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Encouraging Filing: Tax Credits and Social Safety Nets

James Alm

Todd Cherry

Michael McKee

Michael L. Jones
Bridgewater State College, m3jones@bridgew.edu

Encouraging Filing via Tax Credits and Social Safety Nets

James Alm, Georgia State University;
Todd Cherry and Michael McKee, Appalachian State University;
and Michael Jones, Bridgewater State College

A nontrivial fraction of the noncompliance associated with the personal income tax is due to individuals who are not "in the system," not having filed a tax return in the recent past or perhaps ever. Erard and Ho (2001) have referred to those who have not filed as "ghosts," and have investigated the extent to which this phenomenon contributes to the tax gap. This phenomenon is most prevalent among middle-to low-income persons who are often "under the radar" of the tax authority because they receive income not subject to third-party withholding. While the tax owed by such persons on their incomes is individually small, the aggregate amount contributes substantially to the tax gap, perhaps as much as $27 billion in Tax Year 2001. A problem confronting policymakers is how to encourage these individuals to join the system by filing a tax return. The payoff to the government from such inclusion may be very high, and evidence suggests that once individuals initially file a tax return they continue to do so in the future.

There are several potential avenues for encouraging tax filing. One prominent class of policies encouraging tax participation is the receipt of direct benefits under various income transfer programs and public sector pensions, including social insurance programs like Social Security. Receipt of benefits associated with these programs can be used to encourage tax filing since being "in the system" may be a condition for eligibility. The use of tax credits like the Earned Income Tax Credit (EITC) and the child care tax credit to affect participation is a more targeted approach. The behavioral issues in all cases include the role of risk attitudes, the prevalence of present-biased preferences (i.e., myopic decisionmaking), and the impact of the compliance costs associated with taking advantage of these programs. For example, the EITC is somewhat complicated, and this feature has probably led to lower participation.[1]

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[1] There also exist other policies that may increase compliance and participation. Anxiety reduction for potential taxpayers as they approach the tax agency (i.e., emphasizing a "kinder, gentler, tax agency") may increase compliance and participation. Research has shown that taxpayers respond to positive inducements to comply (Alm, Jackson, and McKee, 1992), but there may be consequences of such positive inducements on initially compliant taxpayers. Tax amnesties can be an effective means of allowing taxpayers to "wipe the slate clean" if they have evaded taxes in the past (Alm, McKee, and Beck, 1990). Similarly, perceptions of fairness have a significant effect on individual decisions (Cherry and List, forthcoming). Also, some current tax policies often permit individuals to claim losses from some classes of earnings (e.g., capital gains, self-employment income) against income taxes

The difficulty in assessing the effects of such policies is the obvious one: any such effects depend on the behavioral responses of individuals currently not filing tax returns and so not currently observable by the tax authority. Indeed, studies of nonfiling using field data are not numerous. While compliance behavior is difficult to observe in the field, nonfiling is even more hidden. Crain and Nourzad (1993) compared the characteristics of those who evade while filing versus those who choose simply not to file. In the most detailed and comprehensive study of nonfiling, Erard and Ho (2001) use IRS information to estimate the factors that affect nonfiling. Also, see Alm, Bahl, and Murray (1991) for an analysis of nonfiling in Jamaica.

As with all studies based on field data, these studies suffer from not having direct measures of noncompliance (e.g., the use of reported income, not unreported income), from being forced to contend with various econometric issues (e.g., the endogeneity of audit selection arising from budgets for audit activities), and from not being able to control for all variables that might affect taxpayer reporting decisions (e.g., changes in the tax laws, taxpayer attitudes, economic conditions). Further, there are few changes in the rules for tax credits and/or income support programs, and such changes as do occur are often confounded with other effects such as changes in macroeconomic conditions.

Some quasi-natural experiments have also been studied. The introduction of the EITC has provided an opportunity to observe changes in the characteristics of filers. Most recently, one could study the effects of the Bush Administration "stimulus package" tax rebate checks on the filing behaviors of citizens, although those data are not yet available. In the case of the EITC, Scholz (1994) uses 1990 Survey of Income and Program Participation (SIPP) data, and finds that the participation rate for the EITC is between 80 percent and 86 percent. See also Kopczuk and Pop-Eleches (2007).

Since it is the behavioral responses of individuals whom the tax authority cannot directly observe that are of interest, the laboratory is a natural arena to investigate the effects of policies aimed at increasing tax participation. Although there are numerous experimental studies that examine

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imposed on other wage and salary income, but only if the individual files a tax return. While these policies are typically understood as focusing on higher-income taxpayers, the programs also affect middle-and low-income taxpayers and those working outside the purview of the tax authority (e.g., individuals with part-time self-employment or with cash only businesses). Provided an individual has taxable income from wages and salaries, he or she can benefit from the use of offsets. Indeed, the presence of loss offsets may encourage individuals to undertake entrepreneurial activities involving some risk of incurring losses. "Social norms" may also affect tax compliance. There has been work in this area, and the results suggest that such motives can have a positive effect on compliance. Even so, there has been little literature on filing itself. See, for example, Cummings, Martinez-Vazquez, McKee, and Torgler (forthcoming).

behavioral responses of those individuals who already file a tax return (e.g., Becker, Buchner, and Sleeking, 1987; Webley et al. 1991; Alm, Jackson, and McKee, 1992; Alm, Jackson, and McKee, 1993; Gerxhani and Schram, 2006; Cummings, Martinez-Vazquez, McKee, and Torgler, 2008), there are, so far as we can ascertain, no experimental analyses of filing inducements, in which subjects have the option to file or not to file a tax return.

Accordingly, our research here is directed at assessing the effects on filing of reinforcing the social insurance aspect of the fiscal system and of providing tax credits, either of which is received only if the taxpayer files a return. To examine these issues, we introduce in a controlled laboratory setting various filing inducements, including social safety nets and tax credits. Our results are preliminary, but suggest that such inducements can increase tax filing, with the most effective policy being tax credits that are simple to obtain.

The Filing Decision

The traditional theoretical development of the compliance decision typically begins with the assumption that the individual has already chosen to file a return. Evasion is then modeled as a gamble in which the states of nature are being caught or not being caught, where, if caught, a fine is assessed (Allingham and Sandmo, 1972). The individual then decides only the amount of income to report and so the amount to evade. A rational individual is viewed as maximizing the expected utility of the tax evasion gamble, weighing the benefits of successful cheating against the risky prospect of detection and punishment. The individual pays taxes because he or she is afraid of getting caught and penalized if he or she does not report all income. This approach gives the plausible and productive result that compliance depends on audit rates and fine rates. Indeed, the central point of this approach is that an individual pays taxes because—and only because—of this fear of detection and punishment. See Andreoni, Erard, and Feinstein (1998), Alm (1999), and Slemrod and Yitzhaki (2002) for comprehensive surveys and discussions of this literature.

This compliance decision has been extensively investigated using field and lab data. For those who file, the traditional recipe of increased audits and/or increased penalties is the recommended policy for increasing compliance, subject of course to taxpayer awareness of the enforcement effort increase (Alm, Jackson, and McKee, 2007).

Of perhaps more interest is the issue of the filing decision. To the extent that nonfilers 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.[2] Indeed, the traditional Allingham and Sandmo (1972) analysis does not fully capture this key element of the individual's decisions.

For the filing decision, the individual must compare the expected utility from filing versus the expected utility from nonfiling, where an individual who files must also then determine the amount of income to report on the return (e.g., the compliance decision). Erard and Ho (2001) expand the traditional model to include both the filing and the compliance decisions, by constructing a sequential decision process that includes such steps as the choice of income withholding, the decision to file, and the compliance decision. The framework is an extension of the typical "gamble" model of evasion, but incorporates the more realistic setting that reflects the true decision setting of the taxpayer. In their framework, the decision to not file is influenced by the costs of filing, the probability of being identified as a nonfiler, and the penalties for not filing. To these, one should also incorporate the potential benefits from such tax credits as may exist and the existence of a social safety net where the benefits and/or coverage may be conditional on prior tax filings. Both the tax credit and the expected value of the social safety net represent positive inducements to file. It is these positive inducements that our experimental design investigates.

Experimental Design

The experimental design captures the essential features of the voluntary income reporting and tax assessment system used in many countries. Human participants in a controlled laboratory environment earn income through their performance in a task. The participants must decide how much of this income to report to a tax agency. Taxes are paid on reported income only. However, unreported income may be discovered via a random audit, and the participant must then pay the owed taxes plus a fine based on the unpaid taxes.[3] This income earning, income reporting, audit, and penalty process is repeated over a number of rounds that each represent a tax period. At the

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[2] Most audit schemes are based on factors that are reported on tax returns and that past audit results indicate are associated with large amounts of unreported income (e.g., the Internal Revenue Service use of a "DIF" score). Individuals who do not file a return are obviously not at risk of audit from such audit schemes.

[3] It may be argued that current audit practice in many countries also implements endogenous audits, since a taxpayer either elicits an audit or not depending on his or her "score" in an audit rule. However, whether a taxpayer is actually audited depends both on the score and on the audit budget of the tax authority. Since the taxpayer cannot know this latter item with certainty, there remains a random component to the audit process. See Alm and McKee (2004) for an experimental examination of this type of endogenous audit selection rule.

completion of the experiment, all participants are paid in cash their laboratory market earnings converted to U.S. dollars.

These experiments are designed to inform policymakers, and so must satisfy the experimental precept of "parallelism" (Smith, 1982). Parallelism is satisfied when the experimental setting captures the essential elements of the decision problem faced in the naturally occurring setting. It is neither necessary nor desirable that the experimental setting implement all of the complexity of the naturally occurring setting (Plott, 1987). As implemented, our experimental design follows the elements of much of the earlier experimental research, but incorporates additional features to improve parallelism with taxpayers' decisionmaking in the naturally occurring world. Participants earn income by performing a task (rather than receiving an endowment), they must choose how much income to report, and they face an audit process similar to that in the naturally occurring setting. Importantly, participants must choose whether or not to file a return. The experiments utilize tax language in the instructions and the computer interface. While the stakes are small, the decision is also simplified, implying that the ratio of decision costs to rewards parallels the naturally occurring setting.

Participants are recruited from the pool of undergraduate students at a major public university. On arrival at the laboratory, participants are assigned to a computer station. The lab server assigns participants to groups (consisting of seven to ten persons depending on the total number of participants in the session). Basic instructions are provided via hardcopy, while the main instructions are provided via a series of screen images. After the practice rounds are completed, any final procedural questions are answered. Participants are not allowed to communicate with one another during the session. They are not told the exact duration of the experimental session, which is predetermined to last for 20 real rounds. Sessions take on average 70 minutes to complete. Participant earnings range from $14 to $38, depending on task earnings, reporting behavior, and audit experience. Participants are told that payments will be made in private at the end of the session and that all responses are anonymous.

The earnings task requires participants to sort the digits 1 through 9 into the correct ascending order from a randomized order presented in a 3 by 3 matrix. Participants do this by pointing the computer mouse and "clicking" on the numbers in the correct sequence. On their computer screens, a 3 by 3 matrix with the digits in random order appears on the right side of the screen; as the numbers are "clicked," they appear in a 3 by 3 matrix on the left side of the screen. A counter on the screen shows the elapsed time from when the first number is "clicked" and also when all nine numbers have been ordered. Participants click the Continue button to transmit this

time to the server. Actual income is then determined by the relative speed
of performance, with the fastest performer receiving the highest income and
the slowest performer receiving the lowest income. Once all participants
have completed the income task, they are informed via the computer of their
incomes for the round and presented with a screen that provides details of
the policy in effect, where they are informed of the tax rate, the audit prob-
ability, and the penalty rate on discovered evasion. For the credit treatments,
participants are informed of the level of the tax credit they are eligible to
receive and that this is conditional on filing a tax return. For the income
support treatments, participants are informed of the probability of being un-
employed, the duration of unemployment, and the income support they are
eligible to receive. The unemployment benefits are determined as follows.
The number of filing periods for eligibility is stated in the instructions, and
the benefit is a stated percentage of the average of the incomes filed during
the periods required for eligibility.

  The tax form is not provided at this point. Participants may choose
to get a form or not, where there may be a cost for the form. If participants
choose not to obtain a tax form, then they do not file and are not subject to
an audit in the current round. If participants choose to get the form, then
the cost, if there is one, is deducted from income for the round. Even if
participants obtain the form, they may still choose not to file by selecting the
Not File button. Since the tax filing season is limited, there is a time limit
imposed (75 seconds), and a counter at the bottom of the tax form informs
participants of the time remaining. If the time expires and a tax form has
not been filed, participants are automatically audited, and an additional 10
percent penalty is imposed.

  At the end of the session, participants complete a short questionnaire
asking age, gender, and whether they prepare and file their own taxes. If
they respond "No" to this last question, we assume that their parents are re-
sponsible for tax preparation, given that participants are college sophomores,
juniors, and seniors.

  The process of determining who is audited is generated by a com-
puterized draw. After the return is filed, participants are presented with an
animated (computerized) representation of a bucket from which a draw is
made. In this bucket, there are 10 blue and white balls in total, with a white
ball signifying no audit and a blue ball denoting an audit. Each taxpayer
is audited independently. The balls "bounce" in this bucket, and, after a
randomly determined interval, a door opens, and a ball exits the bucket
through this door. The color indicates whether the taxpayer will be audited.
Participants choosing not to file a tax return are presented with a screen that
informs them that they will not be audited in the current round.

After the audit process has been completed, taxpayers are presented a new screen that provides earnings and audit outcome summaries for the round. When group audit outcomes are provided, the end-of-round information screen reports the number of audits conducted in the current round and the fines collected via audits in the current round.

As part of our investigation, we incorporate the effects of complexity on the propensity to claim the credit because a credit that is not claimed is unlikely to enhance filing. We also incorporate the role for taxpayer information services, following on the preliminary investigations reported in Alm, Jones, and McKee (2007). Complexity is introduced in the experimental setting through the use of "fuzzy" information concerning allowed tax deductions and refundable tax credits.

Our overall objective is to examine the effects on tax filing of potential inducements to file a return, and we set out some basic inducement programs to investigate. These are outlined in Table 1. Our focus is on the use of tax credits and the income protection offered through unemployment benefits. To establish a baseline, we have conducted sessions in which these inducements are absent but the other features of the tax filing regime are incorporated. The no inducement treatments are described in Table 2. The tax rate is set at 35 percent in all rounds of all sessions. The audit probabilities range from 0.2 through 0.4 with three values in use in each session. The rate is set for the first 8 rounds, changes for the second 8 rounds, and reverts to the original level for the final 4 rounds; for example, in Table 2, the audit rates for NI1 are 0.4 for 8 rounds, 0.3 for 8 rounds, and 0.4 for the final 4 rounds. Participants are instructed that the rate may change during the course of the session but are not told the specific pattern. In all cases, the onscreen bingo cage shows the audit rate as the number of blue balls among 10 in the cage.

The tax form may cost from zero to two lab dollars, and this information is presented at the time of choosing whether to obtain the form. The tax form cost represents the general cost of filing incurred, in addition to the cognitive cost of completing the form.

Table 1. General Treatment Design for Investigation of Inducements To File

Treatment	Sample Parameters		
No Positive Inducement	Cost of Tax Form and Probability of Audit		
Refundable Tax Credit	Conditional on Low Income	Available to Low and Medium Income	Available to All Income Levels
Income (Employment) Risk	Support: Moderate Percentage of Previous Income	Support: High Percentage of Previous Income	

Table 2. No Inducement Conditions

Treatment	Tax Rate	Audit Probabilities	Penalty Rate	Deduction	Income Range	Form Cost
NI1	35%	0.4, 0.3, 0.4	150%	15%	10 to 100 1 per level	2, 1, 0

The first set of filing inducements is the use of tax credits targeted at lower-income taxpayers. This targeting is typically motivated by equity concerns, but it has the collateral effect of addressing a specific set of ghosts—those with lower incomes who may well be earning incomes that are not matched by employer records submitted to the tax authority.[4] The basic tax credit settings are shown in Table 3 as CT1 and CT2, where "CT" denotes "Credit Treatment" and where the key difference is the targeting of the tax credit to the lower-income earners. One issue arising from tax credit programs is the complexity of the filing requirement necessary to claim the credit. The EITC provides a case in point, and Alm, Jones, and McKee (2007) examine complexity and the related information services provision by the tax authority.

Table 3. Tax Credit Settings

Treatment	Income Range	Penalty Rate	Audit Probability	Credit Equation
CT1	10 – 100 1 per level	150%	0.3, 0.4, 0.3	CR = 20 – 0.2*I (Moderate Income Credit)
CT2	10 – 100 1 per level	150%	0.3, 0.4, 0.3	CR = 30 – 0.6*I (Low Income Credit)

Notes: The "Income Range" 1 is 10 ("Low") to 100 ("High"), with increments of 10 and 1 person per level. The credit equation reports the intercept (e.g., the base credit) and the reduction in the credit as income increases. For example, if CR = 20 – 0.2*I ("Moderate Income Credit"), then the base credit is 20 lab dollars; if the participant earns, say, 60 lab dollars, then the credit is 8 lab dollars; the credit goes to zero at 100 lab dollars. In the "Low Income Credit" setting, the base credit is set at 30 lab dollars, and the credit drops to zero when the participant has earned 50 lab dollars.

The other inducement investigated here is the presence of an income program that pays (unemployment) benefits in the event of the individual becoming unemployed. Payment of benefits is conditional on the previous filing history of the individual. Specifically, benefit payouts are computed as a stated percentage of average income filed in previous periods. The parameters in effect for this series of sessions are shown in Table 4, where "UT" denotes "Unemployment Treatment." Audit probabilities and cost of the

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[4] Alm, Deskins, and McKee (2008) investigate experimentally the filing behaviors of individuals earning income not subject to the type of matching paperwork usually associated with formal sector earnings.

tax form are set at levels in the baseline and credit treatments so that we can focus on policy parameters specific to the unemployment benefits program and on effects of the risk of becoming unemployed. Thus, in Table 4, we introduce as treatments the percentage of the income that will be replaced by unemployment benefits and the filing periods necessary to qualify for benefits.

During periods of unemployment, participants do not see an income earning task screen. Instead, they are presented a screen informing them that they are unemployed and that this is round X of unemployment period of duration Y. The unemployment benefits are taxable. Thus, participants are presented a screen informing them of the unemployment benefits (if any) that they will receive in the current round and the opportunity to obtain a tax form or not. If participants file a tax return reporting unemployment benefit income, they are subject to the normal audit process. If participants choose not to file, they are not audited.[5]

Table 4. Income Support Settings

Treatment	Probability of Unemployment	Percentage Benefits	Filing Periods Required	Audit Probabilities	Form Cost
UT1	0.4 and 0.2	0.5	2	0.3, 0.4, 0.3	2, 1, 0
UT2	0.4	0.6	2	0.3, .04, 0.3	2, 1, 0

The instruments applied here are largely intended to target lower-income taxpayers. The experimental setting has an income range that represents a low-to moderate-income range. The tax credits apply to 50 percent to 90 percent of income earners, and the unemployment benefit safety net pays out 50 percent to 60 percent of average earnings. Because of this targeting, the net tax yield from participants in all of these settings is quite small when the proposed programs are implemented. For settings in which there are 10 participants in a group (the typical case), the income distribution ranges from a high of 100 lab dollars to a low of 10 lab dollars, and total income is 550 lab dollars; at a tax rate of 35 percent applied to net-of-deduction (15-percent) income, the tax yield for full compliance is 110 lab dollars per round. By way of comparison, the per round cost of the Moderate Tax Credit is 90 lab dollars, and the per round cost of the Low Income Tax Credit is 60 lab dollars; for the social safety net (unemployment insurance), there is an expected cost (under full compliance and filing) of 90 lab dollars. Thus,

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[5] Of course, it is true that, in the naturally occurring world, individuals who do not (but should) file a tax return may be detected through, for example, the IRS Automated Underreporter program. Even so, the probability that a given case will be worked is generally low due, among other things, to IRS resource constraints.

net yield to the tax authority of encouraging tax filing will generally be small. Nevertheless, the objective is to increase filing, and it is this behavior that we analyze here.

Our hypothesis is that filing will increase under inducements offered by the tax credit and social safety net provisions. The next section discusses our preliminary results.

Preliminary Results and Discussion

One hundred and six subjects participated in twelve sessions, each lasting between 18 and 20 rounds, thereby yielding 2,126 observations. Treatment variables include the cost of obtaining the tax form ("Form Cost"), the audit probability, the opportunity to claim a credit ("Credit"), the availability of group audit information, the availability of unemployment benefits, and whether unemployment is possible. Observed outcomes include the subject's earned income ("Income Earned"), whether the subject bought the tax form ("Form Bought"), and whether the subject filed the form ("Form Filed"). Subjects averaged 20 years of age, and just over half were female (51.9 percent). The typical participant earned nearly 51 lab dollars per round, bought a tax form about 61 percent of the time, and filed the form nearly 59 percent of the time. There was considerable variance across subjects and rounds.

Given the complex nature of the experimental design, simple tests of hypotheses provide limited insight on treatment effects. We therefore proceed directly to a conditional analysis at the individual level to estimate treatment effects while holding other factors constant. We predict that the propensity to file will be increasing in the size of the direct inducements and in the perceived effect of the social safety net. Since there are two decisions in each period (three if we include the compliance decision), we analyze the decision to obtain a form and the decision to submit or file the form separately.

We estimate the following empirical model:

$$T_{i,t} = \beta_1 + \beta_2 P_i + \beta_3 I_i + \beta_4 p(A)_{i,t} + \beta_5 C_i + \beta_6 U_i + \beta_7 LB_{i,t-2} + \beta_8 (I^*C)_i + \psi_t + u_i + \varepsilon_{i,t},$$

where the dependent variable $T_{i,t}$ denotes subject i's decision to buy or file a tax form in period t; P_i is the price subject i must pay to obtain a tax form; I_i is subject i's earned income; $p(A)_{i,t}$ is the audit probability for subject i in period t; C_i and U_i are indicator variables that signify the presence of a tax credit and unemployment benefits for subject i; $LB_{i,t-2}$ is an indicator variable that signifies that subject i received unemployment benefits two periods prior; $(I^*C)_i$ is an interaction term between income and credit for subject i; ψ_t is a set of *T-1* dummies that capture potential nonlinear period effects; u_i is for random effects that control for unobservable individual characteristics; β_1

is the constant term; and $\varepsilon_{i,t}$ is the contemporaneous additive error term. The dataset constitutes a panel with 106 subjects making a series of 20 decisions over time. Since the dependent variables are binary, we estimate all relations using a panel probit estimation (Wooldridge, 2002).

From this basic specification, we estimate a "Form Bought" model ($T_{i,t}$ = 1 if the form is bought, and 0 otherwise), and also a "Form Filed" model ($T_{i,t}$ = 1 if the form is filed, and 0 otherwise). For each model, one specification controls for unobserved subject heterogeneity (denoted "1W"), while the other controls for both subject heterogeneity and time period effects ("2W"); Hausman tests suggest time effects are insignificant, but estimates are reported for completeness. Table 5 presents the estimation results.

Table 5. Econometric Results

Independent Variable	Dependent Variable			
	Form Filed 1W	Form Filed 2W	Form Bought 1W	Form Bought 2W
Constant	-0.779* (0.416)	-0.541 (0.452)	-0.295 (0.539)	-0 .235 (0.532)
Form Cost	—	—	-0.309* (0.182)	-0.303* (0.160)
Income Earned	0.004*** (0.002)	0.004*** (0.002)	0.006*** (0.002)	0.005*** (0.002)
Audit Probability	0.589 (0.722)	-0.036 (0.813)	0.895 (0.725)	0.540 (0.821)
Credit	1.406*** (0.401)	1.414*** (0.406)	1.111*** (0.443)	1.123*** (0.447)
Income Earned X Credit	-0.012*** (0.003)	-0.012*** (0.003)	-0.011*** (0.003)	-0.011*** (0.003)
Unemployment Benefit	0.788** (0.397)	0.735* (0.403)	0.419 (0.463)	0.395 (0.467)
Unemployment (lagged 2 periods)	0.269** (0.139)	0.338*** (0.142)	0.273** (0.140)	0.324** (0.143)
Wald Chi-square	31.14***	50.73***	35.21***	46.44***
Log likelihood	-921.61	-911.10	-913.11	-907.03

Notes: *denotes significance at 0.1 level, ** denotes significance at 0.05 level, and *** denotes significance at 0.01 level.

Estimates reported in Table 5 indicate that positive inducements encourage filing, where these inducements are measured by "Credit" (equal to 1 if the tax credit is present, and 0 otherwise) and "Unemployment Benefit" (defined as the percentage of income replaced by unemployment benefit in the event of unemployment). By providing a tax credit, individuals significantly increased the buying and filing of tax forms ($p<0.01$), though this pos-

itive effect diminishes with income, as indicated by the negative coefficient on the "Income Earned" X "Credit" interaction variable (see below). The presence of unemployment benefits also significantly increases filing ("Form Filed"), though no significant effect appears in the "Form Bought" models. The influence of unemployment benefits is clearly evident when considering the change in behavior after receiving benefits. Individuals significantly increase participation (buying and filing) after receiving unemployment benefits. As expected, the likelihood of purchasing a tax form is negatively related to the cost of the form ("Form Cost"). Recalling that the probability of an audit should not matter to subjects, our estimates in fact indicate that changes in the "Audit Probability" have no significant effect on participation. Lastly, our estimates indicate that the level of "Income Earned" is positively related to participation.

Based on the tax credit formula (see Table 3), the tax credit is directed toward lower-income participants. Thus, in the tax credit treatments, we predict that the credit will increase filing but only among the target population; that is, compliance will be negatively correlated with income. Indeed, we find this result, as the coefficient on the interaction term "Income Earned" X "Credit" is negative and significant.

The complexity of the setting limits our ability to simply compare behavior across policy instruments. Nevertheless, such results are interesting, and we provide a brief discussion of the filing behavior across treatments. The aggregate data are presented in Table 6. All of the filing inducement programs increase the propensity to file relative to our baseline setting. The social safety net increases the propensity to file but not by as much as the presence of the tax credit. The targeted (Low Income) tax credit increases tax filing by approximately the same amount as does the more general (Moderate Income) tax credit.

Table 6. Aggregate Filing Behavior

Treatment	Frequency of Filing	Frequency of Obtaining Form	Cost of Specific Program
No Inducement	0.445	0.460	N/A
Credit (All)	0.624	0.660	N/A
Credit (Low Income)	0.610	0.665	60
Credit (Moderate Income)	0.630	0.655	90
Social Safety Net	0.561	0.579	90 (expected)

Comparing the filing behavior impacts with the costs of running the various programs is an interesting policy exercise. As we discussed above, the costs of these programs vary considerably. The average (per round) costs are also reported in Table 6. The broader (Moderate Income) tax credit program and the social safety net program are costly. The narrower (Low Income) tax credit program yields the largest increase in both filing and form acquisition propensity. As in many other instances, it appears that targeted programs yield superior results.

Conclusions

Encouraging filing has important policy implications. Our experimental results are preliminary, but they indicate several promising strategies for encouraging greater tax filing rates. In particular, targeted tax credits that are simple to obtain appear to have some potential for encouraging tax filing. Future work will further address such issues as the effects of the cost of filing on form acquisition, the potential interaction of inducement instruments, and the potential interaction of inducements and complexity/information.

Acknowledgments

References

Allingham, Michael G. and Agnar Sandmo (1972), "Income Tax Evasion: A Theoretical Analysis," *Journal of Public Economics* 1 (3/4), pp. 323-338.

Alm, James; Roy Bahl; and Matthew N. Murray (1991), "Tax Base Erosion in Developing Countries," *Economic Development and Cultural Change* 39 (4), pp. 849-872.

Alm, James; John Deskins; and Michael McKee (2008), "Third Party Reporting and Tax Compliance," *Public Finance Review*, forthcoming.

Alm, James; Betty Jackson; and Michael McKee (1992), "Deterrence and Beyond: Towards a Kinder, Gentler IRS," in Joel Slemrod, editor, *Why People Pay Taxes*, University of Michigan Press, Ann Arbor, MI, pp. 311-329.

Alm, James; Betty Jackson; and Michael McKee (1993), "Fiscal Exchange, Collective Decision Institutions, and Tax Compliance," *Journal of Economic Behavior and Organization* 22 (3), pp. 285-303.

Alm, James; Betty Jackson; and Michael McKee (2007), "Getting the Word Out: Increased Enforcement, Audit Information Dissemination, and Compliance Behavior" (an earlier version was presented at IRS Research Conference, Washington DC, June 2004 under the title, "The Effect of Communication Among Taxpayers on Compliance Behavior").

Alm, James; Michael Jones; and Michael McKee (2007), "I'm From the IRS and I'm Here to Help You: Taxpayer Services and Tax Compliance," presented at the IRS Research Conference, Washington, DC, June 2007.

Alm, James and Michael McKee (2004), "Tax Compliance as a Coordination Game," *Journal of Economic Behavior and Organization* 54 (3), pp. 297-312.

Alm, James and Michael McKee (2006), "Audit Certainty and Taxpayer Compliance," *National Tax Journal* 59 (4), pp. 801-816.

Alm, James; Michael McKee; and William Beck (1990), "Amazing Grace: Tax Amnesties and Compliance," *National Tax Journal* 63 (1), pp. 23-38.

Andreoni, James; Brian Erard; and Jonathan Feinstein (1998), "Tax Compliance," *The Journal of Economic Literature* 36 (2), pp. 818-860.

Becker, Winfried; Heinz-Jurgen Buchner; and Simon Sleeking (1987), "The Impact of Public Transfer Expenditures on Tax Evasion: An Experimental Approach," *Journal of Public Economics* 34 (2), pp. 243-252.

Cherry, Todd and John List, "Examining the Role of Fairness in High Stakes Allocation Decisions," *Journal of Economic Behavior and Organization*, forthcoming.

Crain, Stephen E. and Farouk Nourzad (1993), "An Empirical Analysis of Factors that Distinguish Those Who Evade on Their Tax Return from Those Who Do Not File a Return," *Public Finance/Finances Publiques* 49 (Supplement), pp. 106-118.

Cummings, Ronald; Jorge Martinez-Vazquez; Michael McKee; and Benno Torgler, "Effects of Tax Morale on Tax Compliance: Experimental and Survey Evidence," *Journal of Economic Behavior and Organization*, forthcoming.

Erard, Brian and Chih-Chin Ho (2001), "Searching for Ghosts: Who Are the Nonfilers and How Much Tax Do They Owe?" *Journal of Public Economics* 81 (1), pp. 25-50.

Gerxhani, Klarita and Arthur Schram (2006), "Tax Evasion and the Source of Income," *Journal of Economic Psychology* 27 (3), pp. 402-422.

Kopczuk, Wojciech and Cristian Pop-Eleches (2007), "Electronic Filing, Tax Preparers, and Participation in the Earned Income Tax Credit," *Journal of Public Economics* 91 (6), pp. 1351-1367.

Plott, Charles R. (1987), "Dimensions of Parallelism: Some Policy Applications of Experimental Methods, in Alvin E. Roth, editor, *Laboratory Experimentation in Economics: Six Points of View*, Cambridge University Press, New York, NY, pp. 193-229.

Scholz, John Karl (1994), "The Earned Income Tax Credit: Participation, Compliance, and Antipoverty Effectiveness," *National Tax Journal* 47 (1), pp. 63-87.

Slemrod, Joel and Shlomo Yitzhaki (2002), "Tax Avoidance, Evasion, and Administration," in Alan J. Auerbach and Martin Feldstein, editors, *Handbook of Public Economics*, Elsevier, Amsterdam, London, and New York, pp. 1423-1470.

Smith, Vernon, L. (1982), "Microeconomic Systems as an Experimental Science," *The American Economic Review* 72 (5), pp. 923-955.

Webley, Paul; Henry Robben; Henk Elffers; and Dick Hessing (1991), *Tax Evasion: An Experimental Approach*, Cambridge University Press, Cambridge, UK.

Wooldridge, Jeffrey M. (2002), *Econometric Analysis of Cross Section and Panel Data*, The MIT Press, Cambridge, MA.