

The Influence of Tax Audits on Reporting Behavior

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The Internal Revenue Service estimates that the gap between income taxes owed and income taxes voluntarily paid amounted to \$95 billion in 1986—a figure representing nearly one-half of the federal budget deficit for that year. This revelation prompted Congressman Byron L. Dorgan to launch a bipartisan task force investigation of ways to reduce the tax gap. One of the recommendations of the task force was to raise the audit rate from its 1986 level of 1.14 percent to 2.50 percent by 1992. If this recommendation were to be enacted, the increased examinations, in principle, could have both direct and indirect revenue consequences. A higher audit rate would translate directly into increased tax revenues through the collection of greater amounts of unpaid taxes and penalties. In addition, there would be two potential sources of indirect revenue gains. First, if audited taxpayers respond to the examination experience by improving their compliance in subsequent years, then a higher frequency of tax audits should promote additional future tax revenues. Second, if taxpayers who are not audited nevertheless perceive a greater threat of examination, they also may improve their compliance behavior. Although researchers have had some success in quantifying the direct impact of tax examinations on tax revenue, relatively little is known about the indirect effects of tax audits on tax compliance. In this essay, the influence of tax audits on subsequent year reporting behavior is investigated using IRS data sources on taxpayers who were the targets of an audit in one year and, purely by chance, were the subjects of a second audit two years later.

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Conceptual Issues

In the early economic models of tax evasion (e.g., Allingham and Sandmo 1972), tax audits do not provide any information that would influence future reporting behavior. In these models, taxpayers are already aware of the (exogenous) probability of audit and detection; they know their true taxable incomes; and they are familiar with the penalties for noncompliance. Based on this information, they choose an amount to report to maximize expected utility. An audit is simply an instance of a taxpayer losing the "tax lottery"; no information is gained that would be useful in future reporting decisions. In more recent models, researchers allow for the possibility that taxpayers may not be fully aware of their tax circumstances. For example, in Alm (1988), Beck and Jung (1989), Scotchmer (1989), and Scotchmer and Slemrod (1989), taxpayers are uncertain of their true levels of taxable income. Under conditions of uncertainty, it is feasible that an audit might play a valuable informational role that would influence future taxpayer reporting activities. Taxpayers who want to comply with the tax laws may gain a better understanding of how the laws apply to their particular circumstances from an audit. This would make it possible for them to file more accurate returns in the future. In contrast, strategic tax evaders may use the information they obtain from audits to develop more effective noncompliance strategies. In addition to gaining a better understanding of their true tax liabilities, these individuals may learn about such enforcement issues as the detectability of noncompliance, opportunities for the appeal of tax judgments, and criteria for the imposition of penalties that would be of use to them in forming future reporting strategies.

An important issue ignored in most models of tax compliance is the repeated nature of tax reporting activities. Greenberg (1984) examines the issue of auditing within a multiperiod framework. His results indicate that making audit probabilities contingent on the results of previous audits can be effective in reducing the overall level of tax evasion. Tax evasion is discouraged in his model by a policy of auditing all future returns of persistent tax offenders. If audit probabilities are conditioned on prior audit experience, it is plausible that taxpayers will take this information into account when forming noncompliance strategies, as they do in Greenberg's model.

The quality of a taxpayer's audit experience also may influence his or her subsequent reporting decisions. Tittle (1980) summarizes evidence indicating an important relationship between perceptions of fairness and compliance with societal rules and regulations. A positive audit experience may encourage future tax compliance; a negative audit experience may discourage it.

Prior Empirical Research

Although a fair amount of empirical research has been performed on the general deterrent effect of an audit (e.g., Beron, Tauchen, and Witte 1988; Dubin and Wilde 1988; Tauchen, Witte, and Beron 1989; Witte and Woodbury 1985) there have been relatively few studies of the specific deterrent effect of an audit on subsequent year reporting behavior. Spicer and Lundstedt (1976) examine the relationship between prior audit experience and tax compliance using survey data on 130 Ohio households. The authors find a positive relationship between an index of reported tax evasion and prior audit experience based on a multiple regression; however, the authors do not state how the evasion index was created. If the index was based on reported prior tax evasion, then the results simply may be an indication that returns that understate income are relatively more likely to be audited.

Spicer and Hero (1985) perform an experimental study of factors influencing taxpayer compliance decisions. This study involves a game played by thirty-six University of Colorado undergraduates in which the participants were asked to make tax reports based on their true income, a random audit probability, and a preannounced penalty rate. The game was played for ten rounds.¹ The results indicate a significant positive relationship between tax compliance on the final round and the number of prior audit experiences. This finding is rather curious, given the random nature of the audit selection process used in the experiment. The authors do not state whether participants were able to observe the frequency of audits taking place in each round. If the frequency of audits could not be observed, it is plausible that taxpayers relied on personal audit experience to gauge the random audit probability. An alternative explanation is that those participants who experienced a number of audits began to doubt that the audit selection process was, in fact, random. A second finding from this study is that the level of evasion on the final round of play is positively correlated with the level of evasion on the first round, indicating the persistence of noncompliance over time.

Long and Schwartz (1987) investigate the impact of tax audits on subsequent year reporting behavior using audit data from an IRS Taxpayer Compliance Measurement Program (TCMP) panel study. This data source contains information on 2,171 taxpayers who were subjected to audits of their 1969 tax returns and, subsequently (without prior warning), of their 1971 returns.² The

1. The participants were informed of the length of the game prior to beginning play.

2. The data used in this study consist of a stratified random sample from the population of filers of nonbusiness returns with adjusted gross incomes of less than \$50,000 and filers of business and farm returns with less than \$10,000 income.

TCMP audits experienced by these taxpayers differed from ordinary operational IRS audits in two important ways. First, the returns were randomly chosen for audit. IRS ordinarily targets returns for audit that are expected to result in substantial tax changes. The random nature of the audit selection process for this experiment makes it possible to compare the audit results for 1969 returns in the sample with those for 1971 returns without the need to control for the possible confounding influences of a nonrandom audit selection criterion. Second, the audits were unusually thorough in that every line item on the return was examined. In contrast, ordinary IRS audits typically concern only a small number of issues relating to a tax return. The thoroughness of the TCMP audits allows relatively accurate measurement of tax non-compliance. The authors perform a statistical comparison of audit results for the 1969 and 1971 tax returns in the sample. Differences in both the frequency and magnitude of tax adjustments across years are examined. The results indicate that the 1969 TCMP audit was marginally effective in reducing the overall frequency of 1971 tax noncompliance by taxpayers in the sample, but not its average size. In addition, the frequency of large tax adjustments (adjustments of more than \$1,000) was not significantly different between the samples of 1969 and 1971 tax returns. Unfortunately, the very features that facilitated an analysis of the data—random selection and audit thoroughness—limit the generalizability of the results from this study to the responses of taxpayers experiencing ordinary operational audits. Because taxpayers were notified that TCMP audit selection was random, they may not have formed the same perceptions as they would have had they been selected for audit under an ordinary program. Moreover, as the authors point out, the unusual thoroughness of the audits may have resulted in atypical taxpayer experiences.

Data Sources

The current study is based on two IRS data sources. The first is the 1982 IRS TCMP Survey. This data source contains the results of thorough, line-by-line audits of a large stratified random sample of 1982 federal individual income tax returns. In addition to information about the 1982 tax return audits, the data file includes limited information about the prior year return characteristics of all taxpayers in the TCMP sample, including whether their previous two tax returns were audited. In contrast to the 1982 TCMP examination, any audits of 1980 or 1981 tax returns would have been ordinary operational audits. Thus, the data set contains information about two groups of individuals: (1) taxpayers who were targeted for an ordinary audit in one year who, purely by chance, were selected for a thorough TCMP audit in a subsequent year; and (2) taxpayers who were selected for a thorough TCMP audit who

had not been audited in the recent past. In addition to indicators for whether either of a taxpayer's previous two tax returns were audited, the data file contains information concerning the results of these prior audits. The file contains the net amount of recommended tax and penalty assessments for those taxpayers who agreed with the auditor's finding. In those cases where the recommended tax and penalty assessments from a prior audit were appealed, the data file contains the actual amount of tax and penalty assessments that were imposed if the case was settled by the time the 1982 TCMP data set was created. Unfortunately, the tax and penalty assessment field for prior audits that were not settled by this time contains the same code used to indicate that the prior audit resulted in no recommended tax change, thus rendering these two cases indistinguishable. Another potential limitation of this data source is that, in a small number of cases, the audit of a prior year tax return may have been a direct result of the 1982 TCMP audit.³

The second data source is based primarily on the 1985 TCMP Survey. Although the TCMP survey for that year does not include the prior audit history of taxpayers, this information was obtained through a social security number match with IRS records on audits of 1983 and 1984 tax returns that were closed by the end of the 1988 processing year. These records include nearly all 1983 audits and the vast majority of 1984 audits that were performed. Information from the 1985 TCMP Survey was used to identify those 1983 and 1984 tax return audits that were initiated in response to the 1985 TCMP examination. The data obtained through this match includes the examiner-recommended tax and penalty assessments resulting from the prior audits. Also available is information concerning the disposition of prior audit cases. From this information, it is possible to determine whether the taxpayer agreed with the examiner-recommended tax and penalty assessments or if these assessments were protested. Unfortunately, this data source contains no information about the prior year return characteristics of taxpayers in the 1985 TCMP Survey who did not experience a prior audit.

Clearly these two data sources have different relative merits and flaws. The first data source contains some information about prior year return characteristics both for taxpayers who experienced prior audits and for those who did not. However, the data on prior audit assessments is incomplete, and no information is available concerning the disposition of prior audit cases. The second data source contains no information about the prior year return characteristics of taxpayers who were not audited, but it contains complete

3. According to IRS sources, it is possible that the recording of prior year audit histories may have taken place after some of the 1982 TCMP cases were completed and posted to the master file. As a result, a small number of the prior year return audit cases identified may actually have been initiated in response to findings from the 1982 TCMP examination.

information on prior audit assessments as well as the disposition of prior audit cases.

In the next section, a methodology is developed for taking advantage of the relative merits of these data sources to investigate the influence of tax audits on subsequent year reporting behavior.

Methodology

Both of the data sources for this study contain the audit history of the returns taxpayers filed for the two years preceding the filing of the TCMP tax year return. Tax returns normally are selected for audit over a period of approximately one year, beginning in October of the year the returns are filed. For example, 1990 tax year returns are due in April 1991. Audit selection for these returns will most likely take place between October, 1991, and September, 1992. As a result of the timing of the audit selection process, many audits of returns filed for the tax year immediately preceding the TCMP tax year would not have taken place prior to the filing of TCMP tax year returns. Consequently, I focus on the impact of audits of returns filed two years prior to the filing of the TCMP tax year return on TCMP tax year compliance.

Two approaches are used to examine the influence of a tax audit on subsequent year reporting behavior. The first approach involves an examination of whether taxpayers who experienced tax changes from a prior year audit experienced lower tax changes from their subsequent year TCMP audits. Such a finding would be consistent with the notion that audits have a positive influence on subsequent year tax compliance. However, because factors other than prior audit experience are not controlled for, the results of this analysis will be subject to alternative explanations. If other aspects of the taxpayers' compliance decisions were changing over the periods under investigation, then they, rather than the audit, may be responsible for the observed changes in reporting behavior. For measurement reasons, only taxpayers who experienced substantial tax changes as a result of their prior year audits are used in the comparison. Because ordinary operational audits generally involve only a small number of line items on a return, nondetection of tax noncompliance is a relatively more serious problem for these audits than it is for TCMP audits. A small audit change resulting from an ordinary examination might indicate either a relatively compliant return or a return with large amounts of undetected noncompliance. By focusing only on cases in which the prior year return audit uncovered substantial noncompliance, nondetection of tax noncompliance poses a less serious problem. If a prior year return shows a great deal of noncompliance and a subsequent year return subjected to a more thorough audit shows little noncompliance, this is relatively strong evidence of a movement toward more compliant reporting. As pointed out by Susan B. Long, however, it is expected that a group of taxpayers with large prior audit

assessments, even in the absence of a positive audit effect, would show some reduction in overall tax noncompliance simply because of regression toward the mean. Thus, an improvement in compliance by taxpayers with substantial prior year audit assessments would not provide conclusive evidence of a positive influence of tax audits on subsequent year tax compliance.

The second approach to examining the influence of tax audits on subsequent year tax compliance involves an analysis of whether, after controlling for factors that influence the compliance decision, taxpayers who have experienced recent prior audits differ in their compliance behavior from those who have not experienced recent prior audits. A difficulty in performing this analysis is that the selection of returns for ordinary operational audits is not random. Rather, selection is based on IRS perceptions of the likelihood that an audit will uncover substantial reporting errors. If compliance behavior is correlated over time, it is important to control for the role of the audit selection process in subsequent year compliance outcomes. It is possible to control for this process in a limited way using the 1982 TCMP data set. This set contains the prior year levels of reported income as well as indicators for presence of Schedule C (business) and Schedule F (farm) returns for all taxpayers in the sample. When the IRS selects returns for audit, it classifies returns into audit classes on the basis of these variables.⁴ Audit coverage tends to be greater within the business and farm return classes than the nonbusiness classes. Moreover, within a return category, audit coverage tends to be higher among the upper reported-income classes.⁵ Within an audit class, the IRS selects returns for audit based on tax return characteristics and other available information that are judged to be significantly related to tax noncompliance.

To analyze the influence of an audit on subsequent year reporting behavior, a two-equation sample selection model is estimated. The first equation is a probit specification of the IRS decision to audit a taxpayer's 1980 tax return. This decision is modeled as a function of the limited information available on the prior year return characteristics of the taxpayer. The second equation specifies noncompliance on the TCMP year tax return as a function of taxpayer characteristics, including prior audit experience. To account for the mass of taxpayers in the sample who apparently file perfectly compliant returns, a tobit specification for TCMP tax year noncompliance is employed.⁶ The model is specified as follows.

4. Actually, the income concepts used for classification (total positive income and total gross receipts) are somewhat different than the measure that is available (adjusted gross income).

5. This information is detailed in the 1982 Annual Report, Commissioner and Chief Counsel, IRS, 50.

6. Taxpayers who either correctly report or overreport taxable income are treated as compliant taxpayers in this model.

$$A_i^* = \beta_1' X_{1i} + \epsilon_{1i},$$

and

$$N_i^* = \beta_2' X_{2i} + \gamma A_i + \epsilon_{2i},$$

where A_i^* is a latent variable for the propensity of IRS to audit the i^{th} taxpayer's prior year return; A_i is a dummy variable for whether or not the i^{th} taxpayer's prior return actually was audited; N_i^* is a latent variable for the propensity of the i^{th} taxpayer to underreport taxable income on his or her 1982 tax return; and X_{1i} and X_{2i} are vectors of explanatory variables for the i^{th} taxpayer. The prior audit indicator is included to capture the influence of an audit on subsequent year reporting behavior.

To control for possible sample selection bias resulting from the prior year audit selection procedure, a correlation, ρ , is allowed between the disturbances ϵ_{1i} and ϵ_{2i} . It is assumed that these disturbances are jointly normally distributed with variances of one and σ^2 , respectively. If ρ were equal to zero, this would imply the absence of sample selection bias from the prior year audit selection process. In this case, the prior year audit equation would be independent of the subsequent year noncompliance equation in the model, and simple equation tobit estimation could be employed to consistently estimate the impact of a prior audit on TCMP year tax noncompliance. A zero correlation would exist if taxpayer compliance decisions were independent across tax years. In this case, unobservable factors that influenced the IRS's decision to audit a return in one year would be uncorrelated with subsequent year tax noncompliance. In their experimental study, Spicer and Hero (1985) find that taxpayer compliance decisions are positively correlated over time. A positive value for ρ would imply that unobserved factors that positively influenced the chances of an audit in one year (other factors held constant) would be associated with greater subsequent year tax noncompliance.

The following example illustrates the importance of accounting for the role of the audit selection process in subsequent year compliance outcomes. Suppose that the same taxpayers were responsible for deliberate noncompliance each tax season and that audits had no impact on their reporting behavior. One tax season, the tax authority learns of the reporting strategy being used by these willful evaders and audits all returns consistent with the known evasion strategy. In the subsequent year, a random sample of tax returns is subjected to audit. The results indicate that taxpayers who experienced a recent prior audit tend to have greater levels of noncompliance than those who did not experience a recent prior audit. Unless the prior year audit selection procedure were taken into account, a researcher would incorrectly conclude from this finding that audits have a detrimental impact on subsequent

year tax compliance. The failure to appreciate the difference between the role of audit experience and the role of audit selection in subsequent year compliance outcomes can result in biased inferences.

Although the IRS, perhaps, does not have such accurate knowledge of the identities of tax evaders as the tax authority in the above example, it is capable of identifying factors that are correlated with noncompliance on tax returns. If unobserved factors that influence the IRS's decision to audit a return (e.g., suspicious-looking deductions) represent manifestations of persistent behavioral factors influencing taxpayer compliance decisions (e.g., an enduring desire to "beat the system"), it is important to control for the role of the audit selection process in subsequent year compliance outcomes. In my model, the role of audit selection in subsequent year tax noncompliance is captured by the correlation term; the role of audit experience in subsequent year tax noncompliance is captured by the audit dummy.

Because audit rates tend to be low, the vast majority of observations in the data set are for taxpayers who did not experience a recent prior audit. To reduce the computational burden involved in the estimation of the model, only a one-in-eight randomly chosen subsample of taxpayers with no recent prior audit experience is used in the estimation. The entire subsample of taxpayers with a prior audit experience is used. To correct for the bias introduced by this choice-based sampling approach, a method developed by Manski and Lerman (1977) involving the maximization of a pseudolikelihood function is employed. This procedure involves weighting the contribution of each observation to the likelihood function by the reciprocal of its probability of being kept in the sample.⁷ This procedure generates consistent and asymptotically normally distributed estimators.

Results

In this section, the results of the two approaches for analyzing the influence of tax audits on subsequent year reporting behavior are presented and discussed.

Results of the First Approach

The first approach to analyzing the influence of an audit on subsequent year reporting behavior is to examine whether taxpayers who experienced large audit adjustments on their prior year tax returns tended to experience smaller audit adjustments on their TCMP year tax returns. Table 1 presents information on the real (1982 dollars) tax and penalty assessments for taxpayers who

7. For example, since the probability that the return of a taxpayer with no recent prior audit experience is kept in the sample is $1/8$, observations from this category are given a weight of 8.

TABLE 1. Frequency of TCMP Tax and Penalty Assessments by Prior Year Audit Assessment Range for Taxpayers with Large Prior Year Audit Assessments (in percentages)

TCMP Assessment	Prior Year Audit Assessment Range		
	\$501 to \$1,000	\$1,001 to \$5,000	More than \$5,000
Tax Year 1982 ^a			
Less than \$500	6.83	7.97	2.70
\$500-101	0.12	3.80	1.61
\$100-1	5.56	0.90	0.18
\$0	28.61	10.78	21.16
\$1-100	16.29	5.67	8.99
\$101-500	21.82	31.41	2.17
\$501-1,000	8.97	15.64	20.25
\$1,001-5,000	10.00	19.82	16.99
More than \$5,000	1.81	4.00	25.95
Unweighted N	663	255	68
Tax Year 1985 ^b			
Less than \$500	1.19	4.92	3.84
\$500-101	0.79	12.64	3.42
\$100-1	5.24	4.89	2.49
\$0	24.09	11.39	16.28
\$1-100	9.42	6.31	10.03
\$101-500	32.59	27.86	11.37
\$501-1,000	14.06	12.25	3.67
\$1,001-5,000	11.53	16.27	32.86
More than \$5,000	1.10	3.49	16.05
Unweighted N	204	356	176

^aPrior year is 1980.

^bPrior year is 1983.

experienced audits of their TCMP year returns in a period subsequent to their being audited for the returns they filed two years earlier.⁸ Only taxpayers experiencing a real assessment of more than \$500 on their prior year returns are included in the table. The statistics are weighted to make the results representative of the general filing population. Both the 1982 and 1985 TCMP data sources indicate a strong tendency for improvement in compliance by taxpayers with substantial prior year audit assessments. For the 1982 TCMP

8. In the case of the 1982 TCMP data source, no taxpayers were included who experienced audits of their 1981 tax returns. The purpose of this measure was to minimize the possibility that the 1980 tax return was audited as a result of the 1982 TCMP examination.

data source, only 21 percent of taxpayers experiencing a prior audit assessment in the \$501 to \$1,000 range experienced a TCMP audit assessment of this much or more, while 29 percent of these individuals had no audit assessment at all from their TCMP examinations. For the 1985 TCMP data source, the corresponding figures are 27 percent and 24 percent, respectively. For the 1982 TCMP data source, only 24 percent of all taxpayers experiencing a prior audit assessment in the \$1,001 to \$5,000 range received a TCMP audit of this amount or more, while 11 percent had no audit assessment at all from their TCMP examinations. For the 1985 TCMP data source, the corresponding figures are 20 percent and 11 percent, respectively. For the 1982 TCMP data source, only 26 percent of taxpayers experiencing a prior year assessment in the greater than \$5,000 range experienced a TCMP audit adjustment that was also in this range, and 21 percent actually had no audit assessment at all from their TCMP examinations. The corresponding figures from the 1985 TCMP data source are 16 percent and 16 percent, respectively. The unweighted statistics (not presented) show less dramatic, but still substantial, improvements in reporting behavior by these taxpayers. In contrast to the Long and Schwartz (1987) finding for taxpayers with large prior year audit assessments, the results presented here are encouraging, particularly when one considers that TCMP audits are relatively more likely than operational audits to detect any noncompliance that is present. Although a fair proportion of taxpayers experience substantial audit assessments in both years, a much larger proportion show improved tax compliance from the prior audit year to the TCMP tax year; in fact, perfect TCMP year tax compliance is observed for a substantial proportion of these individuals. Although this result is consistent with a positive influence of audits on subsequent year tax compliance, the evidence is not conclusive. As mentioned previously, some improvement in compliance is expected among taxpayers with large prior audit assessments simply as a result of regression toward the mean.

Explanatory Variables for the Second Approach

The second approach to analyzing the influence of tax audits on subsequent year tax reporting behavior is to estimate a two-equation sample selection model of prior year audit selection and current year tax noncompliance. This model involves the joint estimation of a probit specification for whether a taxpayer's 1980 income tax return was audited and a tobit specification for the level of noncompliance on the taxpayer's 1982 tax return. The explanatory variables included in the probit equation are:

- CON80—a unit vector for estimating the constant term;
- INC80—the maximum of the taxpayer's reported adjusted gross in-

come or \$5,000, divided by \$100,000 as a normalization;

- *SCH80*—a dummy for whether the taxpayer completed a Schedule C (business) return for tax year 1980; and
- *SCHF80*—a dummy for whether the taxpayer completed a Schedule F (farm) return for tax year 1980.

As discussed in the previous section, these variables are related to the classification scheme used in determining audit coverage rates.

The dependent variable in the tobit equation for noncompliance is the difference between the examiner-determined and taxpayer-reported levels of taxable income, divided by \$1,000 as a normalization. This is a rather broad measure of noncompliance that accounts for inaccurate reporting of both income and deduction items. The explanatory variables for the compliance equation were selected after considering the variables used in previous TCMP studies of tax compliance by Clotfelter (1983), Alexander and Feinstein (1987), and Erard (1990). The variables used in the current study include:

- *CON*—a unit vector for estimating the constant term;
- *IMAR*—a dummy for married return;
- *TOTDEP*—the total number of dependents;
- *165*—a dummy for the taxpayer claiming age exemption;
- *INCOME*—the maximum of adjusted gross income or \$5,000, divided by \$100,000 as a normalization;
- *EASY*—a dummy for a return with wages, salaries, and interest as the only income source, with interest income less than \$400;
- *SCHC*—a dummy for Schedule C return;
- *SCHF*—a dummy for Schedule F return;
- *SCHD*—a dummy for Schedule D return;
- *MTAX*—the statutory marginal tax rate; and
- *AUD80*—a dummy for audit of 1980 tax return.

Whenever possible, the explanatory variables are based on examiner-determined values. This is desirable in that examiner-determined values should represent a better approximation of true taxpayer characteristics. To distinguish clearly between the subpopulation of taxpayers who experienced a prior audit of their 1980 tax returns and the subpopulation of taxpayers who did not, taxpayers experiencing audits of their 1981 tax returns are excluded from the analysis. In addition, taxpayers whose second prior year return was not a 1980 tax return also are excluded from the study.⁹

9. These two exclusion criteria resulted in the elimination of 262 observations.

Results of the Second Approach

Table 2 presents (weighted) summary statistics for selected variables from the 1982 and 1985 data files.¹⁰ Separate statistics are presented for taxpayers with and without prior audit experiences. Notice that taxpayers who have experienced prior audits tend to have much higher levels of income, are relatively more likely to file Schedules C, D, or F, and are relatively unlikely to have "easy" returns. For the subsample of taxpayers in the 1985 data file who experienced a prior audit, the table also provides the proportions of taxpayers who experienced no audit assessment, agreed with a recommended audit assessment, protested a recommended audit assessment, or failed to acknowledge a recommended audit assessment.

The audit-induced changes in taxable income and tax amount tend to be substantially larger for taxpayers with prior audit experience than for taxpayers with no prior audit experience. Although this finding would be consistent with a negative influence of audits on subsequent year reporting behavior, it also may be attributable to other factors that differ among the two groups of taxpayers. This issue is investigated using the sample selection model described in the previous section. The results of the analysis indicate a small and statistically insignificant value for the correlation ρ between the disturbances of the two equations in the model. This result is somewhat surprising, because it implies that there is no correlation between unobserved factors that influenced the IRS decision to audit a taxpayer's 1980 return and unobserved factors that influenced the taxpayer's 1982 tax report. As mentioned previously, such a finding is consistent with the notion that, in the absence of an audit, taxpayer compliance decisions are independent across tax years; however, this assumption seems implausible. One would expect that a taxpayer who has a relatively high propensity toward noncompliance in one tax year, in the absence of any substantial changes in his or her circumstances, will have a relatively high propensity toward noncompliance in subsequent years as well.¹¹

Table 3 presents the results of estimating the single equation tobit model that applies under the zero disturbance correlation restriction that cannot be rejected by the data. The coefficient of the prior audit experience dummy is positive but not statistically significant. A significant positive coefficient would imply that tax audits have a detrimental impact on subsequent year tax

10. The weighting procedure accounts both for the original stratification of the data sample and the one in eight sampling rule for taxpayers with no prior audit experience.

11. Even if the noncompliance is unintentional, it seems likely that a taxpayer who is prone to making reporting errors in one year, in the absence of any substantial changes in his or her circumstances, will be likely to make reporting errors in subsequent years as well.

TABLE 2. Summary Statistics

Characteristic	Prior Audit	No Prior Audit
Married	66.7%	51.0%
Age over 65	13.9%	11.6%
Easy filer ^a	9.3%	31.8%
Schedule C filer	29.3%	10.8%
Schedule F filer	4.5%	3.5%
Schedule D filer	29.4%	9.6%
Total dependents	0.89	0.68
Adjusted gross income	\$41,390	\$19,996
1982 income change	\$ 2,600	\$ 887
1982 tax change	\$ 842	\$ 226
Unweighted N	1,489	5,744
1985 Data Set		
Married	67.4%	51.5%
Age over 65	10.1%	11.1%
Easy filer ^a	7.1%	30.8%
Schedule C filer	28.4%	12.1%
Schedule F filer	5.7%	2.3%
Schedule D filer	28.8%	11.9%
No change	24.3%	—
Agreed	50.1%	—
Protest	2.5%	—
Other	23.1%	—
Total dependents	1.08	0.69
Adjusted gross income	\$43,497	\$23,415
1985 income change	\$ 2,686	\$ 975
1985 tax change	\$ 815	\$ 279
Unweighted N	1,837	5,631

^aOnly wage and interest income, with interest income less than \$400.

compliance. The second column of the table presents the results of an extended analysis in which two additional variables are included in the compliance equation.¹² The first additional variable is equal to 100 times the ratio of 1980 tax and penalty assessments to total 1980 tax liability (including penalties) for taxpayers who experienced a positive 1980 audit assessment.¹³

12. The full sample selection model was estimated for this specification. Since the estimated correlation again was both small and insignificant, the tobit model results are presented.

13. Recall that a zero value is recorded in the assessment field for taxpayers whose cases were unsettled by the time the 1982 TCMP audit was performed. This introduces some unavoidable specification error in the extended analysis.

For all other taxpayers, this variable has a value of zero. The second additional variable is equal to 100 times the ratio of the absolute value of the audit assessment to total reported tax liabilities for taxpayers who experienced a negative 1980 tax assessment. For all other taxpayers, this variable has a value of zero. These variables are included to examine whether there is a relationship between the size of 1980 tax assessments as a percentage of tax liability and 1982 tax noncompliance, after controlling for other factors. The results indicate that 1982 tax noncompliance tends to be larger for taxpayers with large positive 1980 tax assessments as a proportion of tax liability than for taxpayers with similar characteristics whose 1980 tax returns were not

TABLE 3. Results for 1982 Data

Variable	Basic Analysis	Extended Analysis
Constant	-3.787 (-12.94)	-3.805 (-12.99)
Married	0.157 (.62)	0.157 (.61)
Total dependents	0.192 (2.33)	0.193 (2.34)
Age over 65	-0.766 (-2.49)	-0.759 (-2.46)
Easy filer	-1.143 (-2.28)	-1.184 (-2.36)
Schedule C filer	4.128 (20.16)	4.125 (20.12)
Schedule F filer	3.896 (17.96)	3.891 (17.87)
Schedule D filer	0.578 (2.82)	0.579 (2.82)
Income	0.204 (6.42)	0.206 (6.53)
Marginal tax rate	8.992 (15.41)	9.075 (15.55)
Prior audit	0.371 (.89)	-0.227 (-.47)
Positive percent change	—	0.042 (3.16)
Negative percent change	—	0.025 (.84)
σ	7.30 (179.3)	7.30 (179.5)
Likelihood function	-20,332.6	-20,330.3
Unweighted N	7,233	7,233

Note: T-statistics are in parentheses. The dependent variable is the change in taxable income (in thousands of dollars).

audited. In this extended model, the coefficient on prior audit experience becomes negative, but it remains statistically insignificant.

Table 4 presents the results of applying the same basic tobit model of noncompliance to the 1985 TCMP data. Because a substantial number of 1983 tax return audit cases were not closed by the time taxpayers filed their 1985 tax returns, the results are presented both for the entire sample of returns and for a restricted sample that includes only those taxpayers whose audits

TABLE 4. Results for 1985 Data

Variable	Basic Analysis		Extended Analysis	
	Full Sample	Restricted Sample	Full Sample	Restricted Sample
Constant	-6.366 (-17.90)	-6.250 (-16.50)	-6.375 (-17.95)	-6.260 (-16.50)
Married	-0.298 (-1.12)	-0.290 (-1.02)	-0.297 (-1.11)	-0.292 (-1.02)
Total dependents	0.012 (0.15)	0.019 (.21)	0.012 (.15)	0.018 (.26)
Age over 65	-0.911 (-2.92)	-0.888 (-2.68)	-0.914 (-2.93)	-0.887 (-2.67)
Easy filer	0.561 (1.03)	0.558 (.97)	0.537 (.99)	0.532 (0.93)
Schedule C filer	4.651 (22.00)	4.670 (20.60)	4.660 (21.98)	4.670 (20.60)
Schedule E filer	1.526 (5.45)	1.500 (4.96)	1.530 (5.46)	1.500 (4.95)
Schedule D filer	-0.174 (-.81)	-0.119 (-.52)	-0.168 (-.78)	-0.117 (-.50)
Income	0.013 (.316)	0.058 (1.44)	0.013 (.32)	0.057 (1.41)
Marginal tax rate	20.86 (22.90)	20.34 (20.80)	20.88 (22.80)	20.36 (20.81)
Prior audit	1.395 (3.70)	0.790 (1.33)	0.405 (.56)	-0.324 (-.28)
Agreed	—	—	0.920 (1.03)	1.290 (.93)
Protest	—	—	0.046 (.27)	-0.634 (-0.11)
Other	—	—	2.580 (2.44)	3.653 (1.81)
<i>n</i>	7.70 (167.8)	7.61 (155.9)	7.70 (167.0)	7.61 (155.0)
Likelihood function	-19,627	-16,693	-19,265	-16,692
Unweighted <i>N</i>	7,468	6,414	7,468	6,414

Note: *T*-statistics are in parentheses. The dependent variable is change in taxable income (in thousands of dollars).

were closed by the time they filed their 1985 returns. The results for the basic analysis are quite similar for the full and restricted data sets. They both imply a positive relationship between prior audit experience and tax noncompliance, although the result is statistically significant only for the full data sample. The statistically significant result for the full data sample is driven by those taxpayers whose 1983 audit cases were not settled by the time they filed their 1985 returns. Perhaps these taxpayers did not wish to alter their reporting behavior prior to learning the final outcome of their prior audit cases. An extended analysis was performed in which additional explanatory variables for the disposition of the 1983 audit were included. These variables concern whether the examiner-recommended audit assessment was agreed to, protested, or not acknowledged by the taxpayer. The base case, captured by the prior audit dummy in this specification, is that of a taxpayer experiencing no audit change as a result of his or her 1983 tax return examination. The estimated coefficient of the prior audit dummy in this specification is negative, indicating an improvement in compliance for taxpayers experiencing a prior audit with no additional tax assessment, but its value is not statistically significant. The dummy variable for the "other" disposition category is the only disposition variable to have a significant coefficient. The positive value of this coefficient indicates that noncompliance by taxpayers in the "other" disposition category increased following their prior year audit experience. This category consists of certain problem cases, including taxpayers who refused to acknowledge the examiner-recommended 1983 tax assessments and those who could not be reached regarding the examiner-recommended 1983 tax assessments.

Sensitivity Analysis

As discussed previously, it is somewhat troubling that the hypothesis of sample selection bias (a nonzero value for ρ) is rejected by the data. It has been argued that if unobserved factors influencing compliance behavior are positively correlated across tax years, the value of ρ also should be positive. To examine the sensitivity of the results to the value of the correlation coefficient, the sample selection model was reestimated restricting the value of ρ to take on the values of .1, .2, and .4, respectively. Table 5 presents the results of this experiment.¹⁴ Notice that even with $\rho = .1$, a prior audit experience is estimated to have a negative and significant influence on subsequent year tax noncompliance, after controlling for other factors. The impact of a prior audit

14. The prior audit equation is not of primary interest in this essay. To protect IRS interests, the estimated coefficients for this equation are not presented.

TABLE 5. Results for the Constrained Selection Model

Variable	$\rho = 1$	$\rho = 2$	$\rho = 4$
Constant	3.752 (12.78)	3.723 (12.69)	-3.679 (-12.63)
Married	0.160 (.62)	0.160 (.63)	0.195 (.77)
Total dependents	0.193 (2.34)	0.193 (2.35)	0.198 (2.46)
Age over 65	-0.768 (-2.47)	-0.769 (-2.48)	-0.746 (-2.45)
Easy filer	-1.143 (-2.29)	-1.152 (-2.30)	-1.140 (-2.29)
30 Schedule C filer	4.167 (20.32)	4.200 (20.47)	4.210 (20.60)
50 Schedule F filer	3.903 (17.86)	3.916 (17.87)	3.929 (17.77)
50 Schedule D filer	0.580 (2.80)	0.578 (2.80)	0.633 (3.11)
Income	0.208 (4.37)	0.224 (4.80)	0.245 (5.14)
Marginal tax rate	9.000 (15.10)	8.989 (15.10)	8.858 (15.03)
Prior audit	-1.423 (-3.26)	-3.103 (-7.21)	-6.544 (-16.10)
σ	7.29 (178.1)	7.32 (178.6)	7.37 (177.4)
Likelihood function	-21,284.5	-21,290.5	-21,333.0
Unweighted N	7,233	7,233	7,233

Note: T statistics are in parentheses. The dependent variable is change in taxable income (in thousands of dollars)

becomes quite important as the value of ρ increases. Restricting ρ to take on a positive value imposes the assumption that taxpayers who were selected for audits of their 1980 returns, in the absence of the audit experience, would have been more noncompliant than taxpayers with similar observable characteristics who were not selected for audits of their 1980 returns.

The econometric results presented here are based on the unweighted sample of returns.¹⁵ Similar results are obtained when a weighted analysis is performed. In addition, comparable results are obtained when the examiner-recommended change in taxes is substituted as the dependent variable in the tobit compliance equation. Finally, a bivariate probit model of prior year audit

selection and subsequent year tax noncompliance was estimated. The implications of the results of that analysis are comparable to the tobit results presented here.

Summary

Two approaches to investigating the impact of tax audits on subsequent year reporting behavior were employed. The first approach involved an examination of whether taxpayers who experienced a large audit change in one year showed improved tax compliance in a subsequent year. The results of investigating two separate data sources indicate that a substantial proportion of taxpayers demonstrate improvements in compliance following a large audit assessment. Although this result is consistent with a positive influence of audits on subsequent year tax compliance, the evidence is not conclusive. At least a portion of the improvement in tax compliance is attributable to regression toward the mean. Moreover, this approach does not control for other aspects of the taxpayer's compliance decision that may have been changing over the period between the initial audit and the subsequent year TCMP audit.

In the second approach, a sample selection model was estimated to examine whether taxpayers who experienced a prior audit differed in their subsequent year reporting behavior from taxpayers who did not experience a prior audit, controlling for taxpayer characteristics and the prior year audit selection process. The results do not indicate a positive relationship between taxpayer compliance and prior audit experience after controlling for these factors. However, the correctness of this finding hinges on the restriction, accepted by the data, that the unobserved factors influencing prior year audit selection are uncorrelated with the unobserved factors influencing subsequent year tax noncompliance. It is plausible that those taxpayers who are targeted for an audit in one year would be relatively more likely, in the absence of the audit, to file noncompliant returns in future years than taxpayers with similar observable characteristics who are not targeted for an audit. If this assumption is imposed in the form of a restriction on the correlation term in the sample selection model, then a significant deterrent effect of tax audits on subsequent year reporting behavior is obtained.

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