Policy Research Center

Research Paper No. 17

WITHHOLDING POSITION AND INCOME TAX COMPLIANCE: SOME EXPERIMENTAL EVIDENCE

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FOREWORD

There is a common belief that tax withholding systems have worked not only as efficient tax collection mechanisms but also as effective tax evasion controls. However, little is known about the role of withholding in tax compliance beyond the fact that withholding may reduce opportunities for evasion. This paper analyzes in an experimental setting some effects withholding may have on tax compliance. In particular, the authors examine three hypotheses about why individuals who unexpectedly find themselves underwithheld might decide to evade taxes: the reflection effect from prospect theory which holds that risk-averse individuals may behave as risk-lovers when they perceive prospects as losses, the liquidity position of taxpayers, and fiscal illusion. The empirical results from the experiments give some support to the liquidity hypothesis but do not support the other two hypotheses.

Gordon Harwood is Professor of Accountancy. Ernest R. Larkins is Associate Professor of Accountancy. Jorge Martinez-Vazquez is Professor of Economics and Senior Associate, Policy Research Center at Georgia State University. The authors acknowledge the support provided by the Georgia State University College of Business Administration Research Program Committee and the Georgia State University Research Grant Program.

Roy Bahl
August 1991
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WITHHOLDING POSITION AND INCOME TAX COMPLIANCE:
SOME EXPERIMENTAL EVIDENCE

I. INTRODUCTION

Because of large federal deficits and the increased demand for government efficiency, tax compliance issues have received a good bit of attention in recent years. Although the income tax withholding system has been justified widely as a way to collect taxes as soon as income is earned, there is a common belief that withholding also has been effective in controlling taxpayer evasion.¹ Attempts in the U.S. and other countries have been made to substitute a withholding system for reporting systems for income from capital. A frequently given justification for the substitution has been the control of tax evasion. Surprisingly, little research has been directed at the potential role withholding systems may play in tax compliance.

One way in which withholding may reduce tax evasion is by simply decreasing the opportunities for it. The purpose of this paper is to analyze other possible effects withholding may have on taxpayers' decisions to evade taxes. More particularly, we examine in an experimental setting three possible reasons why individuals who unexpectedly find themselves underwithheld might decide to evade taxes: (1) the reflection effect, which is a type of decision framing bias; (2) the liquidity effect; and (3) fiscal illusion.

In the next section we discuss the three hypotheses and review several previous papers that have studied certain aspects of the three hypotheses. We present the experimental methodology in Section III and the empirical results in Section IV. The final section summarizes the results and makes some suggestions for further research.
II. WITHHOLDING AND TAX COMPLIANCE

One common feature of the personal income tax in most countries is that it is a self-assessed tax. That is, governments rely on the taxpayers to file annual tax returns and to honestly declare income, adjustments, exemptions and deductions in order to arrive at the income tax owed. The withholding of income taxes at the point of payment on certain types of income is also a common feature of most income tax systems. In the U.S., tax withholding was initiated in World War II primarily to bring tax revenues into the government sector quicker than after-year-end collection allowed. Withholding also has worked efficiently as a collection device of accepted tax liabilities. In this paper, we shift attention from the revenue delivery and collection roles of the withholding tax to its tax enforcement role, other than the obvious reduction in opportunities for evasion.

Under the U.S. income tax, the taxpayer's exact tax liability often is not known until after the end of the year. However, an estimate of the final tax liability generally enters into the taxpayer's initial withholding decision (or decision to pay estimated tax for the self-employed) at the beginning of the year. The true tax liability of the taxpayer computed at the end of the year may be considerably different from the sum of the withholdings and estimated tax payments during the year. This difference can be in the taxpayer's favor (underwithheld) or the government's favor (overwithheld). Furthermore, the difference in either direction can be intentional on the part of the taxpayer or unintentional. Unintentional differences can arise because a taxpayer's actual tax return parameters, such as income and deductions, unexpectedly differ from those anticipated when the initial withholding decision was made (e.g., when the Form W-4 was filed). Intentional differences may arise, for example, from a desire to earn an
investment return on the underwithheld tax during the year, then pay the remaining tax liability after the end of the year. This strategy may result in an underpayment penalty, but only if underwithholding is substantial. Intentional differences also may arise because of an intention to defraud the government at the end of the year and pay less tax than owed.

There has been little research on the relationship between withholding position and tax compliance. The evidence available, however, does suggest a positive correlation between underwithholding and underreporting of tax liabilities. A private communication of the Research Division of the IRS, based on TCMP 1982 data, shows that the level of compliance is lower for all types of income when taxpayers are underwithheld. A recent paper by Chang and Schultz [1990] confirmed these findings. Clotfelter [1983] used TCMP data for earlier years in a regression analysis of determinants of taxpayer evasion, and found that after controlling for other variables, underwithheld taxpayers are more likely to understate true tax liabilities. However, there is a problem with straightforwardly interpreting these findings to mean that underwithholding is the cause for the lack of compliance. As Clotfelter [1983] points out, underwithholding and underreporting of tax liability may not be independent. There are several ways the casual link may run. For example, taxpayers who intend to evade income taxes may intentionally underwithhold because they plan to overstate deductions so that reported taxes equal the amount withheld. Or they may underwithhold unintentionally and afterwards decide to evade taxes.

One way to control for the linkage, or simultaneity, of the evasion and withholding decisions is to concentrate on the impact of unintended or unexpected underwithholding. If the level of underwithholding is unexpected, it cannot be argued that underwithholding is caused by
a planned or conscious decision to evade. There are no statistics about what percentage of underwithheld taxpayers are surprised at being underwithheld. Casual empiricism would seem to indicate that this percentage is not low. Knowing more about the responses to unexpected underwithholding should also interest tax administrators. A large percentage of underwithholding among taxpayers may be unexpected if, for example, there is some generalized misinterpretation of the law. In what follows, we examine three hypotheses about how unexpected underwithholding may affect tax compliance. In Section IV, we test their validity in an experimental setting.

The Reflection Effect

If a taxpayer is unintentionally underwithheld at the end of the year, the taxes unexpectedly owed may be viewed as a loss of net wealth even though the obligation to pay the total amount of the tax liability exists whether withheld or not. A body of research in experimental psychology has led to the hypothesis that individuals react quite differently to an event perceived as a loss vis-a-vis an event that has an identical impact on net wealth but is perceived as a gain. Much of this research has been formalized in prospect theory [Kahneman and Tversky, 1979; Tversky and Kahneman, 1981]. Prospect theory leads to the implication that the manner in which decision alternatives are framed, or presented to the decision maker, may lead to different decisions. We refer in particular to the reflection effect tenet of prospect theory. According to this tenet, individuals who exhibit risk-averse behavior when faced with risky prospects perceived as possible gains tend to behave as risk-lovers when faced with other risky prospects which are perceived as losses. That is, individuals will accept unfair bets in the domain of losses. In contrast, under expected utility theory, risk-averse individuals continue to
exhibit this risk-averse behavior no matter how the risky prospects are framed. If the kind of framing bias suggested by the reflection effect is at work, we would expect several things to happen. First, unexpectedly underwithheld taxpayers should understate tax liability through evasion to a greater extent than taxpayers who expected to be underwithheld or who expected their final tax liability to be equal to withholdings. While unexpectedly underwithheld taxpayers would view the additional tax due as a loss and consequently behave as risk-lovers (i.e., accept unfair bets), those taxpayers expecting to owe additional tax all along would not perceive the additional tax due as a loss and, therefore, would exhibit risk-averse behavior. In the second place, unexpectedly overwithheld taxpayers should not understate their tax liability to any significantly greater extent than similar taxpayers who expected a tax refund all along. Under the reflection effect, both groups of taxpayers should behave the same when confronted with the risky prospect if the prospect is perceived as gains.

Several prior papers have examined reflectivity vis-a-vis withholding position. Through field experimentation Chang [1984] examined reflectivity among taxpayers taking aggressive positions with respect to deductions. He found that subjects were significantly more inclined to choose an aggressive position when underwithheld than when overwithheld. Also through field experimentation, Jackson and Spicer [1986] examined reflectivity among taxpayers taking evasive positions. They found no significant difference in tax compliance between overwithheld and underwithheld taxpayers. Schadewald [1989] also studied reflectivity in aggressive tax avoidance decisions. To calibrate his subjects' risk preferences he found significant reflectivity in context-free choices between risky and sure losses and between risky and sure gains, but there was essentially no difference in risk preference in the instances when the choices were framed in
overwithheld and underwithheld contexts, except in the case where outcomes were explicitly labeled "gains" or "losses." However, none of these studies correctly tested for the presence of the reflection effect because they did not control for possible simultaneity of the decisions to underwithhold and evade, and because they did not use unfair bets in their experiments. With respect to this last point, note that the reflection effect cannot be truly tested when individuals are confronted with fair bets, since the acceptance of fair bets will be compatible with risk-loving behavior, but also with risk-averse and risk-neutral behavior. Simply put, the definition of risk-loving behavior implies the acceptance of unfair bets. Our study of reflectivity in evasive choices therefore expands on the previous literature by concentrating on choices that amount to unfair bets and by controlling for the possible simultaneity of evasion and underwithholding decisions.

**Taxpayer Liquidity**

Another factor that may affect the causal link between unexpected underwithholding and income tax evasion is a taxpayer's liquidity position. Suppose a taxpayer is unintentionally underwithheld at filing time and does not have the liquid assets to pay the taxes he owes. One possibility is for the taxpayer to approach the government and work out an alternative plan for payment; at the same time he adjusts his expenditure and work effort plans. Alternatively, the taxpayer may be tempted to solve the situation by simply underreporting his income or exaggerating the adjustments to taxable income to which he is entitled. Casual observation in the private sector indicates that individuals with liquidity problems are overall less likely to pay commercial debts. If liquidity is as relevant in the tax arena as in private transactions, then withholding systems could be expected to enhance tax compliance by reducing the chance of evasion by illiquid taxpayers.
There are no published findings to indicate that the role played by taxpayer liquidity in tax evasion in a withholding context has been studied. However, two previous studies have shed some light on the importance of taxpayers' financial needs or strain on tax compliance. Wärneryd and Waterud [1982] carried out a telephone survey with a sample of Swedish male adults who were asked fairly general questions about tax evasion and tax avoidance. Taxpayers' financial strain was not found to be a significant factor for explaining tax evasion behavior. In a second study, Kaplan and Keckers [1985] presented undergraduate business students with simple tax evasion scenarios. The students were asked to select a penalty for the type of evasion illustrated and to state whether in similar circumstances they would have evaded. Kaplan and Reckers found that the strongest factor for leniency was the financial need of taxpayers, suggesting that high need may have been interpreted as a justification for evasion. However, Kaplan and Reckers also found that financial need did not affect the respondents' own evasion intentions.

Fiscal Illusion

As pointed out before, the most frequently asserted rationale for the introduction of withholding systems has been to hasten the flow of tax revenues into the government accounts. A second, and perhaps planned, effect of withholding systems may have been the enhancement of tax compliance via fiscal illusion. By fiscal illusion we mean the possibility that taxpayers underestimate their true tax burdens because of the complexity and indirectness of tax institutions (Buchanan and Wagner, 1977). Note that fiscal illusion does not necessarily imply that taxpayers subject to withholding do not see their tax burdens but rather that they see less of a tax burden than the actual tax burden they bear.³
Two characteristics of withholding may induce fiscal illusion. First, through withholding, taxpayers may be unmindful of paying the tax since they never receive the income or have to write a check. This interpretation of fiscal illusion, which we will call the "distance" effect, was advanced by Goetz (1987). The second way in which withholding may induce fiscal illusion is by spreading the tax liability over time in smaller "installments" rather than concentrating the payment in a more obvious single period. Puviani, the Italian economist who wrote at the beginning of this century and is credited by Buchanan and Wagner (1977) as the "father" of fiscal illusion, specifically mentioned the installment characteristic of some taxes as a way for governments to reduce the perception of tax burdens. The fact that installment contracts are often effectively used in the private sector to lure buyers gives support to the hypothesis that the "installment-plan" nature of withholding may induce fiscal illusion and reduce taxpayers' propensity to evade taxes.

We are not aware of any test thus far of the fiscal illusion hypothesis in a withholding tax context. However, testing this hypothesis using an experimental approach, as we proposed to do, is not a straightforward matter. In fact, we do not think we can test the "distance" effect of withholding. On the other hand, it seems quite feasible to test the installment effect of withholding on fiscal illusion. To the extent that withholding does result in fiscal illusion, we should observe that unexpectedly underwithheld taxpayers are more likely to evade taxes when they are asked to pay their tax shortfall in a single payment than when they can extend the payments through periodic withholding installments.
III. METHODOLOGY

To run the experiments we used MBA students enrolled at a large southeastern university who were taking graduate business courses. The average age of the MBA students was 27 years, and around 80 percent were holding a full-time job. Since the population of interest is taxpayers, both age and job status of the experiment subjects enhanced the appropriateness of the sampling frame.⁴

Each subject was presented with one tax scenario and asked to make choices, some of which involve the understatement of tax liabilities. The main strategy behind the experiments was to compare the subjects’ decision to evade in different scenarios. All assignments of a scenario to a subject were random. To control for the possible simultaneity of witholding and evasion decisions mentioned earlier, certain tax scenarios explicitly addressed the issue of taxpayer surprise upon learning they owed taxes. To avoid respondent fatigue and enhance internal validity, subjects were not presented with more than one tax scenario. For reasons explained below, two pairs of tax scenarios were designed to test two of the effects respectively: framing and liquidity. The illusion effect was tested with only one pair of tax scenarios. Although we make an effort to keep the expected and certainty values of the different options of the same magnitude, different values will be used when it is required in the design of the test. For example, presenting subjects with an unfair bet requires different assumptions than presenting them with a favorable bet. However, we do not think this is of any important consequence, since each scenario is given to a different group of subjects.

Because of the sensitive nature of the tax evasion issue, subjects were assured orally before the questionnaire instruments were handed out that their responses would be anonymous.
In addition, we attached the instruments to a letter from the researchers giving further assurances of anonymity. As a final assurance, subjects were asked to drop their completed questionnaire in a drop box provided in the classroom, to reduce the perception that a particular response could be linked to a particular respondent at hand in time. The instruments used in all the experiments are reproduced in the Appendix.

One last methodological issue is the use of hypothetical questions versus monetary payments in the experiments. In this study we use only hypothetical questions, because the use of monetary rewards would have presented several difficulties, including their proper integration in the experiments. For example, what type of subject performance should get rewarded, cheating on your taxes or being honest? Furthermore, there is evidence, for example to the work of Grueter and Plott [1979] and Lichtenstein and Slovic [1973], that the use of hypothetical trial questions yields similar results to using monetary rewards in the experiments.

IV. TESTING AND EMPIRICAL RESULTS

The Reflection Effect

We first test the proposition that the framing bias introduced by the reflection effect leads unexpectedly underwithheld taxpayers to undertake more evasion than similar taxpayers who knew all along that they would be underwithheld. As mentioned above, a strict test of the reflection effect requires confronting subjects with an unfair bet (i.e., a bet with a negative expected value). This creates a sort of dilemma in the design of the experiments. In order to have an unfair bet and keep the probability of detection realistically low, the penalties of getting caught have to be very high (e.g., on the order of 20 times the amount evaded). With such high penalties, of course, we run the risk of everybody choosing to fully comply with taxes, and this
leaves us unable to test the reflection effect. For this reason, we chose to run two sets of experiments to test the possible existence of the reflection effect in the domain of losses; i.e., the proposition that individuals may become tax evaders when confronted with an unexpected increase in taxes due. The first set of experiments has a higher probability of detection if the individual chooses to evade taxes, and a relatively low penalty. The second set has a lower probability of detection but a higher penalty.

In the first set of experiments we manipulate taxpayer surprise. Thirty one students were given Scenario 1a (see the Appendix), which queries the subjects’ choice between paying $1,000 in unexpectedly owed taxes or evading the tax with a known penalty of $850 and a known probability of getting caught of 2/3. Thirty students were presented with Scenario 2a, which replicates Scenario 1a except that the subjects are told that the tax deficiency of $1,000 was expected all along. In the second set of experiments we also manipulate taxpayer surprise. Forty-seven students were given Scenario 1b, which asks individuals to choose between paying $1,000 in unexpectedly owed taxes or evading the tax with a known probability of getting caught of 20 percent and a penalty of $4,500. Formally, we use a Chi-square test for independence between proportions of responses with the following null and alternative hypotheses:

\( H_0: \) Number choosing the evasion option in Scenario 1a [Scenario 1b] is less than or equal to the number choosing the evasion option in Scenario 2a [Scenario 2b].

\( H_A: \) Number choosing the evasion option in Scenario 1a [Scenario 1b] is larger than the number choosing the evasion option in Scenario 2a [Scenario 2b].

Tables 1a and 1b present the number, and in parentheses the percentage, for combinations in each scenario (surprise/no surprise) and subsequent action (evade/not evade) for the two sets of experiments, respectively. The Chi square statistic with one degree of freedom is not
significant in either of the two sets of experiments. Thus, unexpected withholding and the propensity to evade taxes do not appear to be related. These results do not support the reflection effect of prospect theory. In both sets of experiments subjects chose the alternatives with the highest expected value (\$1,000 versus \$1,233 in the first set, and \$1,000 versus \$1,100 in the second set).

The second proposition we test under the reflection effect is that unexpectedly overwithheld taxpayers do not understare their tax liability to any larger extent than similar taxpayers who expected a tax refund all along. Here, we also run two sets of experiments. The only difference between the two sets is the probability of detection. In the high probability set, thirty-three students were given Scenario 3a, which asked participants to choose between an unexpected tax refund of \$1,000 and a larger fraudulent refund of \$2,000 but with a one-third probability of getting caught and a penalty of \$850. Scenario 4a is exactly the same as Scenario 3a, except for the fact that participants were told they had expected the \$1,000 refund all along.

In the lower probability set of experiments, 51 participants were given Scenario 3b and 52 participants were given Scenario 4b. These two scenarios are the same as 3a and 4a, except that the probability of getting caught is 20 percent instead of 1/3, i.e., the cheating alternative has a higher expected value. The formal null and alternate hypotheses used in the Chi-square test for these two sets of experiments are:

\[ H_0: \] Number choosing the evasion option in Scenario 3a [3b] is not different from the number choosing the evasion option in Scenario 4a [4b].

\[ H_A: \] Number choosing the evasion option in Scenario 3a [3b] is different from the number choosing the evasion option in Scenario 4a [4b].
Table 2a and 2b present the number and percentage for combinations in the surprise/no surprise scenarios and subsequent actions to evade or not evade in the two sets of experiments, respectively. Since the Chi-square is not significant in either case, we cannot reject either null hypothesis. The element of surprise at having a refund coming and evading by arranging for a larger refund appear to be unrelated. In both sets of experiments only a small fraction of the subjects choose to evade -- between 5 and 13 percent. In the first set of experiments (Scenarios 3a and 4a) non-evaders reject a bet with an expected value of $383 and in the second set of experiments (Scenarios 3b and 4b) non-evaders reject a bet with an expected value of $496. These results uphold the reflection effect of prospect theory, but they are also compatible with expected utility theory.

Overall, the withholding position (under or overwithholding) of taxpayers combined with the element of surprise does not appear to affect attitudes toward tax compliance. Like Jackson and Spicer [1986] and Schadowald [1989], we find no support for the proposition of prospect theory that individuals tend to behave as risk-lovers in the domain of losses. Of course, the lack of support for the reflection effect in our experiments may be due in part to the fact that in scenarios 1a-2a and 1b-2b subjects were always confronted with unfair bets. However, as we have argued, using unfair bets is a crucial step for the identification of risk-loving behavior in unexpectedly underwithheld taxpayers. A different issue is whether unfair bets with lower expected losses can be found that would be acceptable to the experiment participants.5

Taxpayer Liquidity

To test the liquidity effect we again designed two sets of experiments. In the first set we used a very small probability of detection. The motivation here was to take advantage of the
flexibility of the experimentation methodology to control for other factors, enabling us to isolate the role of the liquidity effect from other concerns (such as the reflection effect) or anomalies (such as the exaggeration of very low probabilities). The downside of this approach is that the response to the opportunity to evade without any risk may overwhelm the response to the liquidity considerations. Remember, however, that the point of the test is not how many or how few subjects will choose to comply, but whether there is a significant difference in response or behavior between those subjects who are presented with a liquidity problem and those who are not. The second set of experiments confronted the subjects with a realistic probability of detection of 3 percent if they choose to evade, and a penalty equal to 150 percent of the underreported income.

To test the proposition that taxpayers’ lack of liquidity in combination with unexpected underwithholding leads to greater evasion, in the first set of experiments 32 students were given Scenario 5a, and 31 students were given Scenario 6a. In the second set of experiments, 51 students were given Scenario 5b and 51 other students were given Scenario 6b. In Scenarios 5a and 5b, subjects were told that at filing time they discover they owe $1,000 more in taxes above and beyond what they expected, and furthermore that at the present time they have no resources to pay the additional tax. To pay the tax, subjects receiving Scenarios 5a and 5b were told they would have to borrow the money and work extra hours and/or curtail family expenditures to repay the loan. Alternatively, subjects in 5a are given the option of evading the tax with practically no risk and those given 5b face a probability of 3 percent of getting caught and a fine of 150 percent. Scenarios 6a and 6b repeat the conditions and options of Scenarios 5a and 5b, respectively, with the exception that subjects are told that at filing time they have the resources
to pay the unexpected $1,000 in additional taxes. The test of the liquidity effect can be formalized into the following null and alternate hypotheses:

\[ H_0: \] Number choosing the evasion option in Scenario 5a [5b] (illiquid taxpayers) is less than or equal to the number choosing the evasion option in Scenario 6a [6b] (liquid taxpayers).

\[ H_A: \] Number choosing the evasion option in Scenario 5a [5b] (illiquid taxpayers) is greater than the number choosing the evasion option in Scenario 6a [6b] (liquid taxpayers).

The results from the two sets of experiments are presented in Tables 3a and 3b. One notable feature of the four experiments is the high percentage of subjects that decide to underreport income. Given the possibility of evading taxes in a relatively safe way, a near-majority of people will take it. These individuals responded as if they were maximizing expected value. Not surprisingly, the lowest percentage of subjects choosing to evade is in Scenario 6b, where the expected value of cheating is lower and subjects were told they had the funds to pay the taxes owed. How about the liquidity effect? In the first set of experiments (Table 3a) the percentage of individuals choosing the evasion option is not statistically different between the liquid and illiquid Scenarios (5a and 6a, respectively) by a Chi-square test. Thus from the first set of experiments we cannot reject the null hypothesis that for unexpectedly underwithheld taxpayers, liquidity and tax compliance are not related. These results coincide with those of Wärneryd and Walerud [1982] and Kaplan and Reckers [1985], which were discussed in the previous section. The results from the second set of experiments (Scenarios 5b and 6b) in Table 3b, however, offer some support for the liquidity hypothesis. The proportion of individuals choosing the evasion option in an illiquid situation is significantly larger, at least at the 5 percent level, than the proportion choosing evasion in a liquid situation.
Fiscal Illusion

As we saw in Section II, one can distinguish between two different effects of withholding in fiscal illusion: the "distance" effect (the money never passes through the taxpayer's hands), and the installment effect (paying taxes in little chunks may reduce the taxpayer's awareness of, and consequently resistance to, the tax). In this section our intent is to test only the installment effect. To this end 51 students were given Scenario 7 and another group of 51 students was given Scenario 8. The two scenarios manipulate the mode-of-payment option. In Scenario 7 individuals are told that they have the opportunity to pay an unexpected due balance of $1,000 by using an installment withholding arrangement the IRS offers. This arrangement would allow taxpayers who owe taxes at filing time to have additional tax withheld in equal installments over the next 12 months with interest at 10 percent. Individuals in Scenario 8 are denied this opportunity and would have to pay the unexpected tax balance of $1,000 in one single payment. Individuals in both scenarios were also given the option of underreporting income, in which case there is a 3 percent probability that they will be caught and pay a penalty equal to 150 percent of the underreported income.

The test for the installment effect of withholding can be formalized in the following null and alternate hypotheses:

\( H_0: \) Number choosing the evasion option in Scenario 7 (increase withholdings) is greater than or equal to the number choosing the evasion option in Scenario 8 (lump-sum payment).

\( H_A: \) Number choosing the evasion option in Scenario 7 (increase withholdings) is smaller than the number choosing the evasion option in Scenario 8 (lump-sum payment).
The results from the experiment are presented in Table 4. The proportion of individuals choosing the evasion option is high in both scenarios. However, as expected they are lower (50.98 percent) in Scenario 7, where the installment option was available, than in Scenario 8, where 60.78 percent of the individuals chose to evade. Nevertheless, the difference between the two proportions is not significant at the 5 percent level. The null hypothesis cannot therefore be rejected. Our test fails to support the hypothesis that withholding may encourage tax compliance via fiscal illusion.

V. SUMMARY AND CONCLUSIONS

This paper researches several hypotheses concerning the possible linkages between income tax withholding and tax compliance. In particular, we use an experimental approach to examine whether taxpayers who unexpectedly find themselves underwithheld are more likely to evade taxes because (1) after perceiving the additional tax as an extra loss, they become more likely to accept risky prospects, as maintained by the reflection effect of prospect theory; (2) they are illiquid or under financial hardship; and (3) they are subject to fiscal illusion, which may be produced by withholding systems. The empirical results from the experiments, which were performed with MBA students, did not support the reflection effect from prospect theory or the fiscal illusion effect, but did lend some support to the liquidity hypothesis. We find, therefore, some support for the belief that withholding systems, besides being efficient collection devices, also may contribute to tax enforcement in ways other than directly decreasing the opportunities for tax evasion.

There may be other aspects of withholding systems that are related to tax compliance besides the ones discussed in this paper. The paper has only started to explore the issues
surrounding the liquidity and fiscal illusion hypotheses. In particular, our results should be interpreted with caution given the limitations of all experimental methodologies. For example, we have made the assumption that unexpected underwithholding puts the taxpayer in the domain of losses, while expected underwithholding does not. To the extent this assumption does not hold, our experiments would have not fully captured the reflection effect. More research will be necessary to obtain a better understanding of how attitudes toward risk, liquidity, and fiscal illusion may impact the tax compliance attitudes of underwithheld taxpayers.
ENDNOTES

1. Withholding systems, however, can induce a different form of tax evasion by withholding agents. For example, employers may remit to the government only part of the tax withheld from employees. Yaniv [1988] analyzes the possible employer and employee tax evasion interactions under a withholding system.

2. We thank O. Chang for making this information available to us.

3. For example, taxpayers know they pay sales taxes, but they may feel -- due to fiscal illusion -- that this burden is less than it would be with an income tax or a property tax raising the same level of revenue from each taxpayer.


5. Shepanski and Kelsey [1990] found in a tax reporting context that the existence of a reflection effect is sensitive to the reported probabilities of a tax audit.
REFERENCES


TABLE 1a
Scenarios 1a and 2a: Surprised and Not Surprised
Underwithheld Taxpayers
Higher Probability and Lower Penalty

<table>
<thead>
<tr>
<th>Scenario 1a</th>
<th>Scenario 2a</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Owe $1,000 and Surprised (Options X &amp; Y)</td>
<td>Owe $1,000 and Not Surprised (Options R &amp; S)</td>
<td></td>
</tr>
<tr>
<td>Evade</td>
<td>n=2 [6.45%]</td>
<td>n=2 [6.67%]</td>
</tr>
<tr>
<td>Not Evade</td>
<td>n=29 [93.55%]</td>
<td>n=28 [93.33%]</td>
</tr>
<tr>
<td>Total</td>
<td>n=31 [100%]</td>
<td>n=30 [100%]</td>
</tr>
</tbody>
</table>

[Chi-square = .0012; d.f.1; not significant]

TABLE 1b
Scenarios 1b and 2b: Surprised and Not Surprised
Underwithheld Taxpayers
Lower Probability and Higher Penalty

<table>
<thead>
<tr>
<th>Scenario 1b</th>
<th>Scenario 2b</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Owes $1,000 and Surprised (Options X’ &amp; Y’)</td>
<td>Owes $1,000 and Not Surprised (Options R’ &amp; S’)</td>
<td></td>
</tr>
<tr>
<td>Evade</td>
<td>n=3 [6.38%]</td>
<td>n=0 [0%]</td>
</tr>
<tr>
<td>Not Evade</td>
<td>n=44 [93.62%]</td>
<td>n=49 [100%]</td>
</tr>
<tr>
<td>Total</td>
<td>n=47 [100%]</td>
<td>n=49 [100%]</td>
</tr>
</tbody>
</table>

[Chi-square = 3.229; d.f.1; cell sizes too small for test to be valid]
TABLE 2a

Scenarios 3a and 4a: Surprised and Not Surprised
Overwithheld Taxpayers
Higher Probability of Detection and Lower Penalty

<table>
<thead>
<tr>
<th></th>
<th>Scenario 3a Refund $1,000 and Surprised (Options A &amp; B)</th>
<th>Scenario 4a Refund $1,000 and Not Surprised (Options W &amp; Z)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evade</td>
<td>n=3 [9.09%]</td>
<td>n=4 [11.87%]</td>
<td>n=7 [10.5%]</td>
</tr>
<tr>
<td>Not Evade</td>
<td>n=30 [90.91%]</td>
<td>n=30 [88.2%]</td>
<td>n=60 [89.5%]</td>
</tr>
<tr>
<td>Total</td>
<td>n=33 [100%]</td>
<td>n=34 [100%]</td>
<td>n=67 [100%]</td>
</tr>
</tbody>
</table>

[Chi-square = .1279; d.f.1; not significant]

TABLE 2b

Scenarios 3b and 4b: Surprised and Not Surprised
Overwithheld Taxpayers
Lower Probability of Detection and Higher Penalty

<table>
<thead>
<tr>
<th></th>
<th>Scenario 3b Refund $1,000 and Surprised (Options A’ &amp; B’)</th>
<th>Scenario 4b Refund $1,000 and Not Surprised (Options W’ &amp; Z’)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evade</td>
<td>n=3 [5.88%]</td>
<td>n=7 [13.46%]</td>
<td>n=10 [9.71%]</td>
</tr>
<tr>
<td>Not Evade</td>
<td>n=48 [94.12%]</td>
<td>n=45 [86.54%]</td>
<td>n=93 [90.29%]</td>
</tr>
<tr>
<td>Total</td>
<td>n=51 [100%]</td>
<td>n=52 [100%]</td>
<td>n=100 [100%]</td>
</tr>
</tbody>
</table>

[Chi-square = 1.687; d.f.1; not significant]
### TABLE 3a

Scenarios 5a and 6a: Liquid and Illiquid
Underwithheld Taxpayers
Zero Probability of Detection

<table>
<thead>
<tr>
<th>Scenario 5a Owe $1,000 and Surprised and Illiquid (Options L &amp; M)</th>
<th>Scenario 6a Owe $1,000 and Surprised and Liquid (Options C &amp; D)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evade n=21 [65.6%]</td>
<td>n=19 [61.3%]</td>
<td>n=40 [63.5%]</td>
</tr>
<tr>
<td>Not Evade n=11 [34.4%]</td>
<td>n=12 [38.7%]</td>
<td>n=23 [36.5%]</td>
</tr>
<tr>
<td>Total n=32 [100%]</td>
<td>n=31 [100%]</td>
<td>n=63 [100%]</td>
</tr>
</tbody>
</table>

[Chi-square = .1276; d.f.1; not significant]

### TABLE 3b

Scenarios 5b and 6b: Liquid and Illiquid
Underwithheld Taxpayers
Three Percent Probability of Detection
Plus 150 Percent Penalty

<table>
<thead>
<tr>
<th>Scenario 5b Owe $1,000 and Surprised and Illiquid (Options L' &amp; M')</th>
<th>Scenario 6b Owe $1,000 and Surprised and Liquid (Options C' &amp; D')</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evade n=34 [66.67%]</td>
<td>n=23 [45.10%]</td>
<td>n=57 [55.88%]</td>
</tr>
<tr>
<td>Not Evade n=17 [33.33%]</td>
<td>n=28 [54.89%]</td>
<td>n=45 [44.12%]</td>
</tr>
<tr>
<td>Total n=51 [100%]</td>
<td>n=51 [100%]</td>
<td>n=102 [100%]</td>
</tr>
</tbody>
</table>

[Chi-square = 4.812; d.f.1; significant at the 5 percent level]
<table>
<thead>
<tr>
<th>Scenario 7</th>
<th>Scenario 8</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evade</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[Increase Withholdings (Options S &amp; T)]</td>
<td>n=26 [50.98%]</td>
<td>n=31 [60.78%]</td>
</tr>
<tr>
<td>Not Evade</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[Make Lump-Sum Payment (Options U &amp; V)]</td>
<td>n=25 [49.02%]</td>
<td>n=20 [39.22%]</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[100%]</td>
<td>[100%]</td>
<td>[100%]</td>
</tr>
</tbody>
</table>

[Chi-square = 0.994; d.f.1; not significant]
APPENDIX

Scenario 1a [Scenario 1b]: (Note that the differences in Scenario 1b are in brackets. The same system is used for similar pairs of scenarios below).

Assume this is April 1, 1991. You are preparing your tax return for the year 1990. No unexpected items came up during the year that would affect your taxable income. You discover that you still owe $1,000 in taxes. This comes as a surprise because you had kept your withholding all during 1990 at a level you thought would cause you to come out owing about $1,000. There are two options available to you. X [X'] and Y [Y'].

Option X [X'] is to file your income tax return correctly and pay the additional tax of $1,000. You have enough assets (cash, savings, CDs, etc.) to pay the $1,000.

Option Y [Y'] is to pay no additional tax. The way you would get around the tax is to claim a large cash contribution to the United Fund, which you did not make. If you do this, you think there is a 2/3 (20 percent or one in five) chance of getting caught and having to pay $1,850 ($5,500) and a 1/3 (an 80 percent) chance of getting by without paying.

Which option would you choose?

Scenario 2a [Scenario 2b]:

Assume this is April 1, 1991. You are preparing your tax return for the year 1990. No unexpected items came up during the year that would affect your taxable income. You discover that you still owe $1,000 in taxes. This comes as no surprise because you had kept your withholding all during 1990 at a level you thought would cause you to come out owing about $1,000. There are two options available to you, R [R'] and S [S'].

Option R [R'] is to file your income tax return correctly and pay the additional tax of $1,000. You have enough assets (cash, savings, CDs, etc.) to pay the $1,000.

Option S [S'] is to pay no additional tax. The way you would get around the tax is to claim a large cash contribution to the United Fund, which you did not make. If you do this, you think there is a 2/3 (20 percent or one in five) chance of getting caught and having to pay $1,850 ($5,500) and a 1/3 (an 80 percent) chance of getting by without paying.

Which option would you choose?

Scenario 3a [Scenario 3b]:

Assume this is April 1, 1991. You are preparing your tax return for the year 1990. No unexpected items came up during the year that would affect your taxable income. You discover that you have a refund coming in the amount of $1,000. This come as a surprise because you had kept your withholding all during 1990 at a level you thought would cause you to come out above even. There are two options available to you, A [A'] and B [B'].

Option A [A'] is to file your income tax return correctly and accept the refund of $1,000.

Option B [B'] is to arrange for an even larger refund, to be exact, $2,000. The way you would arrange for this is to claim a large cash contribution to the United Fund, which you did not make. If you do this, you think there is a 1/3 (20 percent or one in five) chance of getting caught and having to pay a penalty of $850. In addition, you would have to pay the tax of $1,000 that arose because the "large cash contribution" to the United Fund was thrown out. (The net effect of this would mean that your final refund less penalty was $1,150: $1,000 refund due minus $850 penalty). However, you also think there is a 2/3 (80 percent) chance of not getting caught and getting to keep the $2,000 refund.

Which option would you choose?
Appendix (Continuation)

Scenario 4a [Scenario 4b]:

Assume this is April 1, 1991. You are preparing your tax return for the year 1990. No unexpected items came up during the year that would affect your taxable income. You discover that you have a refund coming in the amount of $1,000. This comes as no surprise because you had kept your withholding all during 1990 at a level you thought would cause you to come out with a refund due of about $1,000. There are two options available to you, W [W] and Z [Z].

**Option W [W]** is to file your income tax return correctly and accept the refund of $1,000.

**Option Z [Z]** is to arrange for an even larger refund, to be exact, $2,000. The way you would arrange for this is to claim a large cash contribution to the United Fund, which you did not make. If you do this, you think there is a 1/3 [20 percent or one in five] chance of getting caught and having to pay a penalty of $850. In addition, you would have to pay the tax of $1,000 that arose because the “large cash contribution” to the United Fund was thrown out. (The net effect of this would mean that your final refund less penalty was $150: $1,000 refund due minus $850 penalty.) However, you also think there is a 2/3 [80 percent] chance of not getting caught and getting to keep the $2,000 refund.

Which option would you choose? ______

Scenario 5a [Scenario 5b]:

Assume this is April 1, 1991. You are preparing your tax return for the year 1990. Your taxable income includes some income you earned on a weekend job (not your regular job). This income was always paid in cash, and your weekend employer did not report these wages to the IRS.

You discover that you still owe $1,000 in taxes. This comes as a surprise. All during 1990 you kept the withholding on pay from your regular job at a level you thought would cause you to come out about even. That is, you thought you would neither owe tax nor be due a refund. You have no assets (cash, savings, etc.) with which to pay the $1,000. However, you can borrow the money to pay the taxes you owe. Two options are available to you, L [L'] and M [M']

**Options L [L']** is to borrow the money and pay the $1,000 tax you owe. In order to repay the loan, you will either have to work extra hours for a few weeks, or you will have to cut back on your standard of living for a few weeks.

**Option M [M']** is to pay no additional taxes. You could get around the extra taxes by not reporting the wages from your weekend job on your tax return. Since your weekend employer did not report these wages to the IRS, the IRS could not discover this income by checking against withholding records. If you omit this income from your tax return, you will not owe any additional taxes. [If you omit this income from your tax return, you think there is a 3 percent probability of getting caught by the IRS, in which case you would have to pay the $1,000 tax you owe plus a penalty of $1,500.]

Which option would you choose? ______

Scenario 6a [Scenario 6b]:

Assume this is April 1, 1991. You are preparing your tax return for the year 1990. Your taxable income includes some income you earned on a weekend job (not your regular job). This income was always paid in cash, and your weekend employer did not report these wages to the IRS.

You discover that you still owe $1,000 in taxes. This comes as a surprise, as you kept your withholding all during 1990 at a level you thought would cause you to come out about even. That is, you thought you would neither owe tax nor be due a refund. You have the assets (cash, savings, etc.) with which to pay the $1,000. Two options are available to you, C [C'] and D [D']

**Option C [C']** is to pay the $1,000 tax you owe by sending in a check with your tax return.

**Option D [D']** is to pay no additional taxes. You could get around the extra taxes by not reporting the wages from your weekend job on your tax return. Since your weekend employer did not report these wages to the IRS, the IRS could not discover this income by checking against withholding records. If you omit this income from your tax return, you will not owe

27
Appendix (Continuation)

any additional taxes. [If you omit this income from your tax return, you think there is a 3 percent probability of getting caught by the IRS, in which case you would have to pay the $1,000 tax you owe plus a penalty of $1,500].

Which option would you choose?

Scenario 7:

Assume this is April 1, 1991. You are preparing your tax return for the year 1990. Your taxable income includes some income you earned on a weekend job (not your regular job). This income was always paid in cash, and your weekend employer did not report these wages to the IRS.

You discover that you still owe $1,000 in taxes. This comes as a surprise. All during 1990 you kept the withholding on pay from your regular job at a level you thought would cause you to come out about even. That is, you thought you would neither owe tax nor be due a refund. You have no assets (cash, savings, etc.) with which to pay the $1,000. Two options are available to you, S and T.

Option S is to pay the $1,000 tax you owe by taking advantage of an installment withholding arrangement the IRS offers. This arrangement allows taxpayers who owe taxes at filing time to have additional tax withheld in equal installments over the next 12 months with interest at 10 percent.

Option T is to pay no additional taxes. You could get around the extra taxes by not reporting the wages from your weekend job on your tax return. Since your weekend employer did not report these wages to the IRS, the IRS could not discover this income by checking against withholding records. If you omit this income from your tax return, you think there is a 3 percent probability of getting caught by the IRS, in which case you would have to pay times the $1,000 tax you owe plus a penalty of $1,500.

Which option would you choose?

Scenario 8:

Assume this is April 1, 1991. You are preparing your tax return for 1990. Your taxable income includes some income you earned on a weekend job (not your regular job). This income was always paid in cash, and your weekend employer did not report these wages to the IRS.

You discover that you still owe $1,000 in taxes. This comes as a surprise to you. All during 1990 you kept the withholding on pay from your regular job at a level you thought would cause you to come out about even. That is, you thought you would neither owe tax nor be due a refund. You have the assets (cash, savings, etc.) with which to pay the $1,000. Two options are available to you, U and V.

Option U is to pay the $1,000 tax you owe by sending in a check with your tax return.

Option V is to pay no additional taxes. You would get around the extra taxes by not reporting the wages from your weekend job on your tax return. Since your weekend employer did not report these wages to the IRS, the IRS could not discover this income by checking against withholding records. If you omit this income from your tax return, you think there is a 3 percent probability of getting caught by the IRS, in which case you would have to pay times the $1,000 tax you owe plus a penalty of $1,500.

Which option would you choose?
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