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The Relationship Between Tax Avoidance and the Corporate Transparency in the Institutional Environment and Accounting Information: The Case of Korea

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Abstract: Since the 1997, financial crisis in Korea, the problems of Korean corporations have been intensively emphasized, resulting in the devaluation of Korean firms in international capital markets. This study focuses on the transparency. The empirical results show that the relationship between corporate transparency and tax avoidance level is negative. This finding supports that companies consider various non-tax costs arising from tax avoidance in addition to tax costs when determining the optimal tax avoidance level. Specifically, firms with high corporate transparency are passive in tax avoidance because of the burden of various non-tax costs such as reputation risk caused by tax avoidance rather than the effect of reducing agent cost. This study sought to evaluate the effectiveness of tax avoidance with regard to tax costs and various non-tax costs with regard to all costs as suggested by Scholes.

Key words: Corporate transparency, tax avoidance, tax costs, non-tax costs, book-tax difference, effectiveness

INTRODUCTION

Since the 1997, financial crisis in Korea, the problems of Korean corporations have been intensively emphasized, resulting in the devaluation of Korean firms in international capital markets. Despite, various efforts such as institutional improvement, corporate transparency continues to cause considerable losses at both the enterprise and national levels. Given, the growing social interest in corporate transparency this study extends corporate transparency to include tax avoidance in this study. As, the economic environment becomes increasingly complicated, new types of tax avoidance are constantly developed and conflicts of interest between the country and taxpayers are increasing. Examining the effect of corporate transparency on tax avoidance can provide meaningful implications for tax authorities, regulators, managers and investors.

In previous studies, earnings management, disclosure quality and corporate governance are used as a proxy for corporate transparency. However, corporate transparency is not measured by the partial factors of firms; it is secured when overall institutional and environmental factors are supported. This study defines corporate transparency as the overall information environment including the quality of the information provided by companies and enterprise environment in which such information is derived. The factors capturing the overall information environment of companies are included in corporate transparency and it is examined comprehensively and systematically using a transparency evaluation index. Specifically, accrual quality, annual stock trading turnover, financial analyst reports, external auditors, corporate governance evaluation and issued sustainability reports are included in corporate transparency. Accrual quality refers to the quality of accounting profits, annual stock trading turnover and financial analyst reports serve as a substitute for information asymmetry, external auditors denote the quality of auditing, corporate governance evaluation measures the goodness of corporate governance and issued sustainability reports quantify management awareness and corporate culture. The transparency substitutes selected in this study differ in terms of the period required to secure the nature and transparency of the factors and the investment conditions of the companies. The results of the factor analysis are similar to those of the prediction. Therefore, the factor scores calculated through factor analysis are used to exclude the arbitrariness.

In this study, tax avoidance is based on the method by Desai and Dharmapala (2006), total BTD, cash effective tax rate and long-term cash effective tax rate to reduce the measurement error.

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MATERIALS AND METHODS

Research hypothesis: The relationship between tax avoidance and corporate transparency which comprehensively considers the information environment of companies has yet to be satisfactorily studied. Corporate transparency plays an important role in the efficient allocation of resources by alleviating information asymmetry between managers and external stakeholders and thus directly affects the economic performance of firms including corporate tax decision making. In addition, the level of tax avoidance is expected to be greatly influenced by the difference in supervision and control functions.

In studying the relationship between corporate governance and tax avoidance, Desai and Dharmapala (2006) argued that reward systems and corporate governance which can match the interests of management and shareholders are important determinants of tax avoidance. Jun (2011) found that the higher the ownership of the manager, the less the aggressiveness of tax reporting. This situation is because managerial ownership controls the managerial private consumption, negligence and neglect of corporate resources. Armstrong *et al.* (2015) analyzed the effects of corporate governance (accounting expert ratio and board independence) on tax avoidance and found that improving corporate governance reduces tax avoidance which negatively affects corporate value.

Regarding the effect of ownership structure on tax avoidance, Kang and Ko analyzed the relationship between incentive and tax avoidance and the results showed a negative relationship between tax evasion and controlling, institutional investor and Foreign investor stakeholding. Chen *et al.* (2010), Koh and Baek (2010) claimed that family firms with concentrated ownership are less likely to avoid tax than non-family firms are. They explained that family firms are sensitive to the total cost of tax avoidance (i.e., the risk of reputation or the suspicion of minority shareholders on the possibility that proprietors may pursue private gains) from a long-term perspective. Ki (2012) contended that companies that are active in social responsibility activities tend to be passive in tax avoidance. Wang (2010) reported that the higher the corporate transparency, the greater the tax avoidance.

The results of previous studies show that good corporate governance reduces tax avoidance which, in turn, reduces corporate value by performing supervision and control functions. Non-tax costs such as reputation risk and agency costs, can also significantly influence tax avoidance decisions.

From a corporation perspective, optimal tax avoidance pertains to avoiding tax to the extent that the marginal benefit of tax avoidance equals the marginal cost of tax evasion. The benefits of tax avoidance can be perceived as an increase in cash that is reserved within the enterprise due to explicit tax savings. The cost of tax avoidance should be based on the paradigm by Scholes *et al.* (2008) which takes into account all costs including non-tax costs. These non-tax costs include financial reporting, agency and political costs as well as negative reputation risks arising from tax avoidance. In addition to the amount of tax that will be deducted when determining the optimal tax avoidance level, managers should consider the explicit cost caused by tax evasion as interpreted by the taxing authority in the future. Apart from these explicit costs, non-tax costs may be an important factor in determining tax avoidance levels. Companies with high corporate transparency are reported to exhibit high corporate value, good profitability, high growth potential, large asset size and low capital cost (Wang, 2010; Bhattacharya *et al.*, 2004; Botosan and Plumlee, 2002; Lang and Lundholm, 1996). Non-tax costs caused by tax avoidance result in the loss of these benefits. Therefore, differences in corporate transparency may lead to the differences in non-tax costs resulting from tax avoidance between companies.

Tax avoidance not only results in tax savings but also generates significant non-tax costs and the effect on non-tax costs may vary depending on corporate transparency. High corporate transparency leads to substantial mitigation of information asymmetry and reduction of agency costs through supervision and control functions. However, the effect of corporate transparency on reputation risk or other non-tax costs such as political costs, may vary. Recently, external investors pay great attention to ethical management as social interest in corporate social responsibility and sustainability management intensifies. In a large-scale survey of tax officers (Graham *et al.*, 2013), managements responded that they do not practice excessive tax avoidance when making tax avoidance decisions and they regard reputation risk and financial reporting cost seriously.

Corporate transparency reduces agency costs through supervision and control functions and improves investment efficiency by mitigating information asymmetry problems through sufficient disclosure of high-quality accounting information. The differences in the characteristics of corporate transparency factors which are classified according to the functions of corporate transparency, may possibly affect corporate tax avoidance.

Companies must secure corporate governance with checks and balances (Barclay and Holderness, 1989). External auditors monitor the activities of companies while maintaining mental and economic independence (Watts and Zimmerman, 1983; Francis and Wilson, 1988). Agency costs are reduced when financial analysts and investors who are information users are interested in the activities of companies and perform supervision and control functions. In this manner, corporate transparency related to the environment and systems that reduce agency costs through supervision and control functions is characterized by a long-term nature. Supervision and control functions are also a favorable factor for large firms in terms of investment conditions.

By contrast, corporate transparency in terms of accounting information increases investment efficiency. If the quality of accounting information is high (Bushman and Smith, 2001) and the amount of accounting information to be disclosed is sufficient then it will reduce information asymmetry between internal and external stakeholders (Leuz and Verrecchia, 2000). Factors of accounting information such as the quality of accounting profits and the level of disclosure are transparency achieved afterward. Such transparency is characterized by a short-term nature and it is easy for small companies.

The amount of non-taxable expenses that will be shouldered by the functional division of corporate transparency may vary. To confirm this difference this study analyzes the characteristics of corporate transparency by separating them into transparency related to institutional environment and accounting information. The components of corporate transparency are expected to exert different effects on tax avoidance. Therefore, this study sets the following hypotheses according to the nature of corporate transparency:

- H_1: there is no relationship between the corporate transparency related to institutional environment and the tax avoidance behavior
- H_2: there is no relationship between the corporate transparency related to accounting information and the tax avoidance behavior

Research model: Hypotheses are used to verify whether significant difference exists in corporate tax avoidance evel according to corporate transparency. The research model is established as Eq. 1:

$$\begin{aligned}\text{Tax Avoidance}_{i,t} &= \beta_0 + \beta_1 \text{Transparency\_INS}_{i,t} + \\ &\beta_2 \text{Transparency\_ACC}_{i,t} + \beta_3 \text{ROA}_{i,t} + \beta_4 \text{LEV}_{i,t} + \beta_5 \text{PP} \\ &\text{E}_{i,t} + \beta_6 \text{INT}_{i,t} + \beta_7 \text{SIZE}_{i,t} + \beta_8 \text{MTB}_{i,t} + \beta_9 \text{AGE}_{i,t} + \\ &\beta \sum \text{YearDummy}_{i,t} + \upsilon_i + y_t + \varepsilon_{i,t}\end{aligned} \quad (1)$$

Dependent variables (Taxavoidance):

- DD_BTD = discretionary BTD as by Desai and Dharmapala (2006)
- Total BTD = (pretax income-tax income)/beginning asset
- CETR = cash taxes paid/pretax income
- LCETR = cash taxes paid over 5 years/pretax income summed over 5 years

Interest variables:

- Transparency_INS = factor score of corporate transparency related to institutional environment (including GTOTAL, AUDITOR, SUSREP and ANALC)
- GTOTAL = corporate governance rating score of Corporate Governance Service
- AUDITOR = indicator variable that takes the value of 1 if an auditor is a Big4 audit firm and 0 otherwise
- SUSREP = indicator variable that takes the value of 1 if a sustainability report is issued and 0 otherwise
- ANALC = natural log of the number of financial analyst reports
- Transparency_ACC = factor score of corporate transparency related to accounting information (including MDD and TRAVOL)
- MDD = absolute value of the residuals of the modified DD (2002) model* (-1)
- TRAVOL = total annual trading of shares/shares traded

Control variables:

- ROA = Return on Assets, measured by net income scaled by total assets
- LEV = Leverage ratio, measured by total liabilities divided by equity
- PPE = Sum of property, plant and equipment divided by lagged total assets
- INT = Intangible assets/lagged total assets
- SIZE: Natural log of the total assets of the firm at the end of a fiscal year
- MTB: Total market value/equity total of shares
- AGE: Natural log of one plus the number of years that listed Σyear dummy

The four tax avoidance measures, namely, DD_BTD, total BTD, CETR and LCETR are used. Corporate transparency is analyzed using the factor scores calculated by the factor analysis of 6 variables. Transparency related to institutional environment (Transparency_INS) includes corporate governance (GTOTAL), audit quality (AUDITOR), sustainability report (SUSREP) and financial analyst reports (ANALC). Also, transparency related to accounting information (Transparency_ACC) includes annual stock trading turnover and accrual quality.

Traditionally, corporate transparency and tax avoidance are expected to be positively related. However, by considering various non-tax costs such as agency costs, corporate transparency and tax avoidance can possibly have a positive and negative relationship with the relative size of the positive and negative effects of tax avoidance. That is, if the positive effect of tax avoidance is large, corporate transparency is high and tax avoidance level is high. However, if the negative effect of tax avoidance is large due to various non-tax costs, corporate transparency is high and tax avoidance level is low.

In addition to corporate transparency, corporate level variables affecting tax avoidance are included in the control variables according to the results of previous studies. The Return On Assets (ROA) refers to profitability. The more the profits to assets, the greater the tax burden therefore, a strong incentive exists to avoid tax. The higher the debt ratio (leverage), the less the tax avoidance because LEV exerts a tax-saving effect on interest expense when debt and tax avoidance is used as a non-debt deduction tool. Tax avoidance is expected to increase because depreciation and amortization (PPE) are likely to be included in the loss through early depreciation rather than economically useful life. INTible assets (INT) can be used as a means of transferring income; thus, tax avoidance is expected to increase. The size of a corporation (SIZE) may possibly increase tax avoidance due to an increase in profitability through economies of scale as the size of a corporation increases. Size also has the potential to reduce tax avoidance by increasing political costs. The Market To Book value ratio (MTB) indicates the future growth potential of the company. Tax avoidance is expected to decrease because of the high proportion of tangible assets holdings which may likely reduce the tax burden due to depreciation. The listing period (AGE) was included to control the effects over the life cycle of the company.

Dependent variables (four tax avoidance variables) and explanatory variables (corporate transparency variables and control variables) are measured in this manner. The multiple regression analyses (OLS) of equations use the fixed effect model of the panel regression analysis. The estimation model is tested for suitability using the Hausman test results. Consequently, the fixed effect model is selected among fixed and random effects. The results of the two-way fixed effect model (firm-year fixed effects model) are presented because the year dummy is significant. The standard error is based on the standard error adjusted using the Huber-White method, considering the heteroskedasticity and autocorrelation of the error term.

Measurement of major variables

Tax avoidance: Tax avoidance is based on DD_BTD, total BTD, CETR and LCETR. This study measures tax avoidance in four ways as Eq. 2-4. This study adopts DD_BTD and the residuals calculated through the firm fixed effect model as in the previous studies using these measures:

$$BTD_{i,t} = TA_{i,t} + \upsilon_i + \varepsilon_{i,t} \quad (2)$$

Where:

BTD = (Pretax income-tax income)/Beginning asset

TA = (Net income-operating cash flow)/Beginning asset

Next, CETR and 5 years cumulative LCETR are calculated as:

$$CETR = \frac{\text{Corporate tax burden}}{\text{Pretax income}} \quad (3)$$

$$LCETR = \frac{\sum \text{Corporate tax burden for 5 years}}{\sum \text{Pretax income for 5 years}} \quad (4)$$

CETR is calculated using the estimated corporate tax burden. The 5 years cumulative LCETR is included in the tax avoidance measure to solve the problem of the incorrect CETR due to the time difference between the denominator and molecule. The lower the CETR and LCETR, the greater the tax avoidance. Correlation and regression analyses excluding descriptive statistics are used to multiply by -1 to reconcile different tax avoidance measures and directions of interpretation.

Corporate transparency: Using the concept by Kwak *et al.* (2004) as basis this study measured the overall information environment including the quality of information provided by companies as well as the corporate environment in which the information is derived.

Specifically, the following measures are selected as substitutes for measuring the transparency related to accounting information that mitigates information asymmetry. Accrual quality (Bushman and Smith, 2001), annual stock trading turnover (Leuz and Verrecchia, 2000) and financial analyst reports are chosen. Next this study includes the Big4 of external auditors as a proxy for measuring the transparency of the accounting system. The inclusion of the Big4 is attributed to previous researches which report that the higher the audit quality (DeAngelo, 1981), the lower the agency cost (Watts and

Zimmerman, 1983; Francis and Wilson, 1988). Based on the findings that good corporate governance alleviates information asymmetry and serves as an external surveillance body this study incorporates corporate governance evaluation as a measure of management transparency (Barclay and Holderness, 1989). Finally, this study includes issued sustainability reports as a substitute for assessing management philosophy and ethical awareness to measure management consciousness transparency.

In this study, the transparency related to accounting information and institutional environment are comprehensively considered to estimate corporate transparency because corporate transparency is secured not by the partial factors but by the overall factors.

Corporate transparency can be measured using transparency levels or opacity levels. In this study, transparency level was used to measure corporate transparency for intuitive understanding and analysis. If high correlation exists between variables representing corporate transparency, then multicollinearity problems may arise when conducting analysis using individual variables. Therefore, common corporate transparency variables are extracted and used for analysis in this study through factor analysis which considers the correlation between variables representing corporate transparency. Through factor analysis, corporate transparency is indexed into transparency related to institutional environment and accounting information.

In this study, two factors are extracted based on the eigenvalues of 1 or more. Factor 1 (Transparency_INS) includes corporate governance (GTOTAL), audit quality (AUDITOR), sustainability report (SUSREP) and financial analyst reports (ANALC). Factor 2 (Transparency_ACC) includes annual stock trading turnover (TRAVOL) and accrual quality (MDD). Factor analysis is used to calculate the factor score based on the two factors and the factor score is used as a corporate transparency variable in multivariate analysis (Francis *et al*., 2005).

Accrual quality in many studies (Wang, 2010; Lang *et al*., 2012) examining the relationship among corporate transparency, tax avoidance and firm value are mostly based on the accrual quality put forward by Francis *et al*. (2005). In the present study, the quality of accounting profits is measured using these measures. The higher the accrual quality, the lower the earnings quality and ultimately the lower the transparency of financial reporting. This study uses -1 to multiply and construct the transparency index by matching the direction of interpretation with other corporate transparency measures:

$$TCA_{i,t} = \alpha_0 + \alpha_1 CFO_{i,t} + \alpha_2 CFO_{i,t} + \alpha_3 CFO_{i,t} + \alpha_4 \Delta REV_{i,t} + \alpha_5 PPE_{i,t} + \varepsilon_{i,t} \quad (5)$$

Where:

TCA = Δcurrent assets-Δcurrent liabilities-Δcash+Δliquidity long term debt/average total assets
CFO = Operating cash flow/average total assets
ΔREV = Sales t-sales t-1/average total assets
PPE = Tangible assets excluding land and assets in construction/average total assets

$$MDD = Absolute\left(The\ residual\ of\ equation\left(5\right)\right)\times\left(-1\right) \quad (6)$$

Sample selection: In this study, the companies listed on the KRX from 2005-2013 are selected as the sample. The research target is limited to the listed securities companies to control the difference in market characteristics between KOSPI-listed companies and KOSDAQ-listed companies. The sample is limited to the December settlement corporation to control the possibility that various economic variables have different effects on the companies with different end of accounting periods. The sample is selected for non-financial companies with the exclusion of financial companies to eliminate the effects of the industry. In addition, incomplete firm-year data such as financial data and capital market data are excluded from the sample. Accrual quality for measuring the quality of accounting profits among corporate transparency is estimated by the yearly industry regression analysis. This study excludes cases wherein the number of samples is less than ten for each year industry to minimize measurement errors.

Financial data are collected using the TS-2000 of the Korea Listed Companies Association. Data guide data are used for capital market data and KIS Value data are used for standard industry data. In this study, the total score of corporate governance is provided through a separate screening at the Korea Corporate Governance Service. Whether or not the company has published a sustainability report is confirmed through the sustainability management website.

Table 1 shows the selection of the sample used in the empirical analysis of this study. The final sample used in this study is 4,423 firms per year based on the measurement of tax avoidance of Desai and Dharmapala (2006). The observation value exceeding the upper and lower 1% of the sample data is adjusted to 1% to reduce the distortion of the analysis result and the loss of the sample due to the outlier.

Table 1: Sample selection and sample distribution by year industry

Sample selection criteria	Values
Initial sample over korea exchange for 2005-2013	6,427
Financial industry (Exclude)	439
Incomplete data and negative capital (Exclude)	962
Less 10 firm-years by industry-year (Exclude)	603
Final firm-year observations	4,423

RESULTS AND DISCUSSION

Results of empirical analysis

Descriptive statistics: Table 2 shows the descriptive statistics of the variables presented in the research model. For the total BTD, the mean is 0.009 (the median 0.006) for DD_BTD, the mean is 0.001 (the median-0.004). These two do not make much difference. The average annual CETR is 0.243 (the median-0.21) which is estimated to pay 24.3% of the pre-tax profit on corporate tax on the average. The average 5 years cumulative LCETR is 0.23 (the median 0.21) which is different from the short and long-term tax burden. This can be interpreted as paying less corporate tax in the long run.

The GTOTAL of the Korean Corporate Governance Service is 300 out of the total with listed companies averaging 108.739. It can be seen that the minimum value is zero point, the maximum value is 230 points and the standard deviation is large. A large difference is assumed in the level of governance structure among the listed companies. AUDITOR which refers to the quality of auditing has an average of 0.7 indicating that approximately 70% of listed companies are receiving external audits from Big4 accounting firms. The average of the SUSREP which refers to the issuance of a sustainability report is 0.049 and is only approximately 5% of the listed companies that voluntarily issued a sustainability report. ANALC had an average of 0.558 (a median of 0 and a maximum of 3.401). It can be inferred that financial analysts focused on a few of the listed companies and issued reports. MDD of Dechow and Dichev (2002) which refers to the quality of accounting profits is multiplied by -1 to match the interpretation direction of corporate transparency related variables, where the value of the mean is -0.051 (the median-0.036). In the factor analysis, the average of the two factors is zero, the median of Transparency_INS is -0.307 and Transparency_ACC is -0.260. Except for INT and MTB, the median of Transparency_INS and Transparency_ACC are similar; the distribution is close to normal. The LEV is 0.428, indicating that the sample comprises companies with relatively good capital structure.

Regression analysis results (multivariate analysis)

Corporate transparency index classification: Table 3 shows the results of the multiple regression analysis (OLS) for Eq. 1 to test the effect of corporate transparency on corporate tax avoidance. As a result of the analysis, Transparency_INS showed a significantly negative value. Transparency_ACC showed negative signs but only a few tax avoidance measures showed significant results. Therefore, hypotheses 1 and 2 which infers that corporate tax avoidance levels would not vary according to corporate transparency are rejected.

Transparency_INS and Transparency_ACC differ in the nature of the individual elements included in each, the period required to secure transparency and the investment conditions of companies. Transparency_INS which performs the supervision and control functions, has intrinsic and long-term characteristics and is a favorable factor for large companies. By contrast, Transparency_ACC is characterized by the transparency achieved afterward, resulting in short-term characteristics and an easy transparency for small-scale companies.

By comparing the regression coefficients of the results in Table 3, Transparency_INS is more effective in reducing the tax avoidance level than Transparency_ACC. This finding implies that tax avoidance can be effectively controlled when environmental and institutional conditions which are essential elements of corporate transparency are addressed. Specifically this also indicates that the better the corporate governance, the better the quality of audit and the more financial analyst reports. In addition, the more companies that issue a sustainability report the lesser the tax avoidance. These results strengthen the supervisory and control functions. These results also show that firms with high corporate transparency are less willing to avoid tax due to the burden on various non-tax costs such as reputation risk caused by tax avoidance rather than the effect of reducing agent cost. In other words, this analysis implies that when determining the optimal tax avoidance level, companies consider various non-tax costs incurred due to tax avoidance in addition to tax costs.

The control variables are statistically significant in most of the predicted directions except for INT and AGE. ROA, PPE and SIZE are all significantly positive. This means that the higher the profitability the higher the incentive for tax avoidance because of the higher taxable income. The higher the proportion of depreciable assets the lower the tax burden by various methods such as depreciation and special depreciation which indicates that the tax avoidance tendency is high. In addition, an economic effect of the scale and a superior tax strategy can be established when the asset size is large. Therefore, tax evasion increases in this case. The LEV is shown to have a negative sign. This indicates that firms with high

Table 2: Descriptive statistics

Variables	Mean	SD	Min.	Q1	Median	Q3	Max.
DDBTD	0.001	0.086	-0.237	-0.042	-0.004	0.035	0.354
BTD	0.009	0.097	-0.348	-0.024	0.006	0.037	0.388
CETR	0.243	0.232	0.000	0.090	0.210	0.300	1.000
LCETR	0.230	0.178	0.000	0.128	0.210	0.288	1.000
GTOTAL	108.739	24.343	0.000	93.000	105.000	119.000	230.000
AUDITOR	0.700	0.458	0.000	0.000	1.000	1.000	1.000
SUSREP	0.049	0.216	0.000	0.000	0.000	0.000	1.000
ANALC	0.558	0.998	0.000	0.000	0.000	0.693	3.401
TRAVOL	0.532	0.824	0.014	0.111	0.260	0.575	5.274
MDD	-0.051	0.051	-0.264	-0.070	-0.036	-0.015	0.000
Transparency_INS	0.000	1.476	-4.784	-0.909	-0.307	0.429	6.373
Transparency_ACC	0.000	1.021	-1.203	-0.629	-0.260	0.313	11.595
ROA	0.031	0.079	-0.321	0.007	0.035	0.071	0.220
LEV	0.428	0.195	0.033	0.275	0.436	0.571	0.875
PPE	0.184	0.138	0.000	0.080	0.159	0.259	0.601
INTANG	0.013	0.027	-0.027	0.000	0.004	0.013	0.169
SIZE	19.672	1.458	16.990	18.648	19.426	20.447	23.921
MTB	1.089	0.920	0.189	0.518	0.801	1.300	5.628
AGE	2.834	0.760	0.693	2.485	2.996	3.466	4.060

Table 3: Multiple regression analysis (hypotheses 1 and 2)

Variables	Exp. Sign	DD_BTD	BTD	CETR	LCETR
Constant		-0.303**	-0.831***	-1.492***	-2.181***
		(-2.25)	(-3.88)	(-3.86)	(-7.63)
Transparency_INS	+/-	-0.008***	-0.012***	-0.016*	-0.013**
		(-3.05)	(-3.21)	(-1.82)	(-2.17)
Transparency_ACC	+/-	-0.004**	-0.003	-0.008	-0.008*
		(-2.12)	(-1.41)	(-1.22)	(-1.79)
ROA	+	0.369***	1.027***	1.620***	0.473***
		(10.45)	(8.03)	(13.45)	(6.86)
LEV	-	-0.078***	-0.093**	-0.095	-0.396***
		(-3.68)	(-2.49)	(-1.57)	(-9.37)
PPE	+	0.207***	0.250***	0.195***	0.093*
		(6.25)	(4.68)	(2.80)	(1.94)
INT	+	-0.104	-0.148	-0.152	-0.635***
		(-0.71)	(-0.46)	(-0.46)	(-2.68)
SIZE	+/-	0.013*	0.040***	0.058***	0.121***
		(1.90)	(3.69)	(2.85)	(8.30)
MTB	-	-0.005	-0.021**	-0.039***	-0.001
		(-1.52)	(-2.46)	(-4.15)	(-0.06)
AGE	+/-	0.014	0.015	0.040	-0.117***
		(1.53)	(1.60)	(1.47)	(-2.81)
Year-Dummy		included	included	included	included
F-value		23.23***	42.54***	19.03***	15.09***
Adj. R^2		0.132	0.273	0.107	0.100
Observations		4.423	4.423	3.257	2.779

Statistically significant at the ***1%, **5% and *10% two-tailed level, respectively; the variables are defined as definitions of Eq. 1

debt ratios are passive in tax avoidance because tax savings can be made through the tax saving effect of interest costs. INT show a negative sign in most cases unlike expected. Moreover, it appears that intangible assets are not used as a means of transferring income.

Integrating the corporate transparency index: In this study, common factors are extracted through factor analysis considering the correlation among variables to evaluate corporate transparency. However, additional analyses are conducted to control the effect of the index created for individual evaluation elements constituting corporate transparency on the study results. Previous studies have used the method of dividing each evaluation factor constituting the corporate transparency into ten quintiles and then summing and standardizing them (Anderson *et al*., 2009; Wang, 2010). The calculated corporate transparency is 0.1-1. Table 4 shows the results of additional tests conducted to control the effects of the measure of corporate transparency index on tax avoidance. As a result of modifying the method of indexing the transparency of the corporation, the tax avoidance decreased as the transparency of the corporation increased. This outcome is similar to the empirical results when common factors extracted through factor analysis are analyzed.

Table 4: Multiple regression analysis

Variables	Exp. Sign	DD_BTD	BTD	CETR	LCETR
Constant		-0.253**	-0.756***	-1.363***	-2.033***
		(-2.36)	(-5.09)	(-3.61)	(-7.24)
Index	+/-	-0.043**	-0.058**	-0.083	0.038
		(-2.5)	(-2.41)	(-1.57)	(1.04)
ROA	+	0.370***	1.028***	1.619***	0.468***
		(15.46)	(31.01)	(13.46)	(6.78)
LEV	-	-0.076***	-0.090***	-0.089	-0.384***
		(-4.41)	(-3.77)	(-1.47)	(-9.13)
PPE	+	0.207***	0.248***	0.193***	0.086*
		(9.36)	(8.11)	(2.79)	(1.79)
INT	+	-0.116	-0.161	-0.183	-0.688***
		(-1.35)	(-1.35)	(-0.55)	(-2.91)
SIZE	+/-	0.012**	0.038***	0.054***	0.113***
		(2.13)	(4.86)	(2.67)	(7.84)
MTB	-	-0.005**	-0.021***	-0.040***	-0.003
		(-2.02)	(-6.15)	(-4.30)	(-0.44)
AGE	+/-	0.013	0.014	0.040	-0.120***
		(1.38)	(1.06)	(1.43)	(-2.88)
Year-dummy		included	included	included	included
F-value		36.33***	90.08***	20.11***	15.63***
Adj R^2		0.131	0.272	0.106	0.098
Observations		4,423	4,423	3,257	2,779

Statistically significant at the ***1%, **5% and *10% two-tailed level, respectively; the variables are defined as definitions of Eq. 1

Therefore, the diversification of calculation methods of corporate transparency index support the results of this study.

CONCLUSION

This study extends corporate transparency which is heightened by social interest, to include corporate tax avoidance and analyzes how corporate transparency that is, the overall information environment of corporations, affects tax avoidance. Corporate transparency includes measures to assess the overall information environment of companies through a broad theoretical review of the concept and the measurement of corporate transparency.

The six corporate transparency substitutes selected in this study differ in terms of the length of time required to secure the nature and transparency of the factors and the investment conditions of the enterprises. These substitutes also differ in terms of the nature of the element, the period required to ensure transparency and the investment conditions of companies. The results of the factor analysis show similar results to those of the prediction. Therefore, the factor scores calculated through the factor analysis are used to exclude arbitrariness. Transparency related to institutional environment includes corporate governance, audit quality, sustainability report and financial analyst reports. Transparency related to accounting information includes annual stock trading turnover and accrual quality as key variables. This study conducted an additional analysis by diversifying the calculation method of corporate transparency index to further analyze the effect of corporate transparency on tax avoidance.

In this study, tax avoidance is based DD_BTD, total BTD, CETR and LETR to reduce the measurement error. In analyzing whether tax avoidance level varies according to corporate transparency, Transparency_INS showed a significantly negative value. Transparency_ACC showed negative signs but only a few tax avoidance measures showed significant results. The comparison of the regression coefficients of the analysis results can be interpreted that Transparency_INS is more effective in reducing tax avoidance than Transparency_ACC. Tax avoidance can be effectively controlled when the environment and institutional conditions which are essential elements of corporate transparency are satisfied. The results show that firms with high transparency are passive to tax avoidance because of the burden on various non-tax costs such as reputation risk, caused by tax avoidance rather than the effect of reducing agent cost. The empirical result that firms with high corporate transparency have low tax avoidance levels shows that firms consider various non-tax costs incurred due to tax avoidance in determining the optimal tax avoidance level.

The contribution of this study is as follows. First this study examined the factors affecting the corporate information environment in a comprehensive manner. In addition, developing a corporate transparency evaluation index that can evaluate the overall information environment of the company through a broad theoretical review of the concept of transparency and measurement is meaningful. This study sought to evaluate the effectiveness of tax avoidance with regard to tax costs and various non-tax costs with regard to all costs as suggested by Scholes *et al*. (2008).

For tax authorities, the emphasis on corporate transparency suggests the possibility of using it as a

policy tool to prevent excessive corporate tax avoidance without revision or amendment of tax law. According to the results of this study, corporate transparency plays a role in lowering corporate tax avoidance level, providing meaningful implications for tax authorities, regulators, managers and investors.

Measurement errors may inevitably occur in the measurement of corporate transparency and tax avoidance. This study also has limitations attributed to the limited available data. Therefore, the interpretation of this study on the effect of corporate transparency on corporate tax avoidance should be considered with caution.

Firms with high corporate transparency have low tax avoidance levels shows that firms consider various non-tax costs incurred due to tax avoidance in determining the optimal tax avoidance level.

For tax authorities, the emphasis on corporate transparency suggests the possibility of using it as a policy tool to prevent excessive corporate tax avoidance without revision or amendment of tax law. And according to the results of this study, corporate transparency plays a role in lowering corporate tax avoidance level, providing meaningful implications for tax authorities, regulators, managers and investors.

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