# Respect Breeds Integrity and Incompetence Incites Deception: A Lab Experiment on How Taxpayers are Treated and the Competence of the Tax Authority[*]

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## ABSTRACT

The theory of the psychological tax contract suggests that tax authorities can enhance tax morale of intrinsically motivated taxpayers by respecting them. Testing this experimentally faces the difficulty of becoming an incompetent auditor. Given that tax evasion is always intentional in the standard tax morale experiments, in which a precise income level is shown to subjects, approving deceivers with respect could be a sign of a weak auditor, which creates a motive to evade, according to the "slippery slope framework". The results then contradict to the prediction of the psychological tax contract due to incorporating respect into experiments inappropriately. To overcome this problem, we create inadvertent tax evasion by showing subjects several income components for only ten seconds. Consistent with the theory, we find that tax morale was higher in the respectful treatment. This effect disappeared for subjects who could calculate total income within ten seconds. They might think that experimenters could not identify their purposeful evasion. Hence, their tax morale could only

be raised by treating them harshly.

**Keywords:** psychological tax contract; tax morale; slippery slope framework; fiscal exchanges

**JEL codes:** H26, H83

# I. INTRODUCTION

The research on tax compliance has recently recognized the eminence of the psychological tax contract. For example, Alm, Kirchler and Muehlbacher (2012) investigate the evolution of the tax compliance research and observe a paradigm shift from applying the economic theory of crime (e.g. Allingham and Sandmo 1972) to ascertaining psychological factors promoting voluntary tax payments. One strand of these factors is the psychological tax contract proposed by two scholars Feld and Frey (e.g. Frey and Feld 2002; Feld and Frey 2007).

Some studies have proved that democracy can reinforce citizens' feeling for the contract (Feld and Tyran, 2002; Feld and Frey, 2002). Another important empirical test of the theory is that treating intrinsically motivated taxpayers with respect could increase tax morale, as Frey and Feld (2002) have studied it with the survey data of 26 Swiss cantons. They first hypothesize that an implicit contract is established through a "fiscal exchange", in which citizens are willing to pay taxes to receive high quality public goods in return. Taxpayers then have intrinsic motivation to pay taxes. Second, this motivation has to be sustained by a respectful attitude. Hence, if tax authorities mistrust conscientious citizens and implement external punishments directly, intrinsic motivation is undermined, which would lead to higher tax evasion.

Albeit the impact of a respectful attitude on tax morale has convinced scholars Alm, Kirchler and Muehlbacher (2012), the working paper of Frey and Feld (2002) is the only empirical study examining it. The scarcity of field empirical studies could be ascribed to the endogenous problem of regression models, as Braithwaite (2009) suggests, when the authority treats cooperative and sneaky taxpayers with respect and coercion, respectively.

It is even harder to find experimental researches testing the effect of a respectful attitude on tax morale. As far as we know, there is not a single one in the literature. This is quite bizarre, since applying an experimental approach to this topic should smoothly avert endogeneity by not treating subjects according to whether

they are honest taxpayers. The absence of experimental studies could be attributed to the challenge of being recognized as an incompetent auditor. In the standard tax morale experiment, tax evasion is always deliberate, since a precise income level is shown to subjects. When intentional cheaters are treated with esteem, they and intrinsically motivated subjects might recognize experimenters as weak auditors. The feeling could discourage tax morale according to the "slippery slope framework" (Kirchler, 2007; Kirchler, Hoelzl, and Wahl, 2008). The result then contradicts the prediction of the psychological contract theory due to incorporating respect in experiments inappropriately.

This paper is motivated by the shortage of empirical studies on whether a respectful attitude from tax authorities could enhance tax morale. Two featured designs allow us to incorporate the theory in our experiment. First, to establish the psychological contract, we let subjects choose freely on how their taxes would be spent. Second, in order to not to be considered as incompetent auditors, we justified the respect attitude by creating unintended tax evasion. Subjects' total income was the sum of several numbers, which were shown to them for only ten seconds.

In this between-subjects experiment, we treated subjects with three different attitudes before a subject was audited. In the respectful treatment, we showed our understanding that ten seconds were too short for subjects to calculate and report correct income. In the disrespectful treatment, as Frey and Feld (2002) recognized a direct notification of fines as a disrespectful attitude, we simply told subjects that they would be fined if reported income was below the true value. Finally, in the threatening treatment, we suspected that subjects underreported income deliberately, in order to investigate the impact of a very harsh attitude on tax morale.

The main results of our study support the psychological tax contract theory. First, treated with respect, subjects paid more taxes than those treated with disrespect. Second, the above effect disappeared for subjects with excellent math ability, who might be able to work the total income out within ten seconds. Their tax evasion was purposeful. When the authority still treated them with respect, it could be

a sign of an incompetent auditor. Third, to raise tax compliance of subjects with excellent math ability, experimenters had to treat them with a very harsh attitude. The last two results can be explained by the "slippery slope framework" (Kirchler 2007, Kirchler, Hoelzl, and Wahl 2008), which suggests a positive correlation between the competence of authorities and tax morale.

Although the income components and ten seconds time limit create unintentional tax evasion for our study, one might worry that the reported income becomes a random variable, since subjects could not figure out the true income. Then comparing random variables between treatments are meaningless. We try to avoid this problem with the following design. There are some easy rounds, in which reported income is not polluted by calculation mistakes. We find that the above results are still robust with data from simple rounds.

The rest of this paper is organized as follows. Section II provides a brief review of the psychological tax contract theory and develops a theoretical framework. Section III introduces our experimental design. Section IV reports results of our experiments, and Section V concludes.

# II. THE THEORY OF THE PSYCHOLOGICAL TAX CONTRACT

The psychological tax contract theory originated as a critique of the research paradigm of the economic theory of crime introduced by Allingham and Sandmo (1972). The crime theory was further discussed and extended by Yitzhaki (1974, 1987). Andreoni et al. (1998) wrote a thorough review of relevant theoretical papers. In the paradigm, a taxpayer meditates how much income to declare, given that her true income is $Y$. Her declared income $D$ will be taxed with a rate $t$. Although there is no payment for the undeclared part, she faces an audit probability $p$. In the case that the tax filing is checked, the undeclared part is not only restored, but also fined with a rate $f$. A taxpayer thus ends up with either an income without audit, $Y_{NA} = Y -$

$tD$,  or an income with audit, $Y_A = Y - tY - ft\,(Y - D)$.

A rational taxpayer should maximize the following expected utility:

$$EU = (1 - p) \times U\,(Y - tD) + p \times U\,(Y - tY - ft\,(Y - D)).$$  (Eq. 1)

The above utility function is different from the one of Allinghame of Sandmo (1972), in which fine rate is multiplied by undeclared income $(Y - D)$. If fact, our model is closer to that of Yitzhaki (1974), in which the fine is based on the magnitude of tax evasion, $t\,(Y - D)$. Nevertheless, the minor difference does not change the theoretical predictions of our model.

The first-order condition is:

$$\mathrm{p} \times \frac{\partial \mathrm{U}(Y_A)}{\partial \mathrm{D}} = -\,(1 - \mathrm{p}) \times \frac{\partial \mathrm{U}(Y_{NA})}{\partial \mathrm{D}}\,,$$  (Eq. 2)

which states that the expected marginal utility from reporting the last unit of income, when being audited, is equal to the negative of the expected marginal utility from reporting that unit, when not being audited. In short, a rational taxpayer balances the expected marginal benefit and loss of reporting the last unit income.

The above expected utility model of tax evasion suggests that a taxpayer's optimal choice is dependent on his attitude towards risk. However, as it is criticized by Feld and Frey (2007), to fit the model to the observed tax evasion data in the U.S. (Alm, McClelland, and Schulze 1992; Graetz and Wilde 1985) and Switzerland (Pommerehne and Frey 1992), people need to be unrealistically extremely risk averse. While the experimental results of Kleven et al. (2011) explain the high tax morale in the real world by the impossibility of tax evasion of third-party reported income, Feld and Frey (2007) suggest to modify the model with the psychological tax contract.

Feld and Frey (2007) draw an analogy between the psychological tax contract and the market contract. Governments, like firms, produce goods and provide services, such as national defense, public roads, public libraries, etc. Citizens, like cus-

tomers, have to pay a price – taxes. Feld and Frey assume that if people receive high quality public goods and services, then they would have an intrinsic and genuine motivation to pay taxes voluntarily.

The psychological contract then suggests governments to respect the intrinsically motivated taxpayers, so that their genuine motivation can be sustained for higher tax morale. In particular, Frey and Feld (2002) believe that a rude control from authorities could crowd out the intrinsic motivation to pay taxes. Taxpayers then focus on extrinsic gains and losses of tax evasion, as it is modeled by Eq. (1). Frey (1997) describes this shift of motivations as the 'Crowding Theory'.

The model of Christian and Alm (2014) is suitable to illustrate the shift of motivation, although they use it to investigate a totally different issue – the impact of empathy and sympathy on tax morale. Our "psychological tax contract model" is written as:

$$V = EU\,(Y) - \delta\,(Y - D), \qquad\qquad\qquad\qquad\qquad \text{(Eq. 3)}$$

where $EU\,(Y)$ is formulated by Eq. (1), the "extrinsic motivation utility", which specifies the utility of an extrinsically motivated taxpayer. "Intrinsic motivation utility" is described by $-\delta\,(Y - D)$, as tax evasion could be a thwarting of the genuine wish to pay taxes. We denote $\delta$ as the intrinsic motivation coefficient. The more a taxpayer is intrinsically motivated, the more he despises tax evasion and the greater $\delta$ is.

According to the comparative statics analysis of Christian and Alm (2014), the effect of $\delta$ on D is positive - that is, the model predicts that a taxpayer declares a higher income when she is more intrinsically motivated. Hence, we the following main hypothesis to be tested in our experiments.

**Hypothesis**: A respectful attitude from governments could promote the psychological tax contract and increases tax morale. On the contrary, a disrespectful attitude from governments could undermine the psychological tax contract and decrease tax

morale.

# III. EXPERIMENTAL DESIGN

As discussed in the Introduction, to test whether a respect attitude could enhance tax morale experimentally, an implicit tax contract must be established in the lab, and we should not be recognized as an incompetent auditor.

## A. Establishing a psychological tax contract

Previous studies have used two approaches to motivate the contract. First, providing useful public goods in accordance with subjects' wishes. Alm, Jackson and McKee (1993) let students choose one of the two sectors, "students financial office" and "university president's office", in the university that would receive their taxes. As anticipated, group decisions made by the majority rule were the students financial office. They reported that tax compliance was significantly higher when taxes were given to the students financial office. Alm and his co-authors explained their results by the "fiscal exchange" between tax authorities and taxpayers - an idea similar to voluntary exchanges in markets.

A second way is to promote the contract through self-determination. Feld and Tyran (2002) found that tax morale was higher when subjects could vote to decide the fine on tax evasion. Feld and Frey (2002) reported that tax authorities in Swiss cantons with more comprehensive direct democracy treated citizens with more respect. They interpreted this as a positive correlation between direct democracy and the psychological contract.

Consulting the above two approaches, we attempted to build up the psychological contract by allowing student subjects to choose one of the two sectors, "students financial office" and "university financial office", to become the recipient of their taxes. We told subjects that the student financial office helps students with needs, whereas the money of university financial office is not designated for a specific use.

Unlike that the decision was made by the majority rule in the paper of Alm, Jackson and McKee (1993), a subject's taxes would be sent to whichever sector was appointed by her. Following an individual's choice completely should promote a much stronger psychological contract.

## B. Avoiding being an incompetent auditor

As explained in Introduction, tax evasion in the standard tax morale experiment is always deliberate, since an exact income is shown to subjects. Then treating intentional cheaters with respect could be a sign of an incompetent authority, because it cannot identify real deceivers. To avoid this problem, we created unintended tax evasion in our experiments by showing subjects three to five income components for only ten seconds. The total income was the sum of these components. For instance, 3111, 652, 3904, and 82 were the four numbers in the first round. Most subjects could not calculate total income correctly. Since reporting a lower income could be unintentional, a respect attitude was no longer a sign of incompetent authorities for intrinsically motivated taxpayers.

Note that for those who were not intrinsically motivated, their tax evasion was still willful, especially when the reported income was lower than any income components. They would recognize experimenters as weak auditors. If our way of establishing the psychological contract was not effective, there might be very few voluntary taxpayers. However, because we have amended previous effective approaches, there should be many intrinsically motivated subjects, who did not think us incompetent.

## C. Treatment manipulation

There are respectful, disrespectful and threatening treatments in this between-subjects experiment. The only variation between the three treatments was different words manipulating attitudes from experimenters before subjects were audited. We denote those different words in bold characters. (They were not actually bold in the

experiment instructions shown to subjects.)

In the respectful treatment, subjects were treated with respect and understanding. They were also asked to sympathize that experimenters had to follow the rule of the fine announced earlier. They saw the following words before audit:

"Your declared income is being checked in this round. **We understand that the numbers are too complex and time is too short for you to declare the true income. Please kindly tolerate that we have to follow the rule announced earlier**: You will be fined if your declared income is lower than the true income."

Frey and Feld (2002) classified a direct notice to taxpayers as a disrespectful attitude from Swiss tax authorities to voluntary taxpayers. Following their setting, in the disrespectful treatment, there were no words expressing respect and understanding. They simply saw the following words before audit, which is the message in the standard tax morale experiments:

"Your declared income is being checked in this round. You will be fined if your declared income is lower than the true income."

In the threatening treatment, subjects not only received a notice of checking, they were warned and suspected that they underreport tax intentionally. They saw the following words before audit:

"Your declared income is being checked in this round. **Warning! We suspect that you are underreporting income intentionally.** You will be fined if your declared income is lower than the true income."

Note that the audit rate was 20%, and subjects only saw above words in rounds that their income was checked. There were twenty rounds for each subject. To identify whether there is treatment effect, we should analyze subjects' decisions made after experiencing the attitude from experimenters. In order to acquire the maximum decisions qualified for analysis and not to deviate from the 20% audit rate, each subject was checked once in the first five rounds. We will analyze treatment effect with behaviors from and after the sixth round.

It should be pointed out that empathy and fine treatments can be more suit-

able names for respectful and disrespectful treatments, respectively. Nevertheless, we still follow research paradigm of the psychological tax contract (Frey and Feld, 2002; Feld and Frey, 2002, 2007). They have suggested that taxpayers would feel being respected, if the auditor understood that making tax reports is tricky and unintended mistakes are often made. Although this is best described as an empathy attitude, we use their term of respect. Moreover, as discussed earlier, they defined a direct notice of tax evasion as a disrespectful attitude.

## D. Easy rounds without calculation errors

There were "complex rounds", in which it was very difficult to calculate correct income within ten seconds. As argued earlier, this could create unintended tax evasion. However, tax compliance rates in these rounds could be polluted by calculation errors. Hence, there were also some "easy rounds", in which numbers were not too complicated. This allows us to observe subjects' genuine tax morale.

When we show a respect attitude in easy rounds, subjects could recognize us as incompetent authorities and have a lower level of tax morale. Whether this happened is an empirical question, which will be checked later.

## E. Procedure of experiments

We recruited subjects by sending invitation emails to all students of National Taipei University. Any student could sign up for the experiments according to the policy of first-come, first-served. We conducted 6 sessions of experiments using zTree (Fischbacher 2007) between December 2012 and February 2013, each lasting about an hour. A total of 103 subjects participated, with 33, 35, and 35 in respectful, disrespectful, and threatening treatments, respectively. The maximum and minimum numbers of subjects in a session were 20 and 13, respectively. Subjects were well-incentivized. Average payoffs were NT$566 (approximately US$19.18), ranging from NT$260 (US$8.81) to NT$890 (US$30.17). The contemporary minimum wage rate was NT$ 103 per hour.

Upon their arrival at the lab, they were told that they would receive NT$100 show-up fees at the end of the experiment. Aside from that, after a subject completed the total twenty rounds, one round will be randomly picked, and the payoff of that round will be part of the final payoff. Each round includes the following four stages. (The English translation of the instruction is in Appendix.)

Stage 1:  Subjects could choose between "students financial office" and "university financial office" as the recipient of their transfers. They were told that each subject's transfer will be sent in accordance with her choice, and 20% of their reported income will be transferred to the recipient.

Stage 2:  In each round, three to five numbers were shown on the computer screen for only ten seconds. The sum of these numbers was the total income. Then subjects had to declare their income.

Stage 3:  In each round, 20% of all subjects were randomly chosen by the computer to have their declared income checked. When a subject was checked, she was treated with respect or disrespect or threat according to which treatment she participated. If there was any undeclared income, then it must be restored. On top of that, she had to pay double of the undeclared part as a fine.

Stage 4:  A summary of results of the round was displayed to subjects. This included true income, declared income, fine (if there was any), and payoff.

## F. Identifying subjects with excellent math abilities

We measured individual math ability. Because subjects with an excellent ability could figure out the total income within ten seconds, their tax evasion will be intentional. If the tax auditor still treats them with respect, they may perceive the attitude as a sign of weak authorities. Then their behaviors should be very different from those with normal math abilities. The math tests were conducted by the end of each session, that is, after one of the twenty rounds of the tax morale experiment was picked. Subjects were told that there was a chance to earn more payoffs in math tasks. There were five numbers in each task. By calculating the sum of the five

numbers correctly, a subject could earn NT$30. Within two minutes, subjects could conduct as many tasks as they wished.

## IV. RESULTS

### A. Treatment effect

Figure 1 plots frequency distributions of the tax compliance rate (the ratio of declared income to real income) for the three treatments. Because the rate in easy rounds was highly correlated with that of complex rounds, we combined data from both complex and easy rounds for all analyses in this section, unless separate results checked by us are at odds.[1] Compared to the disrespectful treatment, there were fewer subjects declaring nearly zero income and more subjects declaring almost full income in the respectful and threatening treatments. The mean tax compliance rates in the respectful, disrespectful, and threatening treatments were 0.7265, 0.6317, and 0.7748, respectively. The standard Wilcoxon-Mann-Whitney and Epps-Singleton tests also suggest that distributions of the respectful and disrespectful treatments were different ($Z = 3.438$, $p = 0.0006$; $W_2 = 29.855$, $p < 0.0001$), and distributions of the threatening and disrespectful treatments were also different ($Z = 5.194$, $p < 0.0001$; $W_2 = 53.457$, $p < 0.0001$).

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[1]　A subject's average tax compliance rate of complex rounds was very similar to that of easy rounds. The two mean values were highly correlated (correlation coefficient = 0.7856). In the respectful treatment, the correlation coefficient is 0.9097, which releases us from the worry of being recognized as an incompetent auditor, when we showed respect in easy rounds.

Figure 1    Frequency distribution of tax compliance in the three treatments
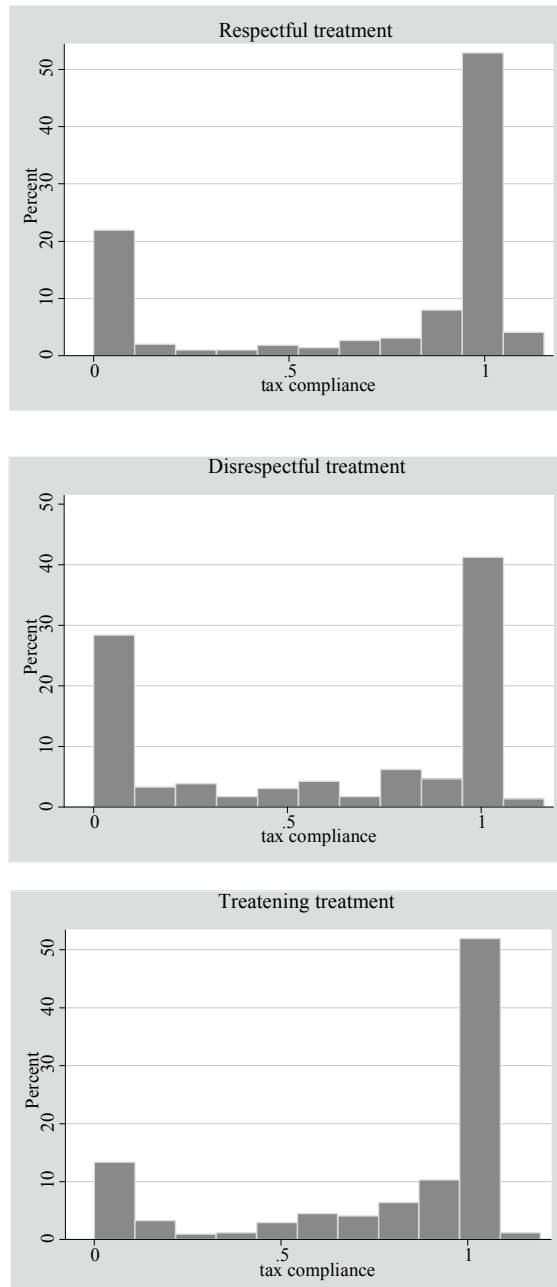
The higher tax compliance in the respectful treatment supports the psychological tax contract theory. A positive correlation between authority power and tax morale suggested by the slippery slope framework (Kirchler 2007, Kirchler, Hoelzl, and Wahl 2008) can explain why tax compliance was higher in the threatening treatment than in the disrespectful treatment. The next part analyzes treatment effects with econometric models.

## B. Econometric models

The dependent variable $TC_{it}$ is subject $i$'s tax compliance rate in round $t$. Independent variables are:

*Gender$_{it}$*: The dummy variable for gender, which is equal to one if subject $i$ is a male; otherwise, it is equal to zero.

*Respectful$_{it}$*, *Disrespetful$_{it}$*, and *Threatening$_{it}$*: Treatment dummies. *Respectful$_{it}$* = 1 if subject $i$ participated in the respectful treatment; otherwise, *Resspectful$_{it}$* = 0. *Disrespectful$_{it}$* = 1 if subject $i$ participated in the disrespectful treatment; otherwise, *Disrespectful$_{it}$* = 0. *Threatening$_{it}$* = 1 if subject $i$ participated in the threatening treatment; otherwise, *Threatening$_{it}$* = 0.

*N-Math$_{it}$* and *H-Math$_{it}$*: Dummy variables for math abilities. In the respectful treatment, subjects with excellent math ability might be able to work out total income, but the authority still treated them with respect. They could recognize this as a sign of weak authorities and then reported less income, as the slippery slope theory predicts. The standard Epps-Singleton test confirms that the tax compliance rate of those working 3 or more questions out in the math ability test are significantly different from the rate of those only working 2 or fewer questions out ($p = 0.0109$). Conversely, according to the slippery slope theory, those excellent math ability opportunists in the threatening and disrespectful treatments should declare more income than those with ordinary math abilities. It is also verified by the Epps-Singleton test. In the threatening and disrespectful treatments, the $p$-values are 0.0000, and 0.0002, respectively. To capture the above within treatment differences caused

by diverse math abilities, we construct interaction terms by multiplying dummy variables of treatments and math abilities. In particular, we assign values of dummy variables for math abilities as follows: $N\text{-}Math_{it} = 1$, if subject $i$ worked 2 or fewer questions out in the math ability test; otherwise, $N\text{-}Math_{it} = 0$. $H\text{-}Math_{it} = 1$, if subject $i$ worked 3 or more questions out in the math ability test; otherwise, $H\text{-}Math_{it} = 0$. *Audited*: The dummy variable for whether a subject was audited in the previous period. It is equal to one if a subject was audited; otherwise, it is equal to zero.

Following Christian and Alm (2014), we analyze our data with an ordinary least squares approach.[2] In addition, because the lower bound is zero in our experiments, we also run the Tobit model. We introduce clustered standard errors at individual level, since a subject usually grouped her tax compliance around an idiosyncratic rate.

Table 1 lists the regression results. We use subjects with an ordinary math ability in the disrespectful treatment as the baseline. We discuss the following main results.

Result 1: For subjects with a normal math ability, tax compliance was higher when they were treated with respect and understanding than when they were treated with disrespect. As the psychological tax contract theory predicts, a respectful attitude could enhance tax compliance by promoting intrinsic motivation to pay taxes, while a disrespectful attitude may undermine the motivation and tax compliance.

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[2]   We can analyze our data with fixed or random effect panel data analysis. However, the nature of the experiment forbids the use of fixed effect panel analysis, since there are no within-subject variations for explanatory variables such as treatment dummies and math abilities. The random effect model is also not appropriate, because the subject-specific error could be related to explanatory variables. For instance, an unobserved stronger social preference could cause a higher subject-specific error, which might be highly related to one of the explanatory variables, gender.

Table 1 OLS and Tobit Models with Clustered Standard Errors at Individual Level (Use subjects with ordinary math ability in the disrespectful treatment as the baseline, with data from the sixth round to the twentieth round.)

| Dependent variable: tax compliance rate | OLS | Tobit |
|---|---|---|
| *Gender* | -0.0202 (-0.30) | -0.3341 (-0.45) |
| *Disrespectful$_{it}$×H-Math$_{it}$* | 0.1731 (1.52) | 0.1962 (1.58) |
| *Respectful$_{it}$×N-Math$_{it}$* | 0.1562* (1.77) | 0.1728* (1.73) |
| *Respectful$_{it}$×H-Math$_{it}$* | -0.0173 (-0.11) | -0.0254 (-0.13) |
| *Threatening$_{it}$×N-Math$_{it}$* | 0.1400 (1.56) | 0.1664* (1.68) |
| *Threatening$_{it}$×H-Math$_{it}$* | 0.3060*** (3.66) | 0.3396*** (3.68) |
| *Audited* | -0.0952*** (-3.35) | -0.1101*** (-3.46) |
| *Constant* | 0.6289*** (8.55) | 0.6024*** (7.15) |
| R-squared | 0.0498 | |
| Pseudo R-squared | | 0.0382 |
| Observations | 1545 | 1545 |

1.t-statistics are in parentheses, which are derived from clustered standard errors at individual level.

2.***, **, * denote significance at the 1, 5 and 10 percent level, respectively.

Result 2: Compared to the disrespectful treatment, tax morale of excellent math ability subjects was higher when they were treated with threats. This can be explained by the "slippery slope framework" (Kirchler 2007, Kirchler, Hoelzl, and Wahl 2008), which suggests a positive correlation between tax morale and the competence of auditors. Excellent math ability subjects might recognize a harsh attitude as a sign of strong authorities and therefore declared more income.

Result 3: For subjects with normal math ability, the impact of threats on tax morale cannot be concluded from our analysis. While the coefficient of $Threatening_{it} \times N\text{-}Math_{it}$ is not significant in the OLS analysis, it is marginally significant in the Tobit model. Warning and suspicion could have two effects. First, it could undermine the psychological contract with an extremely rude attitude. Second, as the slippery slope theory predicts, strong or harsh authorities could increase tax compliance. Which one is more salient is inconclusive.

Result 4: Being audited in the previous period has a negative effect on tax morale. There might be two explanations for it. First, if a subject thought that one was rarely audited consecutively, she might report less income. Second, if one wanted to compensate the loss from fine, with the attempt to increase the overall expected payoff.

Compared to the 0.1 R-squared in the tax morale study of Christian and Alm (2014), the R-squared in our model is only 0.0422. This lower level could be ascribed to that we did not have individual characteristics in our regression, such as empathy and blood donor. Nevertheless, the $F$ statistic is 2.78 ($P > F = 0.0152$), which suggests that our explanatory variables cannot be totally ignored.

# V. CONCLUSION

A policy relevant proposition of the theory of psychological tax contract is that treating intrinsically motivated taxpayers with respect could enhance tax morale (Frey and Feld, 2002). This paper is motivated by the shortage of field empirical and lab experimental tests of the proposition. We ascribe the lack of field studies to the

endogenous problem and the absence of experiments to the problem of being recognized as an incompetent auditor.

In our experiments, we first constructed the psychological contract by letting subjects decide the recipient of their taxes. We then tried not to avoid the issue of weak authorities by creating inadvertent tax evasion.

As far as we know, our study provides the first experimental evidence supporting an important proposition of the psychological tax contract theory: A respectful attitude from authorities could enhance tax compliance, while a disrespectful attitude decreased it. Behaviors of excellent math ability subjects were quite different. Treated with warning and suspicion, they declared more income. This result supports the argument of Braithwaite (2009) that opportunists should be treated with "an iron fist with a velvet glove".

Obviously, there are some limitations of our study. First, culture difference could restrict the external validity, when one applies our results to other countries. In the Eastern societies, following and respecting authorities is a norm, so a threaten attitude could increase tax morale in our experiment. The culture of western societies is very different, and taxpayers might reciprocate kindness but fight against threats. It would be interesting for future studies to explore countries differences in the responses to auditors' attitudes. Second, according to the review paper of Nicoleta (2011), subjective audit probabilities, social national norms, perceived fairness of tax system etc., are important determinants for tax compliance. Compared to them, attitudes from authorities might only have a smaller impact. It should be interesting for future studies to measure the effects of different factors on tax compliance.

# REFERENCES

Alm, J. Jackson, B. R. and McKee, "M. 1993. Fiscal Exchange, Collective Decision Institutions, and Tax Compliance," *Journal of Economic Behavior and Organization*. vol. 22, pp. 285~303.

Alm, J. Kirchler, E. and Muehlbacher, S. 2012. "Combining Psychology and Economics in the Analysis of Compliance: From Enforcement to Cooperation," *Economic Analysis & Policy*, vol. 422, pp. 133~151.

Alm, J. and McKee, M. 2006. "Audit Certainty and Taxpayer Compliance," *Andrew Young School Annual Conference on Public Finance Issues*.

Alm, J. McClelland, G. H. and Schulze, W. D. 1992. "Why do People Pay Taxes?" *Journal of Public Economics*, vol. 48, pp. 21~38.

Allingham, M. G. and Sandmo, A. 1972. "Income Tax Evasion: A Theoretical Analysis," *Journal of Public Economics*, vol. 1, pp. 323~338.

Andreoni, J. Erard, B. and Feinstein, J. 1998. "Tax Compliance," *Journal of Economic Literature*, vol. 36, pp. 818~860.

Braithwaite, V. 2009. *Defiance in Taxation and Governance* (Cheltenham, UK: Edward Elgar).

Christian, R. C. and James, A. 2014. "Empathy, Sympathy, and Tax Compliance," *Journal of Economic Psychology*, vol. 40, pp. 62~82.

Feld, L. P. and Frey, B. S. 2002. "Trust Breeds Trust: How Taxpayers are Treated," *Economics of Governance*, vol. 3, pp. 87~99.

Feld, L. P. and Frey, B. S. 2007. "Tax Compliance as the Result of a Psychological Tax Contract: The Role of Incentives and Responsive Regulation," *Law & Policy*, vol. 291, pp. 102~120.

Feld, L. P. and Tyran, J. R. 2002. "Tax Evasion and Voting: An Experimental Analysis," *Kyklos*, vol. 552, pp. 197~222.

Fischbacher, U. 2007. "Zurich Toolbox for Readymade Economic Experiments,"

*Experimental Economics*, vol. 10, no. 2, pp. 171~178.

Frey, B. S. 1997. *Not Just for The Money. An Economic Theory of Personal Motivation*. (Cheltenham, UK: Edward Elgar).

Frey, B. S. and Torgler, B. 2007. "Tax Morale and Conditional Cooperation," *Journal of Comparative Economics*, vol. 35, pp. 136~159.

Frey, B. S. and Feld, L. P. 2002. "Deterrence and Morale in Taxation: An Empirical Analysis," CESifo Working Paper no. 760, August 2002.

Graetz, M. J. and Wilde, L. L. 1985 "The Economics of Tax Compliance : Facts and Fantasy," *National Tax Journal*, vol. 38, pp. 355~363.

Kirchler, E. 2007. *The Economic Psychology of Tax Behaviour* (Cambridge, UK: Cambridge University Press).

Kirchler, E. Hoelzl, E. and Wahl, I. 2008. "Enforced versus Voluntary Tax Compliance: The "Slippery Slope Framework,"," *Journal of Economic Psychology*, vol. 29, pp. 210~225.

Kleven, H. J. Knudsen, M. B. Kreiner, C. T. Pedersen, S. and Saez, E. 2011. "Unwilling or Unable to Cheat? Evidence from a Tax Audit Experiment in Denmark," *Econometrica*, vol. 79, pp. 651~692.

Nicoleta, B. 2011. "A Review of Factors for Tax Compliance," *Economics and Applied Informatics*, vol. 1, pp. 69~76.

Pommerehne, W. W. and Frey, B. S. 1992. "The Effects of Tax Administration on Tax Morale," Unpublished Manuscript, University of Zurich.

Yitzhaki, S. 1974. "A Note on Income Tax Evasion: a Theoretical Analysis," *Journal of Public Economics*, vol. 3, pp. 201~202.

Yitzhaki, S. 1987. "On The Excess Burden of Tax Evasion," *Public Finance Quarterly*, vol. 15, pp. 123~137.

# Appendix: English Translation of Experiment Instructions

Welcome to the experiment.

At the end of the experiment, you will receive a NT$100 show up fee, plus possible additional earnings from experiments. Therefore, it is very important for you to read the instruction carefully. If you have any questions about the instruction, please raise your hand and we will come to explain it to you.

During the entire experiment, please do not contact any other participants and do not use your mobile phone, calculators, and any other computer programs. If you violate above rules, you will be asked to leave the experiment without receiving any payment.

The experiment consists of 20 rounds and lasts about 70 minutes.  In each round, you will see 3 to 5 elements of income. The sum of them is your real income in this round. You have to sum those elements up and report the total. Based on your reported income, 20% of it will be transferred to the recipient that you chose earlier, and the computer system will randomly check the reported income. For each participant, the probability of being checked is 20%. If you are found to report less than the real income, you will have to restore the underreported part 20%×real income – reported income. On top of that, you pay double of the underreported part. That is, you will be asked for an extra transfer which is 3 times of the underreported in total 3×20%×real income – reported income. If you are not checked, the extra transfer is zero.

At the end of each round, the computer system will calculate your payoffs in that round real income – reported income – extra transfer. At the end of the experiment, the system will randomly pick one round from the 20 rounds for each participant. Your additional earnings from the experiment are the payoffs of the picked round. The payoffs in experiments are denominated as ESC Experimental Standard Cur-

rency and 10 ESC is equal to NT\$1. Every participant will be paid in private. You are not obligated to tell others how much you earn from the experiment.

At the very beginning of the experiment, you have to choose the recipient of your transfer:

You will have different income in different rounds. Based on the reported amount, 20% will be transferred. You can choose the recipient of the transfer. There are two options. One is the student financial office that helps student with needs, and the other one is a university financial office which is not designated for a specific use.

After you choose the recipient of your transfer, there are three stages in each round.

Stage 1:

The computer screen will show three to five elements of income. These elements will be shown for only 10 seconds. The sum of them is your real income in that round. Then you have to report your income.

Stage 2:

In each round, 20% of participants will be randomly selected, and the computer program will check their reported income.

Stage 3:

The computer will show your real income, your reported income, your transfer and the extra transfer on the screen. There are 4 possibilities:

1. Your reported income is equal to the real income. For example, if your real income is 700 and you report 700, your transfer will be 700*20% = 140. No matter whether you are checked or not, there is no extra transfer. You final payoffs in this round are 700~140 = 560.

2. Your reported income is higher than the real income. For example, if your real income is 700 and you report 800, your transfer will be 800*20% = 160. No matter whether you are checked or not, there is no extra transfer. Your final payoffs in this round are 700~160 = 540.

3. You reported income is lower than the real income and you are not checked. For example, if your real income is 700 and you report 100, your transfer will be

100*20% = 20. Your final payoffs in this round are 700~20 = 680.

4. You reported income is lower than the real income and you are checked. For example, if your real income is 700 and you report 100, your transfer will be 100*20% = 20. Since you are found to underreport income, you will be asked to pay for extra transfer, which is equal to 700~100*20%*3 = 360. Therefore, your final income in this round will be 700~20~360 = 320.