = I - tR - ft(I - R),$$

while if underreporting is not detected, income I_N is

(2) $$I_N = I - tR.$$

The individual chooses *R* to maximize the expected utility *EU*(*I*) of the evasion gamble, or

(3) $$EU(I) = pU(I_C) + (1 - p)U(I_N),$$

where utility *U*(*I*) is assumed to be a function only of income and where *E* is the expectation operator. This optimization generates the usual first- and second-order conditions, which can be solved to examine the responses of the individual to changes in the various parameters. For the interesting case where *R* < *I*, it is straightforward to show that increasing the probability of an audit and/or the fine rate will lead to higher compliance.

This approach is of course a significant oversimplification of the broad activity we call "tax evasion". The actual setting in which individuals make decisions is much more complex, and these complexities affect behavior in ways that go far beyond the scope of the standard model.

One simplification is that this approach examines only the *reporting* decision. There is also a prior *filing* decision, or whether or not to even file a tax return. To the extent that non-filers are not "in the system" and so are not at risk of being selected for audit, the traditional policy response of increased enforcement efforts is not effective. [6] Indeed, the traditional Allingham and Sandmo, 1972 and Yitzhaki, 1974 analyses of the *reporting* decision do not fully capture the elements of the individual's *filing* decision because submitting a tax return with underreported liabilities is inherently different from failing to submit a return at all. Evasion while filing and reporting raises the specter of an audit since the tax return is "in the system"; a return that has not been filed may be exposed to a much lower risk of audit. However, if the individual who has not filed a return is detected as having not filed, there may be additional penalties. There is also a time and resource cost of filing. The relevant tradeoff facing the individual is therefore a lower probability of detection for non-filing (plus a zero time and resource cost from non-filing) versus a higher penalty for detected non-filing. For this *filing* decision, the individual must compare the expected utility from filing versus the expected utility from non-filing, where an individual who files must also then determine the amount of income to report on the return. See Erard and Ho (2001) for a detailed analysis of the non-filing/filing decision.

Another important simplification in the standard theory is that it implicitly assumes that the individual knows with certainty the true tax liability. In fact, the computation of an individual's true tax liability is not a simple matter. The tax code is relentlessly complex, and the computation of allowable deductions, credits, and the like is frequently open to interpretation. Often, reporting that could be interpreted as evasion is simply a misunderstanding of the rules on the part of the taxpayer. In these cases, rulings can appear to be capricious, and the taxpayer may respond to such perceptions by actually reducing initial levels of compliance and waiting for an audit to provide the true interpretation. Thus, complexity in the tax regime can lead to lower compliance as the individual seeks to gamble more not less, and this effect may be exacerbated if

taxpayers become frustrated and respond to the complexity by intentionally evading (Kirchler et al., 2008 and Picciotto, 2007) In other cases, however, some individuals who face uncertainty about tax code interpretations may instead respond by overpaying their taxes, a response that is especially likely if the individual exhibits loss aversion. In short, the effects of complexity can go in the direction of either increasing or decreasing compliance.

One way to incorporate these considerations is to assume that the complexity assigns "fuzzy" values to the elements in an individual's set of reporting decisions (e.g., deductions and tax credits). In the simplest setting, this result of complexity can be viewed as a mean-preserving spread, and the degree of uncertainty is captured by the support of the distribution of the values (Rothschild & Stiglitz, 1970). Risk neutral individuals would simply base their reporting decisions on the mean value. However, a risk averse individual may anticipate the possibility of overpaying through uncertainty, and respond by evading more. Suppose that this same individual is informed through an audit that the uncertainty led to a significant penalty. This person may respond by evading more in the future reasoning that the ambiguity in the tax liability is the fault of the tax administration and that the evasion is justified. This is similar to the sort of behavior modeled by "regret theory", which gives rise to the widespread observation that people set a higher value for compensation demanded to part with a good than they are willing to pay to acquire the same good. This latter perspective suggests that compliance may be enhanced when individuals view their interaction with the tax authority in a positive light. In particular, when the services provided by the tax authority are viewed as helpful and the responses to questions are provided in a timely and accurate fashion, then compliance is likely to be higher than if the interaction is viewed as being adversarial.

There are of course other considerations that might enter an individual's calculus and complicate the "gamble" setting. Social psychologists study the compliance effects of individual perceptions of the transparency and fairness of tax administration (Kirchler et al., 2008).

Taken together, these factors lead us to modify the standard evasion model. Assume that an individual who files a tax return incurs both a time and financial cost C of filing a return, and a non-pecuniary (or psychic) cost associated with evading one's own tax liability if one is not caught, as captured by the variable γ. Note that the psychic cost associated with cheating arises only if one is actually cheating, as assumed and analyzed by Gneezy and Rustichini (2000). Thus, a taxpayer who complies fully and is not audited experiences no change in utility from the psychic cost of evasion.

Assume also that a filer may deduct some amount D from reported income R before paying taxes; alternatively, assume that the individual is allowed a tax credit against taxes. The actual level of allowable deductions or credits is both uncertain (given tax code complexities) and constrained (given institutions), so that tax liabilities cannot be reduced to zero. Further, assume that an individual who does not file a return escapes the filing cost C and the non-pecuniary cost γ; however, p' is the probability (possibly

equal to zero) that an individual who has not filed a return is apprehended by an audit, at which point he or she is forced to pay all unpaid taxes at rate t plus a (higher) penalty at rate f' on all unpaid taxes, where $f' > f$.
Finally, assume that the tax authority may provide "services". The greater is the service level of the tax authority, the lower is the uncertainty associated with allowable deductions and the lower is the cost C of completing a tax return. Also, the greater is the service level, the higher is the size of the psychic cost γ and the lower is the utility return to cheating.

An individual who chooses not to file a tax return (and so who declares no income) therefore has expected utility equal to

(4) $$EU(I) = (1 - p')U(I) + p'U(I - (1 + f')tI).$$

An individual who decides to file a tax return and declare income has income defined by modified versions of income in the two states of the world. With a tax deduction, income I_C now becomes

(5) $$I_C = I - t(R - D) - ft(I - (R - D)) - C,$$

and income I_N in Eq. (2) becomes

(6) $$I_N = I - t(R - D) - C - \gamma.$$

The definition of expected utility from filing (Eq. (3)) is unchanged, and is repeated here as Eq. (7), or

(7) $$EU(I) = pU(I_C) + (1 - p)U(I_N).$$

The individual now faces a more complicated calculus. The individual must first choose whether or not to file a tax return, by comparing the value of expected utility from non-filing from Eq. (4), with the expected utility of filing and then reporting the optimal amount of income and deductions in Eq. (7), using the modified definitions of I_C and I_N in Eqs. (5) and (6), respectively. If the individual decides to file a return, he or she must then choose the optimal amount of reported income and deductions, from the maximization in Eqs. (5), (6) and (7).

In the face of these many elements, it is straightforward to demonstrate in this framework that (under some conditions) improved tax administration services will improve filing and reporting compliance, both by reducing the uncertainty surrounding deductions and also by increasing the psychic cost of cheating from the adoption of a more helpful interaction between the tax authority and the taxpayer. The next section discusses our experimental design for examining these impacts.

3. Experimental design and treatments

Our experimental setting implements the fundamental elements of the voluntary reporting system of most country's individual income tax.[14] Participants earn income by performing a task, and they self-report tax liability to the tax authority. At the time of reporting only the individual knows his or her true level of tax liability, and the subject can choose to report any amount from zero on up. An audit occurs with an announced probability, contingent on filing a return, and any unreported taxes are discovered. If the participant has underreported tax liability, then both the unpaid taxes and a penalty are collected. An individual may also choose to not file a return, in which case the audit probability is reduced to zero in our setting. This process is repeated over a number of rounds each representing a tax period. Participants are informed that they will be paid their after-tax earnings at the end of the experiment, converted from lab dollars to US dollars at the rate of 80 lab dollars to 1 US dollar, and at the completion of the experiment all subjects are paid in private their individual earnings.[15] Into this setting, we introduce features that "complicate" the compliance decisions of subjects, and we then provide "services" from the "tax administration" that allow subjects to compute more easily their tax liabilities.

As in the naturally occurring setting, various factors complicate the tax reporting decision in our experiments. In addition to reporting earned income, an individual can claim an allowed deduction (or a reduction in taxable income) as well as a tax credit (or a reduction in tax owed, comparable to the US Earned Income Tax Credit). We set the tax deduction at 15% of income, and we introduce either a "Low Income Tax Credit" or a more general "Income Tax Credit"; in both cases the credit starts at a given level and declines at a stated rate as income increases, and in both cases the receipt of the tax credit is conditional upon filing. These credit and deduction amounts are chosen such that the participants perceive them to be salient.

These factors by themselves add some complexity to the tax reporting decision. Also, the exact levels of the deduction and the credit are, in some settings, uncertain to the taxpayer at the time of filing, so that their presence also results in potential tax liability uncertainty. Uncertainty about one's true tax liability and the provision of information services that resolves the uncertainty constitute the central treatments in our laboratory setting.

We implement the uncertainties on the credit and the deduction via mean-preserving spreads (with a uniform distribution) on the deduction and the tax credit. Thus, the participants are informed of the means of the allowed deduction and tax credit and the ranges for each.

Participants are also informed, with certainty, of the audit probability, the penalty rate, and the tax rate. We set the tax rate at 35% for all sessions; the penalty rate is also fixed for all sessions at 150% (e.g., the participants must pay unpaid taxes plus a penalty of 50% of unpaid taxes if audited). The audit probability is varied once within the session, and the participants are told that there is zero probability of audit if no tax form is filed; even so, the presence of the tax credit generates an incentive to file a tax return

because only filers are eligible for the credit. In the information services treatment, information is provided that is complete, accurate, and costless to the participant.

Table 1 summarizes the basic experimental design. Treatment T1 provides a baseline setting that entails no uncertainty and no tax authority information. The second treatment (T2) introduces uncertainty of tax liability. Participants in this treatment face uncertainty regarding their allowed deduction and tax credit, where we hold the level of this uncertainty constant throughout the treatment. The third treatment (T3) entails the same uncertainty as in the second treatment, but introduces the option of resolving the uncertainty by receiving information from the tax authority; that is, participants in this treatment are able to click on a button to reveal the true levels of the deduction and the tax credit. The parameters used for sessions are reported in Table 2.

Our experimental setting is very contextual, in order to provide the necessary degree of "parallelism" to the naturally occurring world that is crucial for the applicability of experimental results (Plott, 1987 and Smith, 1982). Our experimental interface and instructions use tax language throughout, the participants decide whether or not to file a tax return, and they disclose tax liability in the same manner as on the typical tax form (e.g., entering income, deductions, and credits on a tax form). There is a time limit on the filing of income, and the individual is automatically audited if he or she fails to file on time. A timer is shown on the screen; when there are 15 s remaining, the timer changes color to red, and the clock begins to flash as a reminder that the filing period is about to end.

Participants are recruited from the pool of undergraduate students and staff at a US public university. Upon arrival at the laboratory each participant is randomly assigned a computer located in a cubicle, and is not allowed to communicate with other participants. The instructions are conveyed by a series of computer screens that the participants read at their own pace. Clarification questions are addressed after the participants complete the instructions and participate in three practice rounds. The participants are informed that all decisions will be private; the experimenter is unable to observe the decisions, and does not know the individual earnings from the income earning task. The experimenter does not move about the room once the session starts, in order to emphasize that the experimenter is not observing participants' compliance decisions. These features reduce, as much as possible, both peer and experimenter effects that could influence participant decisions. Also, the participants are informed via the consent sheet that all responses are anonymous, that no individual identification will be collected, and that the only record of participation will be the receipt form signed to receive payment at the end of the session.

Table 1. Experimental treatments.

Tax liability uncertain?	Information service?	
	No	Yes
No	T1	–
Yes	T2	T3

Table 2. Experimental parameters.

Parameter	Values
Income	Mean = 50, high = 100, low = 10, increment = 10
Audit probability	0.3 and 0.4
Fine rate	150%, fixed across all sessions
Tax rate	35%, fixed across all sessions
Deduction	20%, with uncertainty via a uniform distribution
Income Tax Credit	Credit = 30 – 0.1 * income, with uncertainty via a uniform distribution
Low Income Tax Credit	Credit = 30 – 0.6 * income, with uncertainty via a uniform distribution

Subjects do not sign consent forms to further increase their anonymity. Participants are told via the instructions that payments will be made in private at the end of the session and that all responses are anonymous.

Taken together, these experimental procedures implement the properties of a double blind design. The lack of subject-to-subject interaction alone implements a single blind setting. The lack of subject-to-experimenter interaction, the strictly imposed subject anonymity through the computer interface (including the audit process), and the private payment mechanism to subjects implement a double blind design between the subject and experimenter.

Rounds proceed as follows. Participants begin each round by earning income based upon their performance in a simple computerized task, in which they are required to sort numbers into the correct sequence using the computer mouse. The individual finishing the task with the quickest time earns the highest income (100 “lab dollars”); the second place finisher earns 90 lab dollars, and so on. Ties in the earnings task are broken randomly. Individuals are informed of their earnings and those of the others in their group, without being able to identify individuals, in order to ensure that they believe the relative nature of the earnings. This represents the only information individuals have of others. After earning income, participants are presented with a screen informing them of their individual income in that round, as well as the tax policy parameters (i.e., the audit rate, the penalty rate, and the tax rate). The deduction reduces reported income; the credit directly reduces the amount of the taxes paid. Participants are informed that they may enter on the tax form the amounts they choose for their earned income, their deduction, and their tax credit. These choices determine the final taxes that they pay.[16] They are also informed that they may be audited, in which case all underreported taxes will be discovered and a penalty will be imposed.

In the sessions in which the allowed levels of the deduction and of the tax credit are uncertain, the participants are presented with a range from which the true value of the deduction and credit will be drawn. When information services are provided, the uncertainty range is again shown, but the participants are able to click on a button on the screen to have the true levels of deduction and tax credit shown. This information is both perfect and costless to the participant.

The tax form is not yet provided at this point. Participants may choose to get a form or not, and there may be a cost for the form to simulate the costs of assembling

information for computing tax liabilities. If the participant chooses not to obtain a tax form, then they do not file and they are not subject to an audit in the current round.[17] If the participant chooses to get the form, the cost, if there is one, is deducted from the participant's income for the round. Even if the participant obtains the form, the participant may still choose to not file by selecting the "Not File" button on the tax form page. Subjects are informed of all these procedures via the instructions and also via the feedback information provided during and at the end of the round.

If participants choose to file, then they must also choose the amount to report to the tax authority for each entry on the tax form (e.g., income, deduction, and credit). For each set of entries, the computer automatically calculates the resulting tax liability. Participants are able to experiment with different reports during the time allowed for filing and can observe the potential changes in their reported take home income. Since the tax filing season is limited, there is a time limit imposed in the experiment. A timer at the bottom of the tax form counts down the remaining time. The filing period is set at 120 s, and the counter begins to flash when there are 15 s remaining. If time expires and no tax form has been filed, then the participant is automatically audited and an additional 10% penalty is imposed. The process in the lab mimics that by which a taxpayer may well conduct different calculations in the time prior to actually filing her taxes (e.g., whether he or she uses one of the available tax software programs or simply does the tax return by hand).

Individual audits are determined by the use of a "virtual" bingo cage that appears on each participant's computer screen. A box with 10 balls (blue and white) appears following the tax filing. The balls begin to bounce around in the box, and after a

Table 3. Aggregate results by experimental treatment.

Treatment	Tax form filing rate	Reporting compliance rate
No uncertainty (T1)	0.6948 (0.4607)	0.6731 (0.4763)
Uncertainty – no information (T2)	0.7029 (0.4572)	0.6205 (0.4990)
Uncertainty – information (T3)	0.7282 (0.4452)	0.7044 (0.4986)

[a] Means are reported with standard deviations in parentheses.

brief interval a door opens at the top of the box. If a blue ball exits, the individual participant is audited; a white ball signifies no audit. The fraction of blue balls determines the audit probability.[18] The audit applies only to the current period declarations, not to previous (or future) periods. The computer automatically deducts taxes paid and penalties (if any are owed) from participants' accounts. When an audit occurs, the true values of the uncertain components (the deduction and the tax credit) are used, and the participant's declarations are examined. If the participant has underreported the tax liability, then a fine is imposed; however, no refund is made for cases where the participant has overpaid the tax liability by claiming deductions below the allowed deductions or credits below the true credit. Following the audit process, participants see one final screen that summarizes everything that happened during the round.

A few additional design elements are worth mentioning. If no information is provided in the tax liability uncertainty treatment (T2), then participants learn their true liability only if they are audited. If the taxpayer has overpaid taxes for any reason and is audited, any excess tax payments are not returned to the taxpayer, as is sometimes the practice of the tax authorities.[19] The audit probabilities are set at values of 0.3 or 0.4, and all participants experience both rates during the session.[20] The probability that an individual is detected evading taxes is the same for all lines on the tax return, or income, credits, and deductions. The fine rates are consistent with penalties imposed by the IRS for evasion. To focus on tax compliance decisions (filing and reporting), we do not introduce a public good financed by the tax payments, so the tax payments are not transferred to the taxpayers in any way.

The dedicated experimental lab consists of 25 networked computers, a server, and software designed for this series of experiments. Sessions were conducted at a major state university, using both students and staff as participants. Recruiting was conducted using the Online Recruiting System for Experimental Economics (ORSEE) developed by Greiner (2004). The participant database was built using announcements sent via email to all students and staff. Participants were invited to a session via email, and were permitted to participate in only one tax experiment, although other experimental projects are ongoing at the time and participants may have participated in other types of experiments. Only participants recruited specifically for a session were allowed to participate, and no participant had prior experience in this experimental setting.[21] Methods adhere to all guidelines concerning the ethical treatment of human subjects. Earnings averaged $18 for student subjects. Staff participants received a higher exchange rate to reflect their higher outside earnings, and average payoffs for staff were $28.

4. Results and analysis

One hundred and thirty-one individuals participated in the experiment. Table 3 reports the aggregate figures for *filing* behavior and *reporting* behavior by treatment. The aggregate numbers indicate that uncertainty concerning tax liability results in lower reporting compliance rates but that providing information that resolves the uncertainty increases reporting. With uncertainty, the overall *reporting* compliance rate is 0.62 (T2), which is statistically lower than the 0.67 rate without uncertainty ($p = 0.025$) (T1). Further, reporting compliance significantly increases when information services are provided in the uncertain setting (T3): 0.70 versus 0.62 ($p = 0.001$). In the aggregate data, *filing* behavior does not appear to be affected

Table 4. Estimates for tax form filing and reporting compliance behavior.

Independent variables	Dependent variable	
	Tax form filing	Reporting compliance rate
Constant	0.8081*** (0.000)	0.6719*** (0.000)
Income	−0.0003** (0.020)	−0.0006** (0.012)
Wealth	−0.0003*** (0.000)	−0.0002*** (0.000)
Audit probability	0.0107 (0.907)	−0.0339 (0.813)
Lag audit	–	−0.0099 (0.330)
Tax form cost	−0.1323*** (0.000)	–
Tax liability uncertainty	−0.0426** (0.021)	−0.1424*** (0.000)
Tax agency information	0.0475** (0.028)	0.1972*** (0.000)
Age	0.0022*** (0.007)	0.0074*** (0.000)
Male	−0.1607*** (0.000)	−0.3622*** (0.000)
Prepare own tax	0.0293** (0.036)	0.0557*** (0.003)
Dependent	0.1314*** (0.000)	0.3187*** (0.000)
χ^2	221.15 (0.000)	676.40 (0.000)
N	2620	2489

[a] All estimations control for individual and period effects; p-values are shown in parentheses. The dependent variable in the tax form filing estimation equals 1 if individual i files a tax return in period t and 0 otherwise; the dependent variable in the reporting compliance rate estimation is the ratio of reported taxes to true taxes of individual i in period t.

* Significance at the 10% level.

** Significance at the 5% level.

*** Significance at the 1% level.

by uncertainty or information services. The probability of filing is not statistically different between the certain and uncertain treatments (p = 0.72) or between the uncertain treatments with and without information services (p = 0.29).

Note that that the filing rate is approximately 70% across the three treatments despite the fact that the audit probability if no return is filed is zero. While this behavior may seem anomalous, it is in fact consistent with maximizing behavior on the part of the participants. Recall that subjects are allowed to claim a tax credit, but only if they file a tax return. Given the presence of the Low Income Tax Credit, roughly 40% of the subjects in a given session have an incentive to file because the tax owed is negative and the tax credit is refundable; the percentage is higher in the case of the more general Income Tax Credit. Further, if any individuals underreport income in the presence of either credit, then the effective credit is even higher, and even more individuals have an incentive to file.

We turn to a conditional analysis at the individual level to confirm the initial impressions from the aggregate data. We estimate the effects of uncertainty and information services on filing and reporting while holding other factors constant, using the basic specification of

$$Y_{i,t} = \beta_0 + \beta_1 Income_{i,t} + \beta_2 Wealth_{i,t} + \beta_3 AuditProbability_{i,t} + \beta_4 TaxLiabilityUncertainty_i + \beta_5 TaxAgencyInformation_t + \beta_6 X_i + \psi_t + u_i + \varepsilon_{i,t}, \quad \textbf{(8)}$$

where the dependent variable $Y_{i,t}$ denotes subject *i*'s decision either to file a tax form or to report income in period *t*; $Income_{i,t}$ is subject *i*'s earned income in period *t*; $Wealth_{i,t}$ is subject *i*'s accumulated earnings (or *Wealth*) in period *t*; $AuditProbability_{i,t}$ is the audit rate for subject *i* in period *t*; $TaxLiabilityUncertainty_t$ is an indicator variable that signifies the presence of uncertainty about tax features in period *t*; $TaxAgencyInformation_t$ is an indicator variable that signifies the presence of agency-provided in period *t*; X_i is a vector of demographic variables (e.g., subject age, subject sex, subject own preparation of tax returns, subject claimed as a dependent on parental tax returns); ψ_t is a set of $T - 1$ dummies that capture potential non-linear period effects; u_i are random effects that control for unobservable individual characteristics; $\varepsilon_{i,t}$ is the contemporaneous additive error term; and ψ_k is the coefficient for variable *k*. We also include a dummy variable for whether the individual is audited in the previous period, and, in the filing equation, we include $TaxFormCost_{i,t}$, or the price subject *i* must pay to obtain a tax form in period *t*.

For the tax form *filing* decision, we report the results for a linear probability model, with the dependent variable defined as the probability that individual *i* files a tax form in period *t* ($Y_{i,t}$ equals 1 if the form is filed and 0 otherwise). [22] For the tax *reporting* decision, we report results for a Tobit model with the dependent variable defined as the reporting compliance rate of individual *i* in period *t* ($Y_{i,t}$ equals reported tax paid divided by true tax owed of individual *i* in period *t*). [23] In all cases, we employ panel methods to control for subject heterogeneity and time period effects. Our estimates are presented in Table 4.

The conditional estimates confirm our initial impressions. Estimated coefficients from the *reporting* model indicate that the presence of uncertainty lowers the reporting compliance rate (significant at the 0.000 level), but that the provision of information service that resolves the uncertainty increases tax reporting to more than offset the uncertainty effect (significant at the 0.000 level). Estimates from the tax form *filing* rate model also correspond to the aggregate results. These results indicate that tax filing behavior is slightly affected by tax liability uncertainty and that the effect is offset almost exactly by the provision of information services (both coefficients significant at the 0.03 level or better). Thus, it appears that taxpayers underreport their liabilities in the face of uncertainty; when this uncertainty is resolved, the taxpayers respond by increasing their tax reporting but not by materially increasing their probability of filing.

The remaining coefficients are generally consistent with results reported in the literature (Alm, Jackson, & McKee, 1992a). Filing and reporting are higher for women than men, and are negatively correlated with both income and wealth. Filing is also negatively correlated with the cost of obtaining the tax forms. The audit probability is not a significant determinant of filing or reporting in this more complex setting, although the range of the audit probabilities used here may not be sufficient for us to generalize the results. Those who prepare their own taxes appear to be more prone to file and to be more truthful in reporting tax liability.

5. Conclusions

How do taxpayers respond to tax agency information that both provides services to the taxpayer and also reduces the uncertainty associated with income reporting? Faced with uncertainty concerning true tax liability, a taxpayer may respond by reporting more or less than the expected tax liability. The taxpayer may also simply choose not to file a tax return when faced with uncertain liabilities and the possibility of making an overpayment or when faced with a penalty for an underpayment detected via an audit. In our simplified laboratory setting, taxpayers earn income and qualify for a deduction and a credit. The taxpayers must choose to obtain a tax form, and can opt to file or not. A simple audit and penalty process is introduced in which the tax agency discovers the true tax liability through the audit. Penalties are imposed for non-compliance whether due to information uncertainty or deliberate misreporting. Importantly, we introduce uncertainty regarding both an allowed deduction and an allowed tax credit, and, to simulate the information services of a "kinder, friendlier" tax agency, we introduce an information service available at some monetary cost to the taxpayer.

Our results show that individuals report less tax when their liability is uncertain, but that this lower reporting is more than offset when the tax agency provides information at low cost to the taxpayer. This suggests that recent IRS policy actions to increase taxpayer services may be a useful tool to combat tax evasion. Similarly, we also find that tax uncertainty reduces filing but that information provision again offsets the uncertainty effect on filing; this latter result is of particular interest because non-filing is difficult to detect and punish in the field. Future work will expand this research in several directions, including consideration of additional levels of informational uncertainty and extra assistance in completing tax forms.

More broadly, our results indicate clearly that strategies to improve compliance must be based on more than improved enforcement only. Instead, what is needed is a multi-faceted policy approach that emphasizes enforcement, but one that also emphasizes other administrative policies such as services. Put differently, detection and punishment must be present – the "punishment" paradigm – but other tools are needed as well, tools that reflect the provision of better services to taxpayers consistent with the "service" paradigm. In short, there should be a wide range of policies to reflect the equally wide range of motivations that lie behind individuals' compliance decisions.

Acknowledgements

The research reported here was partially funded by the IRS (TIRNO-07-P-00683). The views expressed are those of the authors, and do not reflect the opinions of the Internal Revenue Service (IRS) or of any researchers working within the IRS. An earlier version of this paper, with pilot data only, was presented at the 2007 IRS Research Conference, under the title "I'm From the IRS and I'm Here to Help You"; we are grateful to Kim Bloomquist and participants at the IRS Research Conference for helpful comments on this earlier version. We are grateful to the editor Erich Kirchler and two anonymous referees for helpful comments on this version.

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