

Procedural Fairness and Taxpayers' Response: Evidence from an Experiment*

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We perform an experiment to investigate how the fairness of decision making procedures affects taxpayers' income reporting behavior. According to our experiment, individuals tend to report more income, and thus evade less tax when majority voting determines a tax rate structure than when a dictatorship determines a tax rate structure. We also find that such a positive effect of majority voting occurs mainly through individuals dissatisfied with the current tax rate structure. These findings hint at a channel through which procedural fairness works to improve tax compliance.

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I. Introduction

Understanding tax compliance behavior is important in theory and in practice. A gambling model is widely employed to investigate tax compliance behaviors. In this model, an individual facing the risk of being penalized for tax evasion reports an optimal level of income, which balances the benefit of saving taxes and the cost of the potential fines charged when tax evasion is detected by the tax authority. This

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approach shows how the level of tax evasion is affected by income level, tax rates, an audit rate, and a fine rate. However, it is not fully successful in explaining the high tax compliance rate in the real world. Considering the current level of tax rates, audit rates, and fine rates of many countries, people report their income more honestly, and thus evade taxes less than what is expected by the model (Alm et al., 1992b; Graetz and Wilde, 1985; Slemrod and Yitzhaki, 2002; Skinner and Slemrod, 1985).

To resolve the limitations of a standard economic model and explain a high tax compliance rate, recent studies introduce non-pecuniary factors in tax compliance behavior.¹ This line of studies finds that in addition to aforementioned tax parameters, non-pecuniary factors, often referred to as tax morale, significantly change the income reporting behavior of individuals. Taxpayers' perceptions of fairness play an important role in forming tax morale. According to previous studies, horizontal equity (Spicer and Becker, 1980; Moser et al., 1995), exchange equity (Kim, 2002; Kim et al., 2005; Leder et al., 2010), provision of public goods (Alm et al., 1992b; Becker et al., 1987), perceived justice of tax amnesty (Rechberger et al., 2010), and rewards on tax compliance (Torgler, 2003; Bazart and Pickhardt, 2010; Kastlunger, 2011) are the factors known to affect the perception of fairness in the tax burden. When an individual feels that his/her tax burden is unfairly large in those respects, he/she has an incentive to cheat on taxes to recover the fairness of tax burden. In this regard, the perception of fairness is closely related to tax compliance behaviors.

In a related context, an interesting study by Alm et al. (1999) provides a clue about how the voting process intervenes in shaping a social norm, and thus how it eventually affects tax compliance by demonstrating that an individual's income reporting behavior differs according to the processes and outcomes of voting. More precisely, in an experimental framework, they observe that people show more (*resp.* less) tax compliance when a voting outcome turns out to accept (*resp.* reject) a proposed change in tax parameters.² They interpret this finding as that voting outcome is regarded as a reflection of how other people feel about the tax environment and behave in reporting income. Individuals might use such an impression to behave similarly to other people when reporting income. In other experiment settings, Feld and Tyran (2002) and Wahl et al. (2010) conclude that more tax compliance associated with endogenously agreed tax parameters is attributed to the legitimacy given by voting.

¹ In explaining the higher tax compliance rate, recent studies emphasize the role of voluntary compliance resulting from an obligation to abide by the tax norms. Moreover, the interaction between voluntary tax compliance and deterrent parameters is also attempted to be investigated. For more details, see the slippery slope framework (Alm et al., 2012; Kirchler et al., 2008).

² Similar results are reported in Alm et al. (1993) when subjects are allowed to vote on the use of tax revenue.

Similar to Alm et al. (1999), Feld and Tyran (2002), and Wahl et al. (2010), our work investigates how voting affects an individual's tax compliance behavior. However, we approach this question with an emphasis on the perception of procedural fairness, which varies by whether people are satisfied with the way how tax parameters are determined or not. We also emphasize the role of taxpayer's preferences by introducing the interplay between procedural fairness and preference. This approach allows the effect of procedural fairness to be varied by taxpayer's preferences on the way how tax parameters are determined. As a result, we can explain the channel through which the perception of procedural fairness makes an effect on tax compliance behaviors.³

Voting, including majority voting, generally treats individual preferences equally. This feature of voting is in sharp contrast to other group decision rules. Thus, in a voting system, an individual is more likely to feel that his/her opinion is respected by an authority and reflected in group decisions. Indeed, Feld and Frey (2002) find that taxpayers tend to be treated more respectfully when they have more political rights. Such a feeling of being respected is one of the key components of procedural fairness as perceived by individuals (Kornhauser, 2008). On this ground, voting is a group decision rule conjectured to enhance an individual's perception of procedural fairness.

There are some studies supporting the view that procedural fairness influences an individual's willingness to comply with another party (Hess and Story, (2005; Tyler, 1997; Tyler and McGraw, 1986; Sunshine and Tyler, 2003). In the tax compliance literature, Kornhauser (2008) claims that procedural fairness plays an important role in forming tax norms and in increasing tax compliance. This argument is supported by an empirical study by Smith (1992). More specifically, Smith (1992) finds empirical evidence supporting the idea that procedural fairness weakens the acceptability of underreporting and increases the perceived likelihood of detection. This finding, together with his estimated equation of the likelihood of underreporting, imply that the improvement of procedural fairness lowers the likelihood of underreporting income.

From these arguments arises a hypothesis concerning a connection between voting and tax compliance behavior. If voting improves the perception of procedural fairness, which also brings better tax compliance, taxpayers are expected to show better tax compliance behavior when voting, rather than another group decision rule, is used. The aim of our study is to test this hypothesis and to find another clue to the role of procedural fairness in tax compliance.⁴

³ To the best of our knowledge, no studies explicitly allow the heterogeneous effect of voting, which could explain a channel of the positive effect of voting. Exceptionally, Wahl et al. (2010) recognizes that voting improves tax compliance only when individuals benefit from the collected taxes.

⁴ There is a difference between our work and that of Smith (1992). Smith (1992) concerns the perception of procedural fairness in tax administration, while our study focuses on the perception of

To this purpose, we carry out an experiment which randomly assigns subjects into two groups. The two groups are designed to be homogenous except in how the tax rate structure is determined. One group is told that majority voting decides its tax rate structure while the other group is told that its tax rate structure is determined by the preference of an anonymous member called the *dictator* in the experiment. Due to the feature of an experiment, the different income reporting behaviors observed in the two groups are attributed to the different rules for deciding a tax rate structure. In our experiment, a significant difference in income reporting is observed between those two groups. This observation supports the idea that people's perception about the procedural fairness in tax parameter decision making plays an important role in forming a social norm, and thus ultimately affects the tax compliance of individuals. The effect of voting on tax compliance turns out to be different according to whether or not the preferred tax rate structure agrees with the implemented tax rate structure. In the subgroup of subjects whose preferred tax rate structure is not implemented in the experiment, the introduction of majority voting is significantly associated with a reduction in underreporting income. In contrast, subjects whose preferred tax rate structure agrees with the implemented tax rate structure do not show a significantly different pattern in reporting income when majority voting is used to decide the tax rate structure. This finding implies that the positive effect of majority voting, when it exists, occurs mainly through the individuals who are confronted with a non-preferred tax rate structure, and thus are probably dissatisfied with the current tax system.

The remainder of this paper proceeds as follows. Section 2 presents the design and features of our experiment. Sections 3 and 4 present and discuss the empirical results, respectively. Section 5 concludes.

II. Experimental Design

This section explains the experimental design.⁵ The experiment is conducted between September 26 and October 13 in 2011 at University of Seoul in Korea. The subjects for the experiment are 83 volunteers from the undergraduate at University of Seoul. They participate only once in the experiment and are paid 5,000 KRW as a participation allowance as well as a reward depending on the experiment outcome.⁶

Participants are randomly assigned to one of four sessions. The sessions are treated differently with the tax rate structure or the procedure of deciding a tax rate structure. In the experiment, we consider two tax rate structures: a flat tax rate

procedural fairness in the decision making process.

⁵ The directions and questionnaires used in the experiment are available upon request.

⁶ As of September 26 in 2011, the KRW to USD exchange rate was 1,193 KRW/USD.

structure and a progressive tax rate structure. The flat tax rate structure means that the average tax rate is constant as the income changes. For the progressive tax rate structure, we consider a linear progressive tax rate structure with an income deduction. In addition, we consider two kinds of procedures to determine a tax rate structure for each session: voting and dictatorship. Voting means that a tax rate structure is determined by the majority rule of the subjects. Dictatorship means that a tax rate structure is determined by the preference of the pre-nominated dictator among the subjects. Table 1 summarizes the treatments of each session.

[Table 1] Treatments for Sessions

sessions	tax rate structure	rule to determine the tax rate structure
Session 1	flat tax rate	dictatorship
Session 2	flat tax rate	voting
Session 3	progressive tax rate	dictatorship
Session 4	progressive tax rate	voting

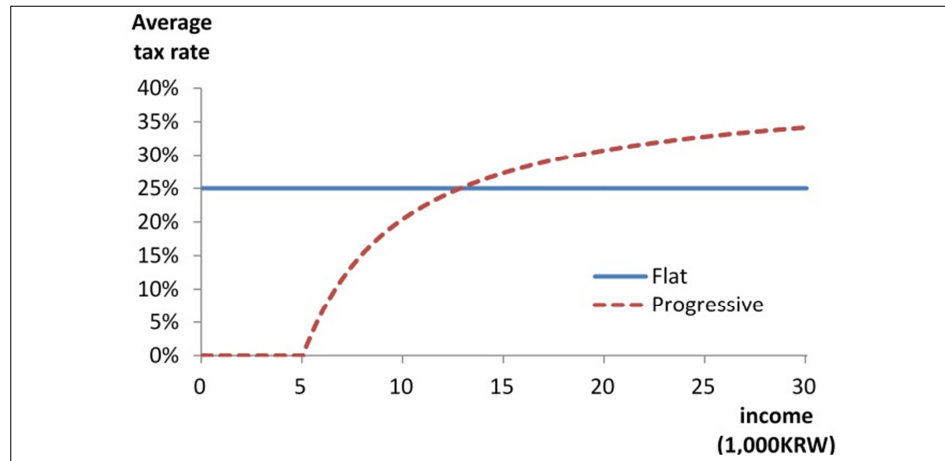
The key parameters in the experiment are the tax rates, the probability of being audited, and the penalty rate against tax evasion. For the flat tax rate structure, we set the marginal tax rate at 25% for any income. Thus, an agent with income y has to pay a tax $T(y) = 0.25y$ and his/her average tax rate is also 25%. Under the progressive tax rate structure, we consider a linear progressive tax rate structure with an income deduction up to 5,000 KRW and a marginal tax rate of 41%. That is, an agent with an income y less than 5,000 KRW does not pay a tax and an agent with an income y more than 5,000 KRW has to pay a tax $T(y) = 0.41(y - 5000)$. In this tax rate structure, the average tax rate increases according to income greater than 5,000 KRW. Figure 1 shows how the average tax rates change with income changes under the two tax rate structures. We choose the tax rates so that the flat tax rate structure yields a higher expected after-tax income than the progressive tax rate structure. Note that if both tax rate structures yield the same expected after-tax income, risk averse agents always prefer the progressive tax rate structure to the flat tax rate structure.

We choose 20% as the probability of the subjects being audited, and 300% as the penalty rate against tax evasion. The values of these parameters are in the range of the parameters used in previous studies.

Next we explain the experimental procedure in detail. The number of subjects in each session is 20 or 21.⁷ The subjects are not allowed to communicate with one another during the experiment. Each session consists of three stages.

⁷ Each session consists of 2 groups. We assign 11 subjects to each group so that 22 subjects are supposed to be in each session. However, some subjects do not show up to the experiment.

[Figure 1] Average Tax Rates



In Stage 1, each subject is assigned an identification number. Then, the subjects learn about the flat tax rate and the progressive tax rate structures used in the experiment. They independently cast secret ballots for a tax rate structure that they prefer. The director of the experiment counts the number of ballots and announces a predetermined voting outcome. The announced winner does not necessarily agree with the winner voted for by subjects. For example, in Session 1 (*resp.* Session 3) we make the subjects believe that the flat (*resp.* progressive) tax rate structure is chosen based on an anonymous dictator's preference. More specifically, we tell subjects that the progressive (*resp.* flat) tax rate structure wins by x to y ;⁸ a dictator was chosen prior to the experiment although no subjects, including even a dictator itself, know who the dictator is; and despite the announced (but artificial) voting outcome, the flat (*resp.* progressive) tax rate structure is decided to be used in this experiment since a dictator prefers the flat (*resp.* progressive) tax rate structure. In Session 2 (*resp.* Session 4), a similar manipulation is used to make subjects believe that the flat (*resp.* progressive) tax rate structure is chosen by a majority voting rule by announcing an artificial voting outcome, which selects the flat (*resp.* progressive) tax rate structure under the majority voting rule. Notice that this experimental design provides the subjects in different sessions different feelings about how group preferences are treated in making a group decision. Such feelings would create the variation in the subjects' perception of the procedural fairness of the chosen tax rate structure.

After choosing a tax rate structure, Stage 2 starts. Stage 2 consists of 10 rounds. The subjects know that the number of rounds is predetermined, but they do not

⁸ Alm et al. (1993) find that tax compliance is affected by the margin of votes as well as the winner of the majority voting. To consider such a factor, the margin of votes between two tax rates structures, $x - y$, is set to be 3 if the number of subjects in a group is odd. Otherwise, the margin of votes is set to be 4.

know the number of rounds until Stage 2 is completed. At the beginning of each round, each subject is randomly endowed an income from a set of incomes uniformly distributed between 5,000 KRW and 25,000 KRW in 500 KRW increments. After receiving his/her income endowment, each subject decides how much income to report and records his/her identification number, endowed income, and income to report. Through the pre-training, the subjects clearly understand that they pay a tax based on their reported income unless they are chosen to be audited. In addition, we provide an income-tax table to the subjects so that they easily recognize tax burden. The records in each round are not revealed to the director of the experiment until Stage 2 is finished. At the end of each round, the director randomly chooses two numbers from 1 to 10. A subject is selected to be audited if the last digit of his/her identification number is the same as one of the chosen numbers. This yields a probability for each subject to be audited in each round of 20%. After deciding the subjects to be audited, the payoffs for the subjects in each round are determined. Each subject's payoff in a round is his/her endowed income deducted tax. If a subject is not selected for the audit, he/she has to pay a tax based on his/her reported income. If a subject is selected for the audit, he/she has to pay a tax based on his/her endowed income and also pay a penalty tax if his/her reported income is less than his/her endowed income.⁹

After finishing 10 rounds of experiments, we randomly select one round. The payoff in the randomly chosen round together with the participation allowance, constitute a reward to each subject for participating in the experiment. This payoff structure makes the subjects' choices in each round independent of the outcomes in the previous rounds.

In Stage 3, the subjects are requested to answer the questionnaires about their characteristics. Hartog et al. (2000) and Dohmen et al. (2011) find that an individual's attitude toward risk is related to social and demographic factors. Indeed, these studies find a tendency that women are more risk averse than men. In addition, individuals who are tall or have a larger household income tend to be less risk averse than those who are short or poor. Taking insight from those observations, we collect information such as sex, birth year, height, and household income. The questionnaires also ask the subjects whether they take economics classes because it may influence their behaviors under the uncertainty.

Following those questions, the subjects are asked about their attitude towards risk. The first two questions are about the willingness to pay for a lottery and the willingness to invest in risky assets. Traditional arguments on risk aversion imply that a more risk averse agent is willing to pay less for a lottery or willing to invest

⁹ For a summary of payoff, consider a subject who is endowed with income y and reports r as his/her income. Let $T(y)$ be the amount of tax for income y . Then, his/her payoff in a round is $y - T(r)$ if he/she is exempt from the audit and $y - T(y) - 3(T(y) - T(r))$ if he/she is selected for the audit.

less in risky assets. After those questions, we ask the subjects their subjective opinions about their risk aversion. We ask the subjects to provide a score about their propensity for the risk. A high score means that a subject is more likely to enjoy risky situations and a low score means that a subject is more likely to avoid risky situations. We also ask about the propensity for specific risk types such as exercise injuries, lending default, and misdemeanor detection.¹⁰

Finally, we ask the subjects how much they are satisfied with the procedure of determining the tax rate structure in the experiment.

III. Preliminary Findings

We use two measures to compare tax compliance behaviors between different decision rules for the tax rate structure. Following many related studies (e.g., Alm et al., 1992a; Alm et al., 1992b; Alm et al., 1993; Alm et al., 1999; Cadsby et al., 2006; Gërkhani and Schram, 2006), as a first measure we use the average tax compliance rate, which is defined as the average ratio of reported income to endowed income for each individual.¹¹ The second measure is the fraction of non-full compliance, that is, the fraction of subjects who underreport their endowed income.¹²

The average tax compliance rate is 75.3% and the fraction of non-full compliance is 60.9% under the dictatorship. In the voting system, the average compliance rate increases to 78.7% and the fraction of non-full compliance also improves to 49.5%. This simple comparison of two measures without considering the effects of other factors implies that better tax compliance behavior is observed under a majority voting rule. This result is consistent with the findings of previous studies (Alm et al., 1999; Feld and Tyran, 2002; Frey 1997; Pommerehne and Weck-Hannemann, 1996; Wahl et al., 2010).

Panel (a) in Figure 2 displays the average tax compliance rate by subgroup. The average tax compliance rate is 68.8% when subjects believe that a dictator determines a flat tax rate structure. That rate jumps to 76.3% when subjects believe that majority voting determines a flat tax rate structure. However, a different pattern is observed under the progressive tax rate structure. Unlike the flat tax rate structure, the average tax compliance rate does not increase when a decision rule is changed from the dictatorship to voting. More specifically, the average compliance rate under

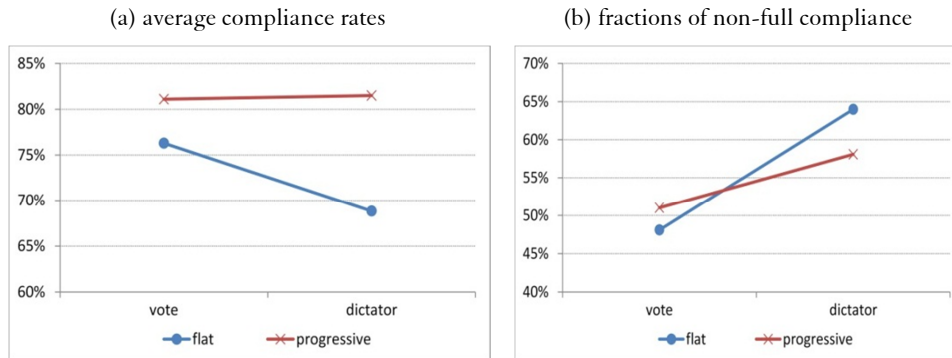
¹⁰ Some of these questions are borrowed from German Socio-Economic Panel (G-SOEP).

¹¹ Consider a group consisting of n subjects. Denote Y_i the endowed income and R_i the reported income for subject i . Then the average compliance rate in our study is given by $n^{-1} \sum_{i=1}^n R_i / Y_i$ while the definition in other studies generates $\sum_{i=1}^n R_i / \sum_{i=1}^n Y_i$ as an average compliance rate.

¹² As in Gërkhani and Schram (2006), this measure is defined as the fraction of times where the reported income is less than the endowed income.

a majority voting is 81.1% while the average compliance rate under the dictatorship is 81.5%.

[Figure 2] Compliance by Tax Rate Structure and Decision Rule



Note: In panel (a), compliance is measured by the average compliance rate, which is the mean of the ratio of reported income to the endowed income. In panel (b), compliance is measured by the fraction of subjects who underreport the endowed income.

A positive relationship between a majority voting and tax compliance behavior is more clearly shown when the fraction of non-full compliance is used as a measure. The fraction of non-full compliance of each subgroup is presented in Panel (b) in Figure 2. In both tax rate structures, the fraction of subjects underreporting income is lower when a majority voting determines the tax rate structure. Another fact commonly observed in Panels (a) and (b) in Figure 2 is better compliance rates under the progressive tax rate structure. This might result from the choice of tax rates and other parameters. Indeed, considering the parameters in our experiment, this result is consistent with the utility maximizing behavior of a taxpayer with a constant relative risk aversion (CRRA) utility function.¹³

IV. Estimation Results

4.1. Characteristics of Experiment Participants

Table 2 provides the sample statistics of experiment participants. The first four columns show the sample statistics for each session and the last column shows the p -value for the null hypothesis that each session has the same mean. For the

¹³ We consider the utility maximization problem of a taxpayer with a CRRA utility function and given tax parameters. The numerical solutions show that the average compliance rate under the progressive tax rate is higher in a reasonable range of risk parameter values. This result is available from the authors upon request.

categorical variables, the numbers in each cell represent the fraction of the corresponding category and the p -values are also calculated to test the null hypothesis that each group has the same distribution. Some variations in each sample mean are observed across sessions but they turn out to be insignificant at 5% significance level. This fact is not surprising since a subject is supposed to be randomly assigned into each session. When setting the significance level at another conventional value of 10%, the same results hold for all variables except for *female* and *age*.¹⁴ Such differences might require controlling for the potential effects of these demographic factors in analyzing tax compliance behavior. Indeed, Dohmen et al. (2011) find that age and gender are correlated with risk preferences. In such a case any significant difference in these factors might cause different tax compliance behavior.¹⁵ To consider such a possibility, *age* and *female* are also controlled for in the empirical analysis.

[Table 2] Sample Statistics of Demographics and Risk-aversions

	Session1	Session2	Session3	Session4	p -value
female (=1)	0.30 (0.47) ^a	0.14 (0.36)	0.43 (0.51)	0.52 (0.51)	0.056
age	24.4 (2.52)	24.8 (2.04)	24.6 (2.20)	23.0 (2.52)	0.052
height (cm)	172.7 (8.97)	173.8 (7.36)	170.6 (7.76)	169.1 (7.18)	0.225
major1 (=1 if economics or business or taxation)	0.50 (0.51)	0.71 (0.46)	0.57 (0.51)	0.67 (0.48)	0.507
major2 (=1 if economics)	0.35 (0.49)	0.48 (0.51)	0.33 (0.48)	0.43 (0.51)	0.769
household income (%) ^{b,c}					
< 2.5M KRW	10.0	19.1	38.1	33.3	0.467
2.5M KRW – 4.5M KRW	70.0	66.7	47.6	52.4	
> 4.5M KRW	20.0	14.3	14.3	14.3	
D6 ^d	46,550 (107,902)	27,429 (19,265)	33,905 (42,727)	29,476 (20,517)	0.731
D7 ^d	51.3 (26.7)	53.1 (30.0)	53.6 (29.8)	36.4 (20.1)	0.133
D8 (%) ^{b,d}					
0-2	35.0	57.1	42.9	47.6	0.556
3-4	50.0	23.8	28.6	38.1	
5-7	15.0	19.1	28.6	14.3	

¹⁴ In the paper, the variables used in the estimation are represented in italic font.

¹⁵ Many studies find that age and gender are related to tax compliance. However, the directions and results on significance of their associational relationship with tax compliance often vary in data (e.g., see Torgler (2007)).

D9-1 (%) ^{b,d}					
0-2	35.0	14.3	33.3	47.6	0.308
3-4	30.0	33.3	19.1	28.6	
5-7	35.0	52.4	47.6	23.8	
D9-2 (%) ^{b,d}					
0-2	35.0	57.1	66.7	57.1	0.388
3-4	45.0	38.1	19.1	28.6	
5-7	20.0	4.8	14.3	14.3	
D9-3 (%) ^{b,d}					
0-2	40.0	47.6	47.6	52.4	0.847
3-4	30.0	38.1	38.1	33.3	
5-7	30.0	14.3	14.3	14.3	

Note: a: Numbers in each cell represents the sample mean and p -values of a null hypothesis that each group has the same mean unless otherwise stated. Numbers in the parentheses are the standard errors.

b: Numbers for these variables show the percentage of each category and the p -value of a null hypothesis that the distribution of the variable is the same for all groups.

c: 1M KRW = 1 million KRW.

d: These are questionnaires measuring risk aversion. See the Appendix for details.

4.2. Model

Unbalanced factors between the groups raise a concern that the preliminary results in Section 3 do not necessarily represent the treatment effect. To control for the effect of those unbalanced factors and isolate the true effect of voting on a subject's compliance rate, consider the following model:

$$Y_{li} = X_i' \beta + \gamma T_i + \varepsilon_{li}, \quad i = 1, 2, \dots, n. \quad (1)$$

where Y_{li} is the ratio of reported income to endowed income and T_i is an indicator variable indicating whether the tax rate structure for a subject is decided by majority voting or not. X_i is the vector of explanatory variables other than T_i , and ε_{li} is an error term. In this model, the parameter γ represents the causal effect of the majority voting rule on the ratio of reported income to endowed income. It is well known that under the conditional mean-independence assumption, $\mathbb{E}[\varepsilon_{li} | X_i, T_i] = 0$, the least square (LS) estimator consistently estimates model (1). If another variable not included as an explanatory variable is correlated with the treatment status T_i and affects the income reporting behavior, the conditional mean-independence assumption is violated. As a result, the LS estimation generates inconsistent estimates. Due to the experimental design, model (1) is not likely to suffer from such a problem. As mentioned, Table 2 confirms this argument. Factors except age and gender are shown to be uncorrelated with the treatment status so that if a failure of LS estimators exists, it might result from not controlling for age

and gender. The endowed income is another factor not passing the test of equal means, so it might be another source of failure of LS estimators if it is not controlled for properly. An indicator variable of the flat tax rate is also controlled for to allow for the possibility that subjects respond differently to the two tax rate structures. Thus, in addition to the treatment status variable T_i , we also include age, gender, endowed income, and an indicator variable of flat tax rate structure as control variables in model (1).

$$Y_{2i} = \begin{cases} 1 & \text{if } Y_{2i}^* \geq 0 \\ 0 & \text{if } Y_{2i}^* < 0 \end{cases} \quad (2)$$

$$Y_{2i}^* = X_i' \beta + \gamma T_i + \varepsilon_{2i}, \quad \varepsilon_{2i} \sim i.i.d. \text{ logistic distribution}$$

Another tax compliance measure, the fraction of non-full compliance, is analyzed in a similar manner at a subject level. Let Y_{2i} be a binary variable indicating whether a subject reports his/her endowed income truthfully or not. Y_{2i} is assumed to be generated by a logit model (2). More specifically, a subject underreports ($Y_{2i} = 1$) if and only if a latent variable Y_{2i}^* has a nonnegative value. Here Y_{2i}^* is allowed to be affected by explanatory variables (X_i and T_i) and an error term ε_{2i} that follows a logistic distribution. Similar to the previous model, a parameter γ captures the causal effect. Age, gender, endowed income, an indicator variable of flat tax rate structure, and treatment status are used as explanatory variables.

4.3. Estimation Results of Tax Compliance Behaviors

The estimation results shown in Table 3 confirm the preliminary findings in Figure 2. The first two columns display the LS estimates of the ratio of reported income to endowed income. The estimates in column (1), which are obtained by regressing the ratio of reported income to endowed income only on treatment statuses such as flat tax and vote, simply redisplay the results in Panel (a) in Figure 2. The coefficient of *vote* is positive but turns out to be statistically insignificant. Such an insignificant estimate of γ reflects the fact that under the progressive tax rate structure the ratio of reported income to endowed income remains quite stable regardless of how the tax rate structure is determined. As already mentioned, this result might disguise the true effect of *vote* if unbalanced effects are correlated with risk preferences, which again cause different behavior in reporting income. The LS estimates after controlling for those factors are shown in the second column. In this estimation, the ratio of reported income to endowed income under majority voting is 4.6% points higher than that under dictatorship. Moreover, such a difference is significantly positive. The significant association between *vote* and tax compliance

behavior is shown even more clearly in the estimates of the logit model. In viewing the estimation results in columns (3) and (4), *vote* has a significantly negative association with subjects' underreporting behavior regardless of whether age, gender, and endowed income are controlled for or not. These estimates indicate that the underreporting behavior is 11.5-13.5% points lower when majority voting determines the tax rate structure.¹⁶

[Table 3] Linear Regression and Logit Estimation

	the ratio of reported income to endowed income		underreporting the endowed income	
	(1)	(2)	(3)	(4)
flat tax (=1)	-0.087*** (0.022)	-0.063*** (0.023)	0.06 (0.141)	-0.036 (0.151)
vote (=1)	0.035 (0.022)	0.046** (0.021)	-0.466*** (0.141)	-0.550*** (0.146)
female (=1)		0.110*** (0.025)		-0.433** (0.172)
age		0.015*** (0.005)		-0.103*** (0.034)
endowed income/10,000		-0.068*** (0.019)		0.597*** (0.124)
constant	0.796*** (0.016)	0.476*** (0.134)	0.417*** (0.122)	2.300*** (0.880)

Note: Numbers in parentheses are the robust standard errors of LS estimates and the standard errors of logit estimates. Dependent variables are the ratio of reported income to endowed income for columns (1) and (2), and a binary variable indicating whether a subject underreports the income or not for columns (3) and (4). ***: p -value < 0.01, **: p -value < 0.05, *: p -value < 0.

There are some comments on the estimation results. First, in columns (1) and (2), the coefficient of *flat tax* is significantly negative. This fact does not necessarily imply that implementing a progressive tax rate structure is useful in improving tax compliance. It is reasonable to understand that this fact reflects a different feature of the two tax rate structures. A partial explanation for different tax compliance under the two tax rate structures is found in the different tax schedules, especially around the low bound of an endowed income of 5,000 KRW. By design, the progressive tax rate structure levies little tax in such a case, while the flat tax rate structure requires a subject to pay a tax close to 1,250 KRW. As a result, a subject has more incentive to underreport the endowed income under the flat tax rate structure when it is close

¹⁶ These numbers are obtained by comparing the estimated probability of underreporting income at $T=0$ and $T=1$ when setting the values of other covariates at their means. In other words, they are given by $F(\bar{X}'\hat{\beta} + \hat{\gamma}) - F(\bar{X}'\hat{\beta})$ where $\hat{\beta}$ and $\hat{\gamma}$ are logit estimates, \bar{X} is a vector of sample means, and $F(\cdot)$ is a cumulative distribution function of a Type I extreme distribution.

to the low bound.¹⁷ Thus, there is no guarantee that such better compliance behavior under a progressive tax rate structure would be maintained if the value of the tax parameters changed.¹⁸ Second, females and older people are more likely to report their actual endowed income than males and younger people, respectively. This result is consistent with findings in Hasseldine (1999), Kastlunger et al. (2010), and Dohmen et al. (2011). Third, subjects underreport more often, and the ratio of underreported income gets larger, as the endowed income increases. A similar associational relationship between endowed income and tax compliance is also observed by Alm et al. (1992a) and Alm et al. (1993). This fact is compatible with the negative association between income and risk aversion in Hartog et al. (2000).

4.4. Estimation Results When Allowing for the Role of Preferences

In comparison with tax compliance under dictatorship, majority voting has effects in the anticipated direction on tax compliance in both tax compliance measures, although its estimate is not always significant. This result reconfirms the findings in Alm et al. (1999) and Feld and Tyran (2002). Their experiments support the view that voting strengthens a social norm of tax compliance and thus causes a positive effect on taxpayer's voluntary income reporting. Despite confirmation of the effect of majority voting, the channel of its effect remains unknown. In other words, it is unclear how the degree to which the social norm is strengthened varies across the population and which subpopulations are more affected when majority voting is implemented. To find a clue on these questions, we collect information on participants' preferences on tax rate structures.¹⁹ We use this information in analyzing the effect of majority voting on tax compliance.

Table 4 shows the distribution of preferred tax rate structure and implemented tax rate structure for the participants. Of the 83 participants, 33 participants are assigned to a session in which their preferred tax rate structure is implemented. The other 50 participants experience a non-preferred tax rate structure. Interestingly, our experimental results do not show that subjects are more tax compliant under their

¹⁷ When the endowed income is close to the low bound, the ratio of reported income to endowed income has a relatively large value. If the taxpayers under the flat tax rate structure underreport more often in this region and the taxpayers under the progressive tax rate structure underreport more often in other areas, then the tax compliance measured by the ratio of reported income to endowed income turns out to be lower in the flat tax rate structure even when the amount of underreported income (or fraction of subjects underreporting income) is the same under the two tax rate structures.

¹⁸ Consider a taxpayer with a CRRA utility function confronted with flat and progressive tax structures. Under the given parameters a flat tax rate structure is shown to induce higher income reporting when the income and risk aversion parameters are lower.

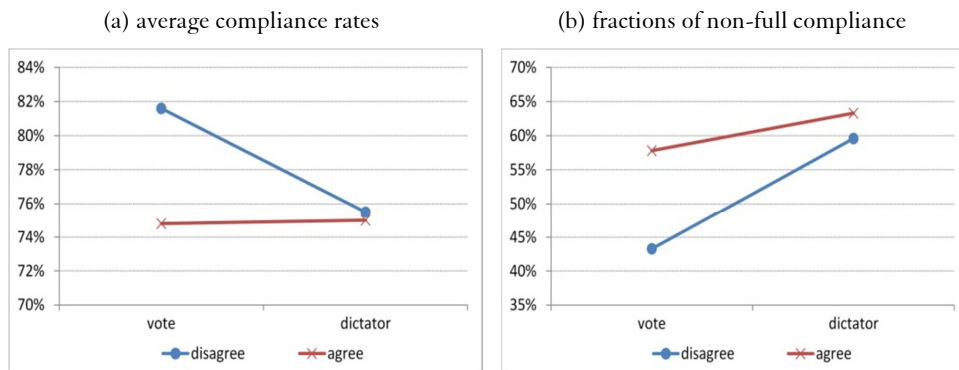
¹⁹ In Stage 1, anonymous voting is used in the sense that only aggregated outcome is announced during an experiment. However, it differs from the conventional form of anonymous voting since each participant is required to write down his/her identification number on the ballot paper. This feature allows us to construct information on each participant's preferred tax rate structure.

preferred tax rate structure. On the contrary, both measures of tax compliance get worse. More specifically, only 74.9% of endowed income is reported under the preferred tax rate structure, while 78.9% of endowed income is reported under the non-preferred tax rate structure. Similarly 60.3% of participants is found to underreport the endowed income under the preferred tax rate structure, but only 51.8% underreport their income under the non-preferred tax rate structure.

[Table 4] Number of Subjects by Preferred vs. Implemented Tax Rate Structure

implemented tax rate \ preferred tax rate	flat tax rate	progressive tax rate	total
flat tax rate	19	28	47
progressive tax rate	22	14	36
total	41	42	83

[Figure 3] Compliance by Decision Rule and Application of (Non)Preferred Tax Rate Structure



Note: In panel (a), compliance is measured by the average compliance rate, which is the mean of the ratio of reported income to the endowed income. In panel (b), compliance is measured by the fraction of subjects who underreport the endowed income. *Agree* (*resp. Disagree*) indicates a group whose preferred (*resp.* nonpreferred) tax rate is implemented in an experiment.

We have two comments on this finding. The first comment is related to the compositional effect. The fraction of subjects under the progressive tax rate is higher in a group under the non-preferred tax structure than in a group under the preferred tax rate structure (56.0% vs. 45.5%). Recall that a subject is expected to report more income under the progressive tax rate. Considering these facts, the gap between the two groups turns out be smaller when controlling for the composition of tax rate structures, which we will show later in this section. The second comment is that preferring a specific tax rate structure does not necessarily mean that a taxpayer would show better tax compliance behavior when a preferred tax rate is

adopted. Instead, in a standard tax compliance model, it is more plausible that an individual wants a specific tax rate structure since he/she expects to enjoy the greatest utility level under that tax rate structure.²⁰ In this regard, implementing a preferred tax rate structure does not always lead to better tax compliance.

As mentioned earlier, this difference between the two groups might result from confounding factors. To avoid such a concern, we estimate models (1) and (2), which control for a dummy variable for voting, an indicator of flat tax, age, a female dummy variable, and endowed income as well as a dummy variable indicating whether the preferred tax rate structure is implemented or not.

[Table 5] Linear Regression and Logit Estimation

	the ratio of reported income to endowed income		underreporting the endowed income	
	(1)	(2)	(3)	(4)
flat tax (=1)	-0.082*** (0.022)	-0.061*** (0.023)	-0.002 (0.143)	-0.087 (0.154)
vote (=1)	0.005 (0.035)	0.002 (0.034)	-0.233 (0.227)	-0.205 (0.229)
disagree (=1)	-0.001 (0.032)	-0.036 (0.032)	-0.157 (0.212)	0.051 (0.224)
disagree × vote	0.053 (0.044)	0.074* (0.043)	-0.425 (0.291)	-0.587** (0.300)
female		0.111*** (0.025)		-0.404** (0.175)
age		0.016*** (0.005)		-0.096*** (0.035)
endowed income/10,000		-0.069*** (0.019)		0.604*** (0.126)
constant	0.794*** (0.026)	0.477*** (0.135)	0.548*** (0.186)	2.084** (0.868)

Note: Numbers in parentheses are the robust standard errors of LS estimates and the standard errors of logit estimates. Dependent variables are the ratio of reported income to endowed income for columns (1) and (2), and a binary variable indicating whether a subject underreports the income or not for columns (3) and (4). ***: p -value < 0.01, **: p -value < 0.05, *: p -value < 0.1.

The estimation results are displayed in Table 5. Columns (1) and (2) show that the findings in the previous estimation results remain true even after controlling for a dummy variable indicating whether the preferred tax rate structure is actually implemented or not. Under a flat tax rate structure, subjects report a significantly

²⁰ The preference between two tax rate structures depends on risk aversion and income distribution. In a certain combination of those two factors, it can be shown that a taxpayer reports less income when a preferred tax rate structure, which results in a higher expected utility level, is implemented.

smaller fraction of their incomes. Females, older subjects, and subjects with smaller endowed incomes also show significantly more tax compliance than males, younger subjects, and subjects with larger endowed income, respectively. As anticipated, the estimates of the coefficient of *disagree* are negative when controlling for other factors, although they turn out to be insignificant. Voting works for increasing the reported income by 0.5% point (or 0.2% point). The result agrees with our anticipation but the coefficient turns out to be insignificant. A similar result is observed for the coefficient of the interaction between *vote* and *disagree*. Positive coefficients for this interaction in columns (1) and (2) support the finding that subjects under a non-preferred tax rate structure tend to report more income when majority voting is applied. However, the coefficients are significant only in column (2). In columns (3) and (4), we present the estimates of the logit model. The main estimation results remain the same in the alternative model.

The heterogeneous effect of voting is more clearly revealed when the effect of voting on the ratio of reported income to endowed income is directly calculated based on estimates. The effect of voting is summarized as $\beta_{\text{vote}} + \beta_{(\text{vote} \times \text{disagree})} 1(\text{disagree})$. The effect of voting for subjects under a preferred tax rate structure is given by β_{vote} . Thus, the estimate for those subjects is identical to the estimated coefficient of voting in columns (1) and (2) in Table 5. The effect of voting for the subjects under the non-preferred tax rate structure is given by $\beta_{\text{vote}} + \beta_{(\text{vote} \times \text{disagree})}$. These estimates provided in the second row in Table 6 show that voting increases the ratio of reported income to endowed income by 5.7% point (or 7.6% point). Moreover, these estimates are significant in contrast to the estimates for subjects under a preferred tax rate structure. Similar results are observed in the logit estimation of underreporting behavior in columns (3) and (4) in Table 5. When voting is used, subjects in both groups are less likely to underreport endowed income. In the subgroup of subjects under a non-preferred tax rate structure, the reduced percentage in underreporting turns out to be approximately 16.3% point in column (3) and 19.5% point in column (4).²¹ These estimates are significant. Subjects under a preferred tax rate structure also show approximately 5.8% point (or 5.1% point) less underreporting when voting is used in the experiment. These estimates are less than those of the other group in magnitude and insignificant at conventional significance levels.

A plausible explanation for the heterogeneous effect of voting is related to the following argument in the literature on outcome favorability and individuals' reactions. People tend to pay more attention to procedural fairness or legitimacy when their economic or social status becomes worse as a result of the associated

²¹ The reductions in the probability of underreporting are obtained by evaluating the changes in the latent variable y^* associated with the different treatment status of voting ($T=0$ and $T=1$) after fixing other variables at their means.

change. If they find that such a change lacks procedural fairness or legality, people negatively affected might react strongly against the change, while people who benefit remain silent about it (Brockner and Wiesenfeld, 1996; Brockner et al., 1997; Krehbiel and Cropanzano, 2000). In light of these findings, the subjects might feel unfavored and pay more attention to procedural fairness when they are a non-preferred tax rate structure is implemented. Thus, subjects under a non-preferred tax rate structure show tax compliance behavior that is more sensitive to the way of determining the tax rate structure.

[Table 6] Effect of Majority Voting

	Δ (the ratio of the reported income to endowed income)		Δ (the latent variable for underreporting the endowed income)	
	(1)	(2)	(3)	(4)
agree	0.005 (0.035)	0.002 (0.034)	-0.233 (0.227)	-0.205 (0.232)
disagree	0.057*** (0.027)	0.076*** (0.028)	-0.658*** (0.182)	-0.792*** (0.190)

Note: Numbers in each cell represent the changes in dependent variables, that is, the ratio of reported income in columns (1) and (2) and the latent variable y^* deciding whether a subject underreports or not. All of these numbers are evaluated by fixing other variables at their means and using the estimates in Table 5. Numbers in parentheses are the standard errors. ***: p -value < 0.01, **: p -value < 0.05, *: p -value < 0.1.

4.5. Discussion

Our estimation results indicate that majority voting induces more tax compliance behaviors. In addition, by comparing the magnitude of the effect of majority voting, we also find that such an effect varies with whether the preferred tax rate structure is used in the experiment or not. This finding is interesting because it hints at how majority voting works for improving the tax compliance behavior of taxpayers.

As mentioned earlier, the directions of the estimates of the coefficient on voting and its interaction terms agree with findings in the literature and remain robust regardless of model specification. However, the estimated coefficients of a key variable turn out to be significant only when the endowed income and other characteristics for each subject are controlled for. More specifically, in Table 5, the coefficients of the interaction between *vote* and *disagree* are insignificant in columns (1) and (3), but they become significant after controlling for other variables as shown in columns (2) and (4).

There are some plausible explanations for this fact. The first explanation attributes the sensitivity of significance of estimates to the possible heterogeneity between two groups. Somehow the assignment rule might fail in balancing the covariates between the two groups. It is well known that in such a case, omitting the

variables correlated with treatment status results in a bias of estimates if those variables play a role in deciding the dependent variable. Our data provides consistent results supporting this explanation. First, the partial correlation coefficient between *female* and the interaction of *vote* and *disagree* is negative. It is also reported that females are more risk-averse than males, so the coefficient of the female dummy variable is expected to be positive. Thus, the estimate of the interaction between *vote* and *disagree* when not controlling for a female dummy variable in column (1) is less than that in column (2) after controlling for a female dummy variable. Similar facts are found for the other two variables: *age* and *endowed income*. As a result, we can conclude that if these variables omitted in column (1) are significant as implied in column (2), omitting these variables underestimates the true coefficient of the interaction between *vote* and *endowed income*. Recognize that the standard errors of the estimates do not vary much between the two models. Thus, the negative bias could explain the insignificance of the estimates for the coefficient of the key variable. A similar interpretation can be provided for the logit estimation results in columns (3) and (4).

The second explanation is more directly related to the channel of the effect of majority voting. The previous estimation result provides a plausible story regarding the effect of majority voting. That is, majority voting is effective in strengthening the social norm of subjects who are dissatisfied because non-preferred tax rate structure is applied. An implicit argument is that those dissatisfied subjects are mainly and positively affected by majority voting. In this sense, a more proper treatment is randomly assigning different satisfaction levels for the treatment group and control group. Of course, such a treatment is not possible in practice. Instead, our experiment uses the appearance of different group decision rules to create the intended variation in satisfaction. Notice that in contrast to the infeasible experimental setup, some subjects' satisfaction levels are not affected after the treatment.²² The existence of non-compliers is expected to dilute the effect of procedural fairness on tax compliance behaviors.

Considering this possibility, we directly control for the satisfaction level of each subject. To identify who are really affected by the random assignment to majority voting or dictatorship rule, after an experiment, we ask the subjects a question: "In the experiment, the tax rate structure is determined by the dictator (or a majority voting). How much are you satisfied with this decision making process?" In this question, self-reported satisfaction is measured on a 5-point scale (from "strongly dissatisfied" to "strongly satisfied"). Using subjects' responses, we generate a dummy variable *dissatisfied* indicating whether a subject is dissatisfied with the rule used to determine the tax rate structure in the experiment or not.²³ This dummy

²² In the literature of program evaluation, those subjects are called non-compliers.

²³ The variable *dissatisfied* is 1 if the subject selects either "strongly dissatisfied" or "moderately

variable *dissatisfied* shows a significantly positive correlation with *disagree*. We repeat estimating models in Table 5 after replacing variables *disagree* with *dissatisfied*. Estimation results are provided in Table 7. Notice that the estimation results are not much changed even after changing the control variables. However, interestingly, the coefficient of interaction term between *dissatisfied* and *vote* becomes larger in magnitude and remains consistent for all specifications, which contrasts with the results in Table 5. Another difference is found in the negative (*resp.* positive) estimates of the dummy variable *dissatisfied* in columns (1) and (2) (*resp.* columns (3) and (4)). Those results hint that subjects dissatisfied with how the decision was made might be the ones who show relatively poor tax compliance behavior in both measures although the increased probability of underreporting associated with dissatisfaction is not significant. This fact together with the significant estimate of the interaction term between *dissatisfied* and *vote* imply that a majority voting works for improving tax compliance behaviors of a group of subjects who otherwise are expected to show poor tax compliance.

[Table 7] Linear Regression and Logit Estimation

	the ratio of reported income to endowed income		underreporting the endowed income	
	(1)	(2)	(3)	(4)
flat tax (=1)	-0.080*** (0.021)	-0.053** (0.023)	-0.01 (0.143)	-0.122 (0.154)
vote (=1)	-0.041 (0.028)	-0.037 (0.027)	-0.069 (0.186)	-0.106 (0.191)
dissatisfied (=1)	-0.067** (0.031)	-0.079*** (0.031)	0.125 (0.203)	0.17 (0.209)
dissatisfied × vote	0.197*** (0.042)	0.213*** (0.043)	-1.155*** (0.297)	-1.260*** (0.306)
female (=1)		0.119*** (0.025)		-0.477*** (0.175)
age		0.014*** (0.005)		-0.090*** (0.035)
endowed income/10,000		-0.069*** (0.019)		0.637*** (0.127)
constant	0.825*** (0.021)	0.524*** (0.131)	0.381*** (0.156)	1.889*** (0.894)

Note: Numbers in parentheses are the robust standard errors of LS estimates and the standard errors of logit estimates. Dependent variables are the ratio of reported income to endowed income for columns (1) and (2), and a binary variable indicating whether a subject underreports the income or not for columns (3) and (4). ***: p -value < 0.01, **: p -value < 0.05, *: p -value < 0.1.

dissatisfied" and 0 otherwise.

In interpreting the estimation results in Table 7, we are concerned with other sources of dissatisfaction. Although this question explicitly asks about whether a subject is dissatisfied with the way how the tax rate structure is decided, we cannot exclude the possibility that dissatisfaction exists for other reasons. For example, a participant may choose “strongly dissatisfied” or “moderately dissatisfied” since he/she earns little income in this experiment or is selected to be audited. Another logit model is estimated to see whether those facts affect the satisfaction levels of subjects. According to results in Table 8, only the dummy variables *vote* and *disagree* are major determinants of satisfaction levels. Therefore, the results in Table 7 are free from a concern that the dissatisfaction of subjects results from sources other than heterogeneous treatment status.

[Table 8] Logit Estimation of Dissatisfaction

	(1)	(2)	(3)	(4)	(5)
vote (=1)	-0.672 (0.515)	-0.670 (0.516)	-0.640 (0.524)	-0.681 (0.518)	-0.648 (0.526)
disagree (=1)	2.396*** (0.613)	2.413*** (0.618)	2.363*** (0.635)	2.381*** (0.633)	2.322*** (0.649)
flat tax (=1)		0.122 (0.520)	0.052 (0.539)	0.100 (0.528)	0.029 (0.549)
female (=1)			-0.059 (0.619)		-0.048 (0.636)
age			0.049 (0.125)		0.051 (0.125)
audit (=1)				-0.170 (0.671)	-0.164 (0.686)
payment/10,000				0.108 (0.454)	0.121 (0.460)
constant	-1.657*** (0.578)	-1.728*** (0.655)	-2.838*** (3.099)	-1.837*** (0.903)	-3.031 (3.159)

Note: Numbers in parentheses are the standard errors of logit estimates. Dependent variables are a dummy variable indicating whether a subject is strongly or moderately dissatisfied. ***: p -value < 0.01, **: p -value < 0.05, *: p -value < 0.1.

V. Conclusion

In this study, we design an experiment to investigate how the introduction of majority voting affects the tax compliance behavior of taxpayers. Our experimental design captures traditional features of income taxation: each individual gets an income, pays a tax on his/her reported income, and faces some chance of being audited and penalized for underreporting his/her income. In particular, we divide the subjects into two groups, and apply a majority voting rule for one group and a

dictatorship for the other group as a way of deciding a tax rate structure. Throughout the experiment, we find a tendency for individuals to report more income and evade less tax payments when they believe the tax rate structure is decided by a majority voting rule. This finding supports the idea that procedural fairness in tax system decision making plays an important role in tax compliance behavior.

We also provide additional insight into how the way of deciding a tax system affects tax compliance behavior. Our experiment reveals that a positive effect of majority voting on tax compliance is prominent for individuals who prefer the non-implemented tax schedule rather than for individuals who prefer the implemented tax rate structure. This can be interpreted as majority voting improves the tax compliance through the individuals who are not satisfied with the implemented tax system. An implication of this result is that convincing the taxpayers of procedural fairness is more effective in improving tax compliance when more taxpayers are not satisfied with the current tax system.

We close this paper by discussing several limitations. First, our experimental design might not capture all the features of tax compliance behavior. For example, tax compliance behavior is affected by the usage of tax revenue, taxpayer's perception of equity, sources of income, and so on. In addition, the parameters used in our experiment differ from those in the real world. Second, it is unclear whether the positive and heterogeneous effects of voting appear in more general situations. Related to this question, it is needed to explain theoretically why the effect of voting on tax compliance behavior depends on satisfaction with tax systems. It is also needed to explain why the implementation of the preferred tax rate structure induces a lower tax compliance rate. Despite those limitations, we believe that the findings in this paper shed light on tax compliance behavior. We also expect that future research provides solid theoretical foundations to resolve these limitations.

Appendix: Questionnaires for Table 2

1. Imagine a lottery where you win 100,000 KRW with a probability of 50% and win nothing with a probability of 50%. How much are you willing to pay for this lottery?

_____ KRW

2. Imagine that you can invest your wealth in stocks and cash. If you invest 100 KRW in stocks, those stocks would later be worth 150 KRW or 80 KRW with equal probability. In this situation, what percentage of your wealth would you invest in stocks?

_____ %

3. Would you describe yourself as someone who tries to avoid risks (risk-averse) or as someone who is willing to take risks (risk-prone)? Please answer on a scale from 0 to 7, where 0 means that you really want to avoid any kind of risk and 7 means that you are very willing to take risks.

0	1	2	3	4	5	6	7

4. People can behave differently in different situations. How would you rate your willingness to take risks in the following areas? Please answer on a scale from 0 to 7, where 0 means that you are never willing to take risks and 7 means that you are fully willing to take risks.

Types of risk	0	1	2	3	4	5	6	7
being injured while exercising								
failure of getting back lent money								
detection of traffic violation								

References

- Alm, J., B. R. Jackson, and M. McKee (1992a), "Estimating the Determinants of Taxpayer Compliance with Experimental Data," *National Tax Journal*, Vol. 45, 107-115.
- _____ (1993), "Fiscal Exchange, Collective Decision Institutions, and Tax Compliance," *Journal of Economic Behavior & Organization*, Vol. 22, No. 3, 285-303.
- Alm, J., E. Kirchler, and S. Muehlbacher (2012), "Combining Psychology and Economics in the Analysis of Compliance: From Enforcement to Cooperation," *Economic Analysis and Policy*, Vol. 42, No. 2, 133-151.
- Alm, J., G. H. McClelland, and W. D. Schulze (1992b), "Why Do People Pay Taxes?," *Journal of Public Economics*, Vol. 48, No. 1, 21-38.
- _____ (1999), "Changing the Social Norm of Tax Compliance by Voting," *Kyklos*, Vol. 52, No. 2, 141-171.
- Bazart, C. and M. Pickhardt (2010), "Fighting Income Tax Evasion with Positive Rewards: Experimental Evidence," LAMETA, University of Montpellier Working Papers, No. 09-01.
- Becker, W., H. Buchner, and S. Slesking (1987), "The Impact of Public Transfer Expenditures on Tax Evasion: An Experimental Approach," *Journal of Public Economics*, Vol. 34, No. 2, 243-252.
- Brockner, J., A. P. Siegel, P. J. Daly, T. Tyler, and C. Martin (1997), "When Trust Matters: The Moderating Effect of Outcome Favorability," *Administrative Science Quarterly*, Vol. 42, No. 3, 558-583.
- Brockner, J. and M. B. Wiesenfeld (1996), "An Integrative Framework for Explaining Reactions to Decisions: Interactive Effects of Outcomes and Procedures," *Psychological Bulletin*, Vol. 120, No. 2, 189-208.
- Cadsby, C., E. Maynes, and V. Trivedi (2006), "Tax Compliance and Obedience to Authority at Home and in the Lab: A New Experimental Approach," *Experimental Economics*, Vol. 9, No. 4, 343-359.
- Dohmen, T., A. Falk, D. B. Huffman, U. Sunde, J. Schupp, and G. G. Wagner (2011), "Individual Risk Attitudes: Measurement, Determinants and Behavioral Consequences," *The Journal of the European Economic Association*, Vol. 9, No. 3, 522-550.
- Feld, L. P. and B. S. Frey (2002), "Trust Breeds Trust: How Taxpayers Are Treated," *Economics of Governance*, Vol. 3, No. 2, 87-99.
- Feld, L. P. and J. Tyran (2002), "Tax Evasion and Voting: An Experimental Analysis," *Kyklos*, Vol. 55, No. 2, 197-222.
- Frey, B. S. (1997), "A Constitution for Knaves Crowds out Civic Virtues," *The Economic Journal*, Vol. 107, No. 443, 1043-1053.
- Gérxhani, K. and A. Schram (2006), "Tax Evasion and Income Source: A Comparative Experimental Study," *Journal of Economic Psychology*, Vol. 27, No. 3, 402-422.
- Graetz, M. J. and L. L. Wilde (1985), "The Economics of Tax Compliance: Fact and Fantasy," *National Tax Journal*, Vol. 38, No. 3, 355-363.

- Hartog, J., A. Ferrer-i-Carbonell, and N. Jonker (2002), "Linking Measured Risk Aversion to Individual Characteristics," *Kyklos*, Vol. 55, No. 1, 3-26.
- Hasseldine, J. (1999), "Gender Differences in Tax Compliance," *Asia-Pacific Journal of Taxation*, Vol. 3, 73-89.
- Hess, J. and J. Story (2005), "Trust-based Commitment: Multidimensional Consumer-brand Relationships," *Journal of Consumer Marketing*, Vol. 22, 312-322.
- Kastlunger, B., S. Dressler, E. Kirchler, L. Mittone, and M. Voracek (2010), "Sex Differences in Tax Compliance: Differentiating between Demographic Sex, Gender-role Orientation, and Prenatal Masculinization(2D:4D)," *Journal of Economic Psychology*, Vol. 31, No. 4, 542-552.
- Kastlunger, B., S. Muehlbacher, E. Kirchler, and L. Mittone (2011), "What Goes Around Comes Around? Experimental Evidence of the Effect of Rewards on Tax Compliance," *Public Finance Review*, Vol. 39, No. 1, 150-167.
- Kim, C. K. (2002). "Does Fairness Matter in Tax Reporting Behavior?," *Journal of Economic Psychology*, Vol. 23, No. 6, 771-785.
- Kim, C. K., J. H. Evans III, and D. V. Moser (2005), "Economic and Equity Effects on Tax Reporting Decisions," *Accounting, Organizations and Society*, Vol. 30, No. 7, 609-625.
- Kirchler, E., E. Hoelzl, and I. Wahl (2008), "Enforced versus Voluntary Tax Compliance: The "Slippery Slope" Framework," *Journal of Economic Psychology*, Vol. 29, 210-225.
- Kornhauser, M. E. (2008), "Normative and Cognitive Aspects of Tax Compliance: Literature Review and Recommendations for the IRS Regarding Individual Taxpayers," In *2007 Annual Report to Congress*, Vol. 138, 138-180.
- Krehbiel, P. and R. Cropanzano (2000), "Procedural Justice, Outcome Favorability and Emotion," *Social Justice Research*, Vol. 13, No. 4, 339-360.
- Leder, S., L. Mannetti, E. Hoelzl, and E. Kirchler (2010), "Regulatory Fit Effects on Perceived Fiscal Exchange and Tax Compliance," *Journal of Socio-Economics*, Vol. 39, No. 2, 271-277.
- Moser, D., J. H. I. Evans, and C. Kim (1995), "The Effects of Horizontal and Exchange Inequity on Tax Reporting Decisions," *The Accounting Review*, Vol. 70, No. 4, 619-634.
- Park, M., B. Jun, and M. Cho (2011), *An analysis of determinants of taxpayer compliance: an experimental approach*, KIPF Research Report 11-07, Korea Institute for Public Finance, (written in Korean).
- Pommerehne, W. W. and H. Weck-Hannemann (1996), "Tax Rates, Tax Administration and Income Tax Evasion in Switzerland," *Public Choice*, Vol. 88, 161-170.
- Rechberger, S., M. Hartner, E. Kirchler, and F. Hämmerle (2010), "Tax Amnesties, Justice Perceptions, and Filing Behavior: A Simulation Study," *Law and Policy*, Vol. 32, No. 2, 214-225.
- Skinner, J. and J. Slemrod (1985), "An Economic Perspective on Tax Evasion," *National Tax Journal*, Vol. 38, No. 3, 345-353.
- Slemrod, J. and S. Yitzhaki (2002), "Tax Avoidance, Evasion, and Administration," in Auerbach, A. J. and M. Feldstein, eds., *Handbook of Public Economics*, Elsevier, Vol. 3, Ch. 22, 1423-1470.
- Smith, K. W. (1992), "Reciprocity and Fairness: Positive Incentives for Tax Compliance," in

- Slemrod, J., eds., *Why people pay taxes: Tax compliance and enforcement*, University of Michigan Press (Ann Arbor), 223-257.
- Spicer, M. W. and L. A. Becker (1980), "Fiscal Inequity and Tax Evasion: An Experimental Approach," *National Tax Journal*, Vol. 33, No. 2, 171-175.
- Sunshine, J. and T. R. Tyler (2003), "The Role of Procedural Justice and Legitimacy in Shaping Public Support for Policing," *Law and Society Review*, Vol. 37, No. 3, 513-548.
- Torgler, B. (2003), "Beyond Punishment: A Tax Compliance Experiment with Taxpayers in Costa Rica," *Revista de Analisis Economico*, Vol. 18, 27-56.
- Torgler, B. (2007), *Tax compliance and tax morale: a theoretical and empirical analysis*, Edward Elgar Publishing.
- Tyler, T. R. (1997), "Procedural Fairness and Compliance with the Law," *Swiss Journal of Economics and Statistics*, Vol. 133, No. 2, 219-240.
- Tyler, T. R. and K. M. McGraw (1986), "Ideology and the Interpretation of Personal Experience: Procedural Justice and Political Quiescence," *Journal of Social Issues*, Vol. 42, No. 2, 115-128.
- Wahl, I., S. Muehlbacher, and E. Kirchler (2010), "The Impact of Voting on Tax Payments," *Kyklos*, Vol. 63, No. 1, 144-158.