THE EFFECT OF ANALYST'S FORECAST ACCURACY ON CORPORATE TAX AVOIDANCE: EVIDENCE FROM KOREA

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ABSTRACT

This study examines the association between analysts' information properties and corporate tax avoidance. Using analysts' coverage and forecast accuracy as a proxy for analysts' information properties, we find that analysts' following does not affect corporate tax aggressiveness while their forecast accuracy reduces extreme corporate tax avoidance and the agency problem between management and shareholders. To examine whether analysts' monitoring role affects firms' level of corporate tax avoidance, we partition sample into firms with high levels of corporate tax avoidance and those with low levels of corporate tax avoidance compared to the industry average. We find that analysts encourage management to avoid extreme levels of tax avoidance activities. On the other hand, for firms with low levels of tax avoidance, analysts encourage the management to reduce tax expense and increase the earnings to meet the earnings estimates to be aligned with shareholder's interests. We conjecture that analysts' monitoring role will be stronger when institutional or foreign investors monitor the firm as an external corporate governance mechanism. Consistent with the prediction, analysts' monitoring role is more pronounced when firms have strong corporate governance.

Keywords: Analyst's Forecast Accuracy, Corporate Tax Avoidance, Effective Tax Rate, Institutional Investor, Foreign Investor.

INTRODUCTION

We investigate how analysts affect and mitigate corporate tax avoidance. We presume the number of analysts' following and analysts' earnings forecast accuracy as a proxy for analysts' monitoring role on firms' tax planning and examine whether analysts affect manager's behavior of corporate tax avoidance. A number of prior studies focused on the determinants of tax avoidance. For instance, executives' characteristics, corporate governance, industry-wide characteristics, and firms' financial status affect firms' tax avoidance (Dyreng et al., 2010; Khurana & Moser, 2010; Lev & Nissim, 2004). While substantial papers investigate the relationship between external corporate governance and corporate tax avoidance, it still remains unclear how sell-side analysts' information affect corporate tax planning. This paper extends the prior studies by investigating the impact of analysts' external monitoring role on managers' decision about corporate tax planning.

Prior research shows two conflicting views on corporate tax avoidance. Managers have incentives to minimize tax expense to maximize firm value (Graham & Tucker, 2006). With 2,696 Korean firms, Koh et al., (2007) find that tax avoidance is positively linked to firm value because the tax avoidance activities reduce cash outflows. However, despite of benefits of tax avoidance activities, risk adverse managers would weigh the benefits and costs of tax avoidance

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strategies because the aggressive tax planning would impose costs such as litigation, scrutiny subject to tax authorities (Hanlon & Heitzman, 2010). Therefore, the agency conflicts result from the different level of tax avoidance between the manager's tax planning with the shareholder's preference. To solve the agency problem and make the manager interest align with the shareholders' best interests, shareholders should motivate the management to undertake the aggressive corporate tax avoidance activities by providing the optimal compensation scheme such as manager's equity incentives (Rego & Wilson, 2012).

On the other hand, the alternative view is that the complex tax avoidance schemes enable managers to be engaged in managerial opportunism such as earnings management, related-party transactions activities, and diversion of firm resources for their private benefit (Desai & Dharmapala, 2006-2009; Kim et al., 2011; Baik et al., 2012). Tax avoidance may lead to information asymmetry between managers and shareholders because management's tax planning is complicated and may not be properly communicated with outside investors and sell-side analysts (Balakrishinan et al., 2010). Therefore, tax avoidance implies greater agency conflicts between managers and shareholders and it may not increase the firm value. According to Dharmapala (2006), bonus schemes with stock option for top management decrease manager's aggressive corporate tax avoidance activities under the strong corporate governance. It implies that manager's equity incentives to increase firm value, which is aligned with the shareholders' interest, lead to the reduction in aggressive tax avoidance.

Prior research examines the relation between corporate governance system and corporate tax avoidance. The results are mixed. Armstrong et al., (2015) assume that the relation between corporate governance and corporate tax avoidance is different at extreme (high or low) level of tax avoidance. They find the positive (negative) relation between the level of financial sophistication (or independence) of the directors and corporate tax avoidance under the low (high) level of the tax avoidance. It implies that more knowledgeable directors with financial sophistication and independence would enhance more aggressive tax avoidance at the extremely lower level of corporate tax avoidance. Even though prior literature discussed the impact of the monitoring role of audit committee financial expertise, and board of directors on the tax avoidance (Armstrong et al., 2015; Robinson et al., 2012), limited research has been done to examine how the analysts as external monitor affect management's behavior on tax avoidance.

Analysts provide private information to investors which leads to detect managements' misbehavior (Healy & Palepu, 2001), and analysts with more experience and from top brokers strongly monitor earnings management (Yu, 2006). Accordingly, sell-side analysts mitigate the information asymmetry between management and investors (Healy & Palepu, 2001; Graham, Harvey, & Rajgopal, 2005). Especially, as the earnings forecast information contain useful tax information (Lev & Nissim, 2004), we conjecture that analysts attempt to analyze the corporate tax to provide more accurate earnings forecast information to the market participants. Based on the prior research that institutional investors rely on sell-side analysts' information (Chen, 2006; Kang et al., 2018), we expect that outside shareholders would put more pressure on management to mitigate the management's inefficient tax planning. Thus, we expect that sell-side analysts would decrease the agency problem between managers and outside shareholders by providing private information production including tax information. If analysts monitor the management's opportunistic behavior, and lead corporate tax planning more transparent, they will encourage management to avoid extremely high levels of tax avoidance activities. On the other hand, if the level of tax avoidance activities is inefficiently low, then analysts would encourage the

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management to reduce tax payment and meet the earnings estimates to be aligned with shareholder's interests.

Korea has a unique feature, so-called Chaebol, which is a family-controlled industrial corporation. Lim & Jung (2012) suggest that the risk sharing mechanism within Chaebols can lead affiliated sell-side analysts to provide optimistically biased information for groups. They conclude that affiliated analysts are more likely to provide less accurate and more optimistically biased earnings forecast information for affiliated firms than the independent sell-side analysts in other securities. Therefore, it is necessary to examine whether the more accurate analysts' information mitigates management's extreme corporate tax avoidance. According to the previous research, more experienced analysts have improved skills to estimate more accurate earnings forecast (Mikhail, Walther, & Willis, 1997, 2003; Clement, 1999), and the more experienced analysts can deter the management's earnings management (Fang Yu, 2006). According to Ki & Oh (2012), accurate forecast on tax expenses is one of the important factors that affect the accuracy of forecast information. It means that the under-reaction on the income taxes lead to systematic errors in analysts' earnings forecasts. Baik et al., (2013) find that when analysts disclose the income tax forecast information, their earnings forecast is likely to be accurate because they can analyze the corporate tax information better than the others. Therefore, if earnings forecast is more accurate, it implies that analysts can analyze tax structure of the firm and estimate more accurate corporate tax expenses and provide the private and public information to the investors. Therefore, we expect that the more accurate analysts' forecast information mitigate management's extreme corporate tax avoidance behavior and affect tax strategy of the firm to be aligned with the investor's interests.

Using a sample of firms from Fnguide, Kisvalue, & TS2000 of 2001 to 2011, we conduct several analyses of the analysts' monitoring role on the corporation's tax planning. First, we investigate whether analysts' coverage affects corporations' tax aggressiveness. Second, we examine if analysts' earnings forecast accuracy has the impact on corporations' tax planning (tax aggressiveness). Lastly, in the sensitivity test, we partition our samples into the firms with higher institutional (or foreign) ownership and firms with lower institutional (or foreign) ownership.

Our main empirical findings are as follows. First, using the full sample, we find that analysts' coverage itself does not reduce corporation's abnormal tax rate, but analysts' forecast accuracy mitigates corporations' tax aggressiveness. Second, we split the total samples into firms with aggressive tax planning and those with non-aggressive tax planning compared to the industry average. We find that analysts, who provide more accurate information, lower the firms' effective tax rate if the firms have higher tax rate compared to their industry peers. It implies that when the firm pays excessive tax expense compared to the industry average, analysts advise the management to plan more efficient tax strategy by paying less tax expense. On the other hand, if the firms have the lower tax rate, analysts encourage management to raise tax expense because the reputation risk increases under the aggressive corporate tax avoidance. Lastly, in sensitivity test, we find that negative relationship between analysts' earnings forecast accuracy and corporations' tax avoidance is stronger when the firms have higher institutional or foreign ownership. It indicates that analysts' monitoring role on corporations' tax planning is more pronounced under strong corporate governance. We believe that institutional investors or foreign investors more likely use the sell-side analysts' forecast information when it is more accurate (Chen et al., 2006).

This paper has several contributions to the literature. First, we extend the prior literature on corporate tax planning by suggesting the link between analysts' coverage and the corporate

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tax planning. Second, we extend the prior literature on corporate tax planning by suggesting the relationship between analysts' earnings forecast accuracy and corporate tax planning. Whereas prior literature provides empirical evidence about how the quantitative analyst's information disclosure such as the number of coverage affects corporate tax avoidance, we focus more on the effect of qualitative analyst's information accuracy on the extreme level of corporate tax planning. Third, our findings suggest that the number of analyst's coverage itself does not affect managers' misbehavior on tax avoidance, and analysts' accurate forecast information lead to more efficient and less aggressive tax avoidance, implying that it is important for analysts to provide more reliable information to the public. Lastly, from the results of sensitivity test, we find that under stronger corporate governance system, analysts' accurate forecast information is more likely to affect the extreme level of corporate tax avoidance.

The remainder of our paper is as follows. Section 2 reviews the prior research and develops the hypotheses. Section 3 describes the research design and samples. Section 4 presents our empirical evidence. Finally, Section 5 provides our sensitivity analysis. Section 6 concludes.

PRIOR LITERATURE AND HYPOTHESES DEVELOPMENT

Prior research shows two conflicting views on corporate tax avoidance. Managers have incentives to act tax avoidance activities to maximize firm value by minimizing corporate tax expenses (Graham & Tucker, 2006). With 2,696 Korean firms, Koh et al., (2007) find that tax avoidance is positively connected to firm value because the tax avoidance activities reduce cash outflows. On the other hand, the aggressive tax planning would impose costs such as litigation, scrutiny subject to tax authorities (Hanlon & Heitzman, 2010). Despite of beneficial effect of tax avoidance, risk adverse managers would weigh the benefits and costs of tax avoidance strategies. Therefore, the agency conflicts could result from the different level of tax avoidance between the manager's tax planning with the shareholder's preference. To solve the agency problem and make the manager interest align with the shareholders' best interests to increase firm value, shareholders should motivate the management to undertake the aggressive corporate tax avoidance activities by providing the optimal compensation scheme such as manager's equity incentives. According to Rego & Wilson (2012) argue that CEOs should be motivated by managerial risk taking equity incentives to undertake the aggressive tax strategy. Armstrong et al., (2015) also find that top management's compensation leads the management to undertake the risk of negative results such as reputation loss, penalties (Wilson, 2009; Chen et al., 2010) and increase the level of aggressive tax avoidance activities especially under the higher levels of tax avoidance.

On the other hand, the alternative view is that tax avoidance implies greater agency conflicts between managers and shareholders and it may not increase the firm value. The argument of the research is that the complex tax avoidance schemes enable managers to be engaged in managerial opportunism, which are earnings management, related-party transactions activities, and diversion of firm resources for their private benefit (Desai & Dharmapala, 2006, 2009; Kim et al., 2011; Baik et al., 2012). Also, tax avoidance may lead to information asymmetry between managers and shareholders because management's tax planning is complicated and may not be properly communicated with outside investors, and sell-side analysts (Balakrishinan et al., 2010). Therefore, tax avoidance activity may facilitate management's rent extraction and it allows managers to conceal bad news and exaggerate or manipulate financial performance (Kim et al., 2011). According to Dharmapala (2006), bonus schemes with stock option for top management decreases manager's aggressive corporate tax

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avoidance activities under the strong corporate governance, which implies that manager's incentives to increase firm value, which is aligned with the shareholders' interest, lead to the reduction in aggressive tax avoidance. Desai & Dharmapala (2006, 2009) indicate those managers' resource diversion and tax avoidance activities are complementary, which implies that higher agency conflicts between management and investors increase managers' discretion, and managerial opportunistic behavior such as earning management, and resource diversion behaviors. According to Comprix et al., (2012), changes in effective tax rates (hereafter, ETR) are associated with earnings management, and Cook et al., (2008) considered total tax expense as earnings management because tax expense is material for a broad set of firms.

Prior research which examines the relationship between corporate governance system and corporate tax avoidance suggest mixed results because they are based on measures of how the corporate governance system is linked to the mean value of the corporate tax avoidance distribution. Therefore, Armstrong et al., (2015) assume that the relation between corporate governance scheme and corporate tax avoidance strategy is different at extreme (high or low) level of tax avoidance. They find that the positive (negative) relationship between the level of financial sophistication (or independence) of the directors and corporate tax avoidance under the low (high) level of the tax avoidance. It implies that as the governance mechanisms, independent board of directors and financially sophisticated directors monitor the costs (e.g., reputation loss, penalties) of extremely aggressive corporate tax positions and attempt to mitigate the additional tax avoidance. Conversely, more knowledgeable directors with financial sophistication and independence would enhance more aggressive tax avoidance at the extremely lower level of corporate tax avoidance. Based on Armstrong et al., (2015), in our research we focus on the relation between external corporate governance system and tax avoidance at extreme (high or low) level of tax avoidance. Even though prior literature discussed the impact of the monitoring role of the board of directors, and audit committee financial expertise on the tax avoidance (Armstrong et al., 2015; Robinson et al., 2012), limited research has done to examine about how the external monitor of analysts affect management's behavior on tax avoidance.

Sell-side analysts are perceived information intermediaries as gathering, analyzing and distributing corporate information to the capital market. As providing private information to investors, analysts detect managements' misbehavior (Healy & Palepu, 2001) and analysts with more experience, from top brokerage houses monitor earnings management (Fang Yu, 2006) and the real earnings management of the firm (Zhang, 2011) more thoroughly. Accordingly, sell-side analysts mitigate the information asymmetry between firms and outside investors and they could affect the management's behavior (Healy & Palepu, 2001; Graham, Harvey, & Rajgopal, 2005).

As the earnings forecast information contain tax information which is useful to estimate future earnings changes (Lev & Nissim, 2004), we can conjecture that analysts attempt to analyze the corporate tax to provide more useful earnings forecast information to the market participants. Moreover, Analysts' final products such as earnings forecast, target price, and recommendation opinion enable institutional investors to earn capital gain by trading and move the stocks to enhance the market efficiency (Kang et al., 2018). Based on the prior research that institutional investors rely on sell-side analysts' information (Chen, 2006; Kang et al., 2018), we expect that as the corporate governance mechanism, outside shareholders would put more pressure on management to mitigate the management's inefficient tax planning. Thus, we expect that sell-side analysts would decrease the agency problem between managers and outside shareholders by providing private information including tax information. Analysts' information results in the higher transparency of managers' behavior with discouraging management's

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opportunistic misbehavior through tax planning. Therefore, manager's discretion through tax avoidance activities would be decreased. If analysts monitor the management's opportunistic behavior and lead corporate tax planning more transparent, they will encourage management to avoid extremely high levels of tax avoidance activities. On the other hand, if the level of tax avoidance activities is inadequate and inefficiently lower, then analysts discourage the management's aggressive tax planning and meet the earnings estimates to be aligned with shareholder's interests.

Although prior research suggests that sell-side analysts affect the management's transparency of financial reporting (Allen et al., 2014; Baik et al., 2013), it is an empirical question whether analysts mitigate the agency problems and discourage aggressive tax avoidance activities to reduce tax expenses compared to the industry average, and if analysts encourage the management to decrease tax obligation and maximize the firm value to align with the shareholders' interests. Therefore, our first hypothesis is as follows.

H1: The number of analyst following is positively (negatively) associated with tax avoidance when the level of tax avoidance is abnormally higher (lower) than the industry average tax avoidance.

Korea has a unique feature, so-called Chaebol, which is a family-controlled industrial conglomerate. It is quite similar to the business group, but there are several distinct features that distinguish Korean Chaebols from the normal business groups in other countries. Lim & Jung (2012) suggest that the risk-sharing mechanism within Korean Chaebols could lead affiliated sell-side analysts to provide optimistically biased forecasts for group. Prior studies indicate that analyst's bias arises from sources such as the desire to enhance the relationship with management (Francis & Philbrick, 1993; Das, Levine, & Sivaramakrishnan, 1998; Lim, 2001). Lim & Jung (2012) conclude that affiliated analysts are more likely to provide less accurate and more optimistically biased earnings forecast information for affiliated firms than the independent sell-side analysts in other securities. Therefore, it is necessary to examine whether the more accurate analysts' information mitigates management's extreme corporate tax avoidance.

According to the previous research, more experienced analysts have improved skills to estimate more accurate earnings forecast (Mikhail, Walther, & Willis, 1997, 2003; Clement, 1999), and the more experienced analysts can deter the management's earnings management (Fang Yu, 2006). According to Ki & Oh (2012), accurate forecast on tax expenses is one of the important factors that affect the accuracy of forecast information. It means that the under-reaction on the income taxes lead to systematic errors in analysts' earnings forecasts. Baik et al., (2013) find that when analysts disclose the income tax forecast information, their earnings forecast information is more likely to be accurate because they can analyze the corporate tax information better than the others. Therefore, if earnings forecast are more accurate, it implies that analysts can analyze tax structure of the firm and estimate more accurate corporate tax expenses and provide the private and public information to the investors. Therefore, for the 2nd hypothesis, we examine whether the level of analysts forecast accuracy mitigate management's earnings management on corporate tax expense and affect tax strategy of the firm to be aligned with the investor's interests.

H2: The level of analysts' earnings forecast accuracy is positively (negatively) associated with tax avoidance when the level of tax avoidance is abnormally higher (lower) than the industry average tax avoidance.

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RESEARCH DESIGN AND VARIABLE MEASUREMENT

Measurement of Abnormal Tax Avoidance

To examine whether analysts' forecast accuracy influences manager's tax planning, we use abnormal tax avoidance as a proxy for tax aggressiveness (Baik, Choi, Jung, & Morton, WP; Balarkishnan, Blouin, & Guay, WP). Although there is no universal definition of tax avoidance, we define tax aggressiveness (tax avoidance) as any abnormal actions that firms do so to reduce their tax liability (Slemrod, 2004).

The procedure to calculate tax avoidance consists of two steps. First, we calculate generally accepted effective tax rate (GAAP ETR) for each firm in our sample for each year. The GAAP ETR is the ratio of the firm's total income tax expense scaled by pre-tax income. Following to Dyreng, Hanlon, & Maydew (2008), we aggregate GAAP ETR over five years to smooth out year-to-year fluctuations and we truncate this measure to range between 0 and 1.

$$GAAP\ ETRit = \sum_{t=1}^{t+4} TAX\ EXPENSE_{it} / \sum_{t=1}^{t+4} TAX\ INCOME_{it} \qquad (4)$$

GAAP ETR: Generally accepted accounting principles effective tax rate.

TAX EXPENSE: Total income tax expense

TAX INCOME: Pre-tax income.

Following Armstrong et al. (2015), we isolate abnormal part of the GAAP ETR which captures cross-sectional variation in firm's total tax planning compared to their peer firms in the same industry and same year. We compute the absolute value of abnormal GAAP ETR as the difference between five-year average GAAP ETR of the firms and that of industry peers as following Equation (5). This proxy captures the variation of the firms' tax avoidance relative to tax aggressiveness of the benchmark firms within the same industry in the same year.

$$Abnormal\ GAAP\ ETRijt = abs\ (GAAP\ ETRit - Industry\ Average\ GAAP\ ETRjt) \qquad (5)$$

The higher value of abnormal GAAP ETR from Eq. (5) indicates the firms paid more (or less) tax expense compared to their industry peers. By comparison between ETR of a firms' level and that of its peers within the same industry, we define tax aggressive firms as the firms engage too much (or too little) in tax avoidance activities. Therefore, we denote abnormal GAAP ETR as a proxy for tax aggressiveness.

Research Model

First, we examine whether analysts affect firms' tax planning and whether they induce management to moderate their tax aggressiveness. To test hypothesis 1, we specify the model as Equation (6).

$$Abnormal\ ETR_{ijt} = \beta_0 + \beta_1 COVERAGE + \beta_2 SIZE + \beta_3 ROA + \beta_4 INTAN + \beta_5 INVEN + \beta_6 LEV + \beta_7 OCF + \beta_8 BIG4 + Industry\ Dummies + Year\ Dummies + \varepsilon \qquad (6)$$

Where:

Abnormal ETRijt: The absolute value of abnormal GAAP ETR as the difference between the firms' five-year average GAAP ETR and the five-year average GAAP ETR of industry peers.

COVERAGE: Number of analysts who follow the firm.

SIZE: The natural log of total assets.

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ROA: Return on assets.

INTAN: Intangible assets divided by lagged total assets.

INVEN: Inventory divided by lagged total assets.

LEV: Long-term debt plus short-term debt scaled by lagged total assets.

OCF: Operating cash flows.

BIG4: An indicator variable equal to 1 if a firm is audited by one of Big4 audit firms, and 0 otherwise.

Our main variable is analysts' coverage (COVERAGE), which is the number of analysts who follow a specific firm. As analysts monitor and detect management's misbehavior, managers with higher analyst coverage are more concerned and cautious for their behavior (Jensen & Meckling, 1976; Graham et al., 2015). Therefore, those managers mitigate tax avoidance not to incur reputational costs and other penalties (Hanlon & Slemrod, 2009). However, if managers have huge power on the analysts, analysts cannot play their monitoring role. Also Korea has a unique feature, Chaebol, a family-controlled industrial conglomerate. It is quite similar to the business group, but there are several features distinguish Korean Chaebols from the business groups in other countries. First of all, Chaebol has the substantial economic influence on the Korean economy. Also, CEOs of Chaebol have enormous power on firms and capital market. Therefore, analysts are less likely to monitor those firms. Thus, it is an empirical question if higher analysts' coverage controls manager's tax avoidance in Korea.

Following prior studies on tax aggressiveness, we control firm-specific factors. SIZE is a firm size, measured by the logarithm of total assets. ROA is return on assets and INTAN is intangible assets, measured as intangible assets divided by lagged total assets. INVEN is inventory assets, scaled by lagged total assets. LEV is leverage, measured as long-term debt plus short-term debt scaled by lagged total assets. OCF indicates operating cash flows and BIG4 is an indicator variable equal to 1 if a firm is audited by one of the Big4 audit firms, and 0 otherwise. We include industry and year dummies to control industry and year effect.

Next, we use the following Equation (7) to examine hypothesis 2 whether analysts' earnings forecast accuracy leads the manager to reduce tax aggressiveness.

$$AbnormalETR_{ijt}=\beta_0+\beta_1 ACCURACY+\beta_2 SIZE+\beta_3 ROA+\beta_4 INTAN+\beta_5 INVEN+\beta_6 LEV+\beta_7 OCF+\beta_8 BIG4+Industry\ Dummies+Year\ Dummies+\varepsilon \quad (7)$$

Where:

ACCURACY: Analysts' forecast accuracy. It is measured as the absolute value of the difference between actual earnings and earnings forecast of analyst for firm i in year t, deflated by stock price. Those values acquired above equation are multiplied by -1 to easily interpret.

As analysts report accurate forecasts, they are likely to have more knowledge about the firms. Thus, they are more likely to detect abnormal behavior or misbehavior of managers. Our main variable of hypothesis 2 is analysts' forecast accuracy (ACCURACY). It is measured as the absolute value of the difference between actual earnings and earnings forecast of analyst for firm i in year t, deflated by stock price. Due to interpretation issue, we multiply -1 on the absolute value of the difference between actual earnings and earnings forecast of an analyst. The higher value of accuracy indicates that analysts issue more accurate forecasts. If analysts' coverage may not monitor and detect management's misbehavior due to affiliation issue, analysts' forecast accuracy can be more adequate factor to monitor management's tax aggressiveness. Therefore,

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we investigate whether analysts with accurate earnings forecast can reduce managers' tax aggressiveness.

Sample Selection

We conduct our tests using a sample of Korean companies from 2001 to 2011. We extract annual accounting data from TS2000. We obtain analysts' one-year-ahead earnings forecasts, institutional ownership and foreign ownership data from Fn-Guide.

As of April of each year, we select companies that satisfy the following criteria. First, we require that observations have necessary data to compute main variables in the regressions. To satisfy these criteria, all observations should have annual financial statement data and industry identification codes from TS2000. Consistent with prior studies, we exclude financial institutions and insurance companies from the sample. Lastly, we select firms with December fiscal year-end. In order to mitigate the influence of extreme observations, we winsorized all dependent and independent variables at the 1% and 99% levels.

In this paper, we have a final sample of 883 annual firm-year observations from KOSPI and KOSDAQ listed companies between 2001 and 2011. We present the observations by the fiscal year in Panel A and by industry group in Panel B respectively in Table 1.

Table 1
SAMPLE DISTRIBUTION

Panel A: Sample Distribution by Year

Year	Number of Observations
2001	2
2002	6
2003	25
2004	45
2005	63
2006	107
2007	91
2008	89
2009	108
2010	178
2011	169
Total	**883**

Panel B: Sample Distribution by Industry

Industry	Number of Observations
Grocery and Beverage	97
Fiber and Cloth	29
Lumber and Pulp	31
Chemistry Material and Product	74
Medical Material and Product	36
Rubber and Plastic Product	19
Nonmetallic Mineral	6

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Primary Metal	43
Processing of a Metal	3
Electronic Components, Computer, Screen, Sound	114
Medical, Precision and Optical Instrument and Watch	10
Electronic Equipment	44
Other Machinery and Equipment	74
Car and Other Transportation Equipment	67
Construction	55
Wholesale and Retail Trade	63
Transportation	28
The Publishing Business	9
Picture, Audio, Broadcasting, Telecom and Information service.	117
Service and Others	81
Total	**883**

EMPIRICAL RESULTS

Descriptive Statistics

Table 2 provides descriptive statistics about tax aggressiveness, analysts' forecast accuracy, analysts' coverage, and other control variables in the sample period. The mean (median) of the arithmetic average of abnormal ETR (Abnormal ETR) is 0.053 (0.030). Mean (median) of analysts' forecast accuracy and analysts' coverage are – 0.043(-0.026) and 7.441(5). The mean (median) and distribution of control variables (SIZE, ROA, INTAN, INVEN, LEV, OCF, BIG4) are generally consistent with prior Korean evidence (Yoo et al., 2008; Yoo et al., 2010).

Table 2 presents the distributions of main variables. Abnormal ETR is the absolute value of abnormal GAAP ETR as the difference between five year average GAAP ETR of firm and the five year average GAAP ETR of industry peers. COVERAGE is the number of analysts who follow the firm. ACCURACY is the analysts' earnings forecast accuracy. SIZE is the natural log of total assets. ROA is return on assets. INTAN is the intangible assets divided by lagged total assets. INVEN is the inventory assets divided by lagged total assets. LEV is long-term debt plus short-term debt scaled by lagged total assets. OCF is operating cash flows. BIG4 is an indicator variable equal to 1 if a firm is audited by one of Big 4 audit firms, and 0 otherwise.

Table 2
DESCRIPTIVE STATISTICS

Variables	No. of Observations	Mean	Std. Dev.	1%	5%	10%	25%	Median	75%	90%	95%	99%
Abnormal ETR	883	0.053	0.059	0.000	0.000	0.000	0.000	0.030	0.090	0.141	0.164	0.210
NUMEST	883	7.441	6.479	1.000	1.000	1.000	2.000	5.000	12.000	19.000	21.000	21.000
ACCURACY	883	-0.043	0.046	-0.173	-0.173	-0.115	-0.055	-0.026	-0.011	-0.003	-0.003	-0.002
SIZE	883	13.300	1.462	11.088	11.088	11.088	12.116	13.133	14.271	15.583	16.184	16.184
ROA	883	0.073	0.062	-0.033	-0.033	-0.001	0.028	0.064	0.115	0.163	0.203	0.203
INTAN	883	0.016	0.022	0.000	0.000	0.000	0.001	0.005	0.019	0.052	0.079	0.079
INVEN	883	0.104	0.083	0.000	0.000	0.003	0.039	0.089	0.148	0.229	0.295	0.295
LEV	883	0.476	0.218	0.133	0.133	0.182	0.296	0.466	0.622	0.791	0.913	0.913

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OCF	883	0.089	0.085	-0.053	-0.053	-0.018	0.025	0.079	0.141	0.209	0.274	0.274
BIG4	883	0.194	0.395	0.000	0.000	0.000	0.000	0.000	0.000	1.000	1.000	1.000

Multivariate Analysis

Table 3 presents the regression results for the effect of analysts' forecast accuracy on firms' tax aggressiveness. In column (1) and (2), we partition our sample into non-aggressive and aggressive sample. The non-aggressive sample is that firms have higher ETR compared to their industry peers while the aggressive sample is the firms with lower ETR.

The first column (1) and (2) in table 3 shows that the coefficient on NUMEST is insignificant with tax aggressiveness. This empirical results support that there is no significant relation between tax avoidance and analysts' coverage in Korea.

Table 3 presents the cross-sectional regressions of analysts' coverage on the tax avoidance with control variables. The regression equations are as follows. Non-aggressive sample is that firms have higher ETR compared to their industry peers while aggressive sample is the firms with lower ETR.

$$AbnormalETR_{ijt}=\beta_0+\beta_1 COVERAGE+\beta_2 SIZE+\beta_3 ROA+\beta_4 INTAN+\beta_5 INVEN+\beta_6 LEV+\beta_7 OCF+\beta_8 BIG4+IndustryDummies+Year\ Dummies+\varepsilon$$

Table 3
REGRESSION RESULTS OF THE EFFECT OF ANALYSTS' COVERAGE ON TAX AVOIDANCE

	(1) Non-Aggressive Subsample		(2) Aggressive Subsample	
Variable	**Coefficient**	**t-statistic**	**Coefficient**	**t-statistic**
Intercept	-0.048**	-2.05	0.004	0.07
NUMEST	0.000	0.88	-0.000	-0.40
SIZE	0.003	1.50	-0.005	-1.14
ROA	-0.061**	-1.67	0.088	1.23
INTAN	0.054	0.63	-0.208	-1.33
INVEN	0.063***	2.78	-0.011	-0.23
LEV	0.008	0.86	-0.027	-1.34
OCF	0.015	0.58	-0.080	-1.57
BIG4	-0.005	-1.21	-0.011	-1.13
Year	Included		Included	
Industry	Included		Included	
Adj.R2	27.81		8.42	
No. of obs.	615		268	

Note: ***, **, * indicate significance level at the 1 percent, 5 percent, and 10 percent respectively.
See the notes of Table 2 for the definitions of the variables.
Non-aggressive sample is that firms have higher ETR compared to their industry peers while aggressive sample is the firms with lower ETR.

It implies that even though analysts monitor the management's misbehavior, the quantity does not affect to reduce those abnormal tax planning activities. Therefore, to mitigate manager's misbehavior, analysts should have enough ability or authority such as nominating STAR-Analysts or accurate analysts. As such, we investigate whether accurate analysts could reduce manager's tax aggressiveness.

The column (1) of Table 4 is the non-aggressive subsample with higher ETR firms relative to their industry peers. Higher ETR indicates less possibility of divulgement of tax evasion, but it is also perceived as having an inefficient tax strategy. Annur, Salihu, and Obid

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(2014) find that tax aggressiveness is benefitial to the firm and shareholders in form of tax savings, and managers pursue efficient tax strategy. Therefore, investors demand managers to execute efficient tax planning, so higher ETR is not always good signal to capital market investors. In this case, we expect that more accurate analysts try to reduce abnormal ETR for more efficient tax planning. In column (1) of Table 4, we find the negative relation between tax aggressiveness and analysts with higher accuracy implying that analysts can reduce firms' inefficient tax planning.

The column (2) of Table 4 is the aggressive subsample. The firms in this sample have lower ETR compared to their industry peers. It indicates that they are engaged in more aggressive tax avoidance. If accurate analysts cover this firm and monitor the management's aggressive tax planning, the manager of the firm might reduce their abnormal activities. From the results, we find that there is positive coefficient on ACCURACY, indicating that analysts with higher forecast accuracy encourage managers to raise ETR and decrease too aggressive tax avoidance activities.

Table 4 presents the cross-sectional regressions of analysts' forecast accuracy on the tax avoidance with control variables. The regression equations are as follows.

$$AbnormalETR_{ijt}=\beta_0+\beta_1 ACCURACY+\beta_2 SIZE+\beta_3 ROA+\beta_4 INTAN+\beta_5 INVEN+\beta_6 LEV+\beta_7 OCF+\beta_8 BIG4+IndustryDummies+Year\ Dummies+\varepsilon$$

Table 4
REGRESSION RESULTS OF THE EFFECT OF ANALYSTS' FORECAST ACCURACY ON TAX AVOIDANCE

	(1) Non-Aggressive Subsample		(2) Aggressive Subsample	
Variable	**Coefficient**	**t-statistic**	**Coefficient**	**t-statistic**
Intercept	-0.065***	-3.27	0.029	0.74
ACCURACY	-0.101**	-2.50	0.142*	1.71
SIZE	0.004***	2.78	-0.006**	-2.24
ROA	-0.042	-1.15	0.064	0.90
INTAN	0.058	0.68	-0.233	-1.54
INVEN	0.056**	2.48	-0.011	-0.33
LEV	0.003	0.30	-0.027	-0.95
OCF	0.023	0.90	-0.080	-1.61
BIG4	-0.005	-1.10	-0.011	-0.88
Year	Included		Included	
Industry	Included		Included	
Adj.R2	28.48		9.43	
No. of obs.	615		268	

Note: ***, **, * indicate significance level at the 1 percent, 5 percent, and 10 percent respectively.
See the notes of Table 2 for the definitions of the variables.
Non-aggressive sample is that firms have higher ETR compared to their industry peers while aggressive sample is the firms with lower ETR.

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SENSITIVITY TEST

Kang et al., (2018) find that institutional investors incorporate sell-side analyst's information into their stock trading only when sell-side analyst' earnings forecasts are accurate and suggest that institutional investors contribute to the stock market efficiency in Korean stock market. Accordingly, in sensitivity test, we consider the external corporate governance factors such as institutional investors and foreign investors who monitor the managements' extreme tax avoidance planning. According to the prior research, the higher ownership of institutional investors and foreign investors reduce the tax avoidance. Also, the institutional investors tend to rely on the sell-side analysts' earnings forecast information when the forecast information is more accurate (Chen et al., 2006). Therefore, the information interaction between the investors and analysts would more encourage avoiding the management's extreme tax planning. In this paper, we examine the effect of the accurate earnings forecast of analysts and the management's extreme tax avoidance planning under stronger external corporate governance system.

We use institutional ownership and foreign ownership as a proxy for firms' external corporate governance scheme. We split our sample into two groups. One group has higher institutional ownership (foreign ownership) and other group has lower institutional ownership (foreign ownership) respectively. To examine it, we repeat our analysis with Equation (7) using subsamples. In Table 5, as expected we find there is a stronger relation between analysts' forecast accuracy and tax aggressiveness under the higher institutional ownership or foreign ownership.

Table 5 presents the cross-sectional regressions of analysts' forecast accuracy on the tax aggressiveness with control variables. We impose corporate governance condition such as institution ownership and foreign ownership. The regression equations are as follows.

$$AbnormalETR_{ijt}=\beta_0+\beta_1 ACCURACY+\beta_2 SIZE+\beta_3 ROA+\beta_4 INTAN+\beta_5 INVEN+\beta_6 LEV+\beta_7 OCF+\beta_8 BIG4+IndustryDummies+YearDummies+\varepsilon$$

Table 5
REGRESSION RESULTS FOR IMPACT OF CORPORATE GOVERNANCE ON RELATION BETWEEN TAX AGGRESSIVENESS AND ANALYSTS' FORECAST ACCURACY

	(1) Institution Ownership				(2) Foreign Ownership			
	High		Low		High		Low	
Variable	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
Intercept	-0.069**	-2.38	-0.094***	-3.41	-0.070**	-2.42	-0.091***	-2.80
ACCURACY	-0.126**	-2.23	-0.105*	-1.79	-0.191***	-3.02	-0.082	-1.56
SIZE	0.004*	1.93	0.005***	2.69	0.004**	1.97	0.005**	2.10
ROA	-0.095*	-1.71	-0.028	-0.59	-0.096*	-1.82	-0.059	-1.17
INTAN	0.290**	2.42	0.163	1.50	0.345***	2.74	0.161	1.51
INVEN	-0.011	-0.30	0.101***	3.38	0.067*	1.88	0.038	1.24
LEV	0.008	0.58	0.009	0.74	-0.003	-0.25	0.020	1.52
OCF	0.048	1.23	0.028	0.89	0.025	0.68	0.052	1.50
BIG4	-0.037	-0.54	0.002	0.26	0.001	0.19	-0.004	-0.53
Year	Included		Included		Included		Included	
Industry	Included		Included		Included		Included	

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Adj.R2	23.06	27.10	28.66	22.85
No. of obs.	442	441	442	441

Note: ***, **, * indicate significance level at the 1 percent, 5 percent, and 10 percent respectively.
See the notes of Table 2 for the definitions of the variables.
If firms have more median value of institutional (foreign) ownership, it is classified as higher institutional (foreign) ownership, otherwise it is classified as lower institutional (foreign) ownership group.

In conclusion, tax aggressiveness is not associated with analysts' coverage in Korea. However, there is the negative relation between analysts' forecast accuracy and tax aggressiveness. It indicates analysts' coverage cannot afford to reduce manager's abnormal tax activities, but their accurate information can mitigate manager's misbehavior. Also, we find that analysts' monitoring role is pronounced when the firms have higher institutional or foreign ownership. Finally, we conclude that effective external monitoring mechanism like institutional (foreign) investors and analysts can constrain manager's tax aggressiveness.

CONCLUSION

This paper examines whether analysts mitigate management's extreme tax planning. In the prior literature, analysts' coverage and analysts' forecast accuracy are important components to detect managements' misbehavior. As a large number of analysts follow the firm, the firm has difficulty to use discretion to incur a reputational loss. Also, if analysts are well-known the firms' overall circumstances, the firms are not likely to do abnormal activities. However, if management is influential on analysts, analysts cannot play a monitoring role. Especially, there is the unique feature such as Chaebol in Korea. Chaebol has substantial power to Korean economy and management of Chaebol holds a dominant position to analysts. Therefore, analysts' coverage could not monitor management properly. In this paper, we examine whether the more accurate analysts mitigate management's extreme corporate tax avoidance.

Using Korean listed companies from 2001 to 2011, we find that monitoring role of analysts' coverage does not affect the management's extreme corporate tax avoidance behavior. However, we find analysts with accurate ability can mitigate manager's extreme level of tax aggressiveness. We find that analysts with higher accuracy lower the firms' effective tax rate when the firms have higher tax rate compared to their industry peers. It implies that when the firm pays excessive tax expense compared to the industry average, analysts advise the management to plan more efficient tax strategy by paying less tax expense. On the other hand, if the firms have the lower tax rate, analysts encourage management to raise tax expense because the reputation risk increases under the aggressive corporate tax avoidance. Moreover, these analysts' monitoring role is pronounced when analysts follow the firms with strong corporate governance.

This paper may shed some light on accounting researchers and tax authorities who are interested in the impact of the analyst's information on the corporate tax planning. We extend the prior literature on corporate tax planning by suggesting the relationship between analysts' coverage, the analysts' earnings forecast accuracy and corporate tax planning.

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