세무와회계저널
제25권 제2호 2024년 4월 pp.83～105
한국세무학회

https://doi.org/10.35850/KJTA.25.2.03
ISSN 1738－3323

# The Relation between ESG Activities and Investors' Heterogeneous Beliefs*

Hyun－Uk Jung** · Sun－Young Byun***

〈Abstract〉

We hypothesize that ESG activities would have a negative relation with investors' heterogeneous beliefs and conduct an empirical test. We use trading volume as a proxy for investors' heterogeneous beliefs.

As a result of the analysis, ESG activities are found to have a negative (－) relation with trading volume. This indicates that investors believe that companies that actively perform ESG activities have a high incentive to produce high accounting information. In other words, companies actively performing ESG activities are judged to have a low-trading volume because information risk is low.

We conduct additional tests by separating ESG components into Environmental responsibility (E), Social responsibility (S), and Governance (G). As a result of additional tests, the governance index (G) is found to have a negative (－) relation with trading volume, but Environmental responsibility (E) and Social responsibility (S) are found to have no relation with trading volume. According to the results of these additional tests, the main result is the effect of Governance among ESG components.

This study is expected to have a contribution in that it analyzes how investors judge ESG activities when making investment decisions. In addition, this study is judged to have a contribution in that it presents empirical data that companies with high levels of ESG activities can have low information risks perceived by investors.

〈Key words〉 ESG Activities, Investors' Heterogeneous Beliefs, Trading Volume, Information Risk

* This work is supported by the Dong-A University research fund.

** Associate Professor, School of Business, Dong-A University, biglotos@dau.ac.kr, First Author
*** Associate Professor, School of International Trade, Dong-A University, byeunsy@dau.ac.kr, Corresponding Author

논문접수일 2024년 1월 17일　　1차수정일 2024년 3월 5일　　게재확정일 2024년 3월 14일

# Ⅰ. Introduction

The purpose of this study is to analyze the relation between a firms' ESG activities and investors' heterogeneous beliefs. Specifically, this study aims to analyze how a firm's ESG activities affect investors' heterogeneous beliefs about intrinsic value.

As new information enters the market, trade continues until an equilibrium price is established (Choi and Yoon 2012 ; Jung 2016b). In other words, new information indicates that individual investors have different beliefs (or heterogeneous interpretations), which is an important factor in increasing trading volume (Morse 1981 ; Bamber 1987 ; Choi and Yoon 2012 ; Jung 2016a). In this respect, trading volume is used as a proxy for different (heterogeneous) beliefs (interpretations) among investors about the investment target firms (Karpoff 1986 ; Bamber 1987 ; Chung 1990 ; Ajinkya et al. 1991 ; Jung and Lee 2016).

In studies related to trading volume, information risk is low in firms that produce high quality of accounting information and have excellent governance structure, so investors' heterogeneous beliefs appear to be low (Jung and Moon 2017 ; Sohn et al. 2008 ; Jung 2016a ; Jung and Byun 2017 ; Jung and Mun 2021). On the other hand, in previous studies related to ESG activities, two conflicting theories about ESG activities are presented.

The first is that a firm's ESG activities are conducive to business performance, so a high level of ESG activities increases corporate value (Kang and Jung 2020 ; Park and Han 2021 ; Deng and Cheng 2019). As a research result that supports this logic, Park and Kim (2017) and Ji (2019) present the results that the quality of accounting information is excellent because the level of earnings management is low in the case of firms that perform ESG activities.

In addition, Rhee et al. (2021) report that the higher the level of ESG activities, the lower the volatility of operating income. And Cheung and Rhee (2020) report that ESG activities reduce the information asymmetry. Following this logic, a firms' ESG activities can be a factor in lowering investors' heterogeneous beliefs.

We use average daily trading volume and abnormal daily average trading volume as proxies for investors' heterogeneous beliefs. ESG indicators use data provided by the Korea Institute of Corporate Governance and Sustainability (KCGS).

As a result of analysis by setting the sample period from 2016 to 2021, it is found that ESG activities have a negative (−) relation with trading volume. This is found to be consistent with Tobit analysis. According to these results, it can be interpreted that investors judge that firms that perform high−level ESG activities have a high incentive to produce high−quality accounting

information.

We additionally separate ESG indicators into environmental responsibility (E), social responsibility (S), and governance (G) to test the relation between each of the E, S and G indicators and investors' heterogeneous beliefs. As a result of the test, it is found that E and S indicators have no relation with trading volume, but G indicator has a negative (−) relation with trading volume. This is found to be consistent with Tobit analysis.

The results of the additional test indicate that among the components of ESG indicators, only governance structure reduces investors' heterogeneous beliefs. It is judged that the main result of this study that a firms' ESG activities reduce investors' different beliefs appears as an effect of governance among ESG components.

We are expected to have contributions in that we test how investors judge a firms' ESG activities and reflect them in their investment decisions. In addition, we believe that there will be a contribution in that we present data that high ESG activities can reduce information risk perceived by investors.

In Chapter Ⅱ of this study, precedent research on heterogeneous belief (trading volume) among investors, precedent research related to a firms' ESG activities, and hypotheses are presented. In Chapter Ⅲ, the research model, proxy (measurement) of investors' heterogeneous beliefs (trading volume), and sample selection are presented, and in Chapter Ⅳ, the test results and interpretation of the hypotheses are described. And in Chapter Ⅴ, the conclusion is presented.

# Ⅱ. Prior Research and Hypotheses

## 1. Prior research on trading volume

As new information enters the market, trade continues until an equilibrium price is established (Choi and Yoon 2012 ; Jung 2016b). This suggests that trading volume increases (decreases) when investors' beliefs about the intrinsic value of the investee firm are heterogeneous (consistent) (Morse 1981 ; Bamber 1987 ; Choi and Yoon 2012 ; Jung 2016a). Therefore, in studies related to trading volume, trading volume is used as a proxy variable for heterogeneous beliefs among investors about investment target companies (Karpoff 1986 ; Bamber 1987 ; Chung 1990 ; Ajinkya et al. 1991 ; Jung and Lee 2016).

Early studies related to trading volume limit the period during which net income is disclosed, and then test the information effect of net income using trading volume (Bamber 1987 ; Bamber

and Cheon 1995 ; Chung 1990 ; Hwang 1995 ; Choi and Shin 1997). According to the results, at the time of disclosure of net income, net income has a positive (+) relation with trading volume. In other words, this indicates that high unexpected net income is causing differences in interpretation among investors (Morse 1981 ; Bamber 1987).

However, Choi and Shin (1997) report that the trading volume reaction due to the disclosure of net income can be relatively small when the information environment is excellent. An excellent information environment implies that there is a lot of information exposed to the market. In this respect, disclosure of the net income of companies with a lot of information exposed to the market does not work as an incentive to increase investors' heterogeneous beliefs (Chung 1990 ; Ziebart 1990).

Bhattacharya et al. (2012) explains that information risk can be reduced when the quality of accounting information (the quality of accruals) is high. This suggests that high-quality accounting information can reduce investors' heterogeneous beliefs. In this context, Sohn et al. (2008) report that companies that produce high quality accounting information have a low abnormal trading volume during the net income disclosure period.

A recent study related to trading volume is conducting an empirical test without limiting the period of 'net income disclosure time'. Jung and Moon (2017) report that a high level of matching reduces different beliefs among investors, resulting in a decrease in trading volume.

A good-matching level is an incentive to produce high-quality accounting information (Paek 2011). In this case, high earnings quality can act as an incentive to reduce investors' heterogeneous beliefs. In this regard, Jung (2016a) presents the result that there is a negative (-) relation between earnings persistence and trading volume. In addition, Jung and Mun (2021) presents a result that has a positive (+) relation between earnings management and trading volume, although the results are limited to the logistics industry.

Accounting information is highly likely to be related to corporate governance (Ahn et al. 2005 ; Choi and Yoon 2006 ; Kim et al. 2012). This suggests that corporate governance can influence investors' decision-making. Therefore, studies related to trading volume suggest that corporate governance affects investors' heterogeneous beliefs (Jung and Byun 2017 ; Byun and Jung 2017).

Byun and Jung (2017) suggest that foreign investors use their excellent information analysis ability to make investment decisions, so companies with high foreign ownership have low trading volume. Jung (2016a) reports that the trading volume decreases when an industry special auditor conducts an audit.

In addition, Jung and Byun (2017) explain that switching to a holding company system can be an incentive to reduce trading volume, as conversion to a holding company system improves

ownership structure. Summarizing the studies of trading volume above, high (low) accounting information quality, good (weak) governance and low (high) information risk appear to lower (higher) investors' heterogeneous beliefs.

## 2. Previous studies related to ESG activities and hypotheses

In previous studies related to ESG activities, two conflicting research results on ESG activities are presented. The first is that a firm's ESG activities help to improve the management performance (firm value) (Kang and Jung 2020 ; Park and Han 2021 ; Deng and Cheng 2019). They explain that ESG activities can be a strategy to secure competitive advantage by increasing consumers' loyalty, so companies should continuously perform ESG activities.

High business performance can be an incentive to lower earnings management. In this case, it is judged that companies that perform high-level ESG activities can have a low level of earnings management. In this respect, Park and Kim (2017) presents the result that a firms' ESG activities have a negative (-) relation with profit management (discretionary accrual and real activities). Ji (2019) explains that a firm's ESG activities can be a positive factor in the reliability of accounting information.

High reliability of accounting information is an incentive to increase the credit rating of corporate bonds (Kim et al. 2006 ; Park et al. 2012). Therefore, Na et al. (2013) report the result that a high level of ESG activities has a positive effect on corporate bond credit rating calculation and lowers the cost of debt.

Leem et al. (2019) report that ESG activities have a negative (-) relation with cost of equity. Kang and Jung (2020) report that a firm's ESG activities have a positive (+) relation with Tobin Q (firm value). In this respect, Hanson (2013) explains that investors should consider ESG activities when selecting investment targets.

High-ESG activities must be accompanied by an expense (Rhee et al. 2021). Therefore, some preceding studies related to ESG suggest that a firm's ESG activities have a negative effect on firms in terms of opportunity cost (Fisher-Vanden and Thorburn 2011 ; Byun 2018 ; Jang and Hong 2020 ; Yoo and Hong 2019 ; Rhee et al. 2021). They explain that a firm's ESG activities are negatively affecting shareholder wealth maximization.

Fisher-Vanden and Thorburn (2011) presents the result that companies that disclose membership in the 'EPA (Environmental Protection Agency)'s Climate Leaders program' have a negative (-) correlation with abnormal stock returns. This is also shown in domestic studies. Specifically, Byun (2018) presents a result that a firms' ESG activities reduce firm value.

Shin and Park (2022) report that the control mechanism through ESG does not work when managers are faced with incentives for earnings management. Shin and Park (2022) explain that ESG activities can lower earnings management only when combined with external governance. This suggests that ESG activities can lower earnings management only when an excellent information environment is secured.

Yoo and Hong (2019) test the relevance between a firms' ESG activities and discretionary accrual and real activities (earnings management). As a result, it is found to have a positive (+) relation between ESG activities and earnings management.

Jang (2008) and Richardson (2000) explain that companies with high information risk (information asymmetry) have a high incentive to show high levels of earnings management. In this context, the results of Yoo and Hong (2019) suggest that companies with high levels of ESG activities may have high information risks. This suggests that companies with higher information risk can use ESG activities as incentives to send positive signals to market investors.

Meanwhile, high quality of accounting information (low-earnings management) reduces investors' heterogeneous beliefs (Jung and Moon 2017 ; Sohn et al. 2008 ; Jung and Mun 2021). Park and Kim (2017) report that a high level of ESG activities acts as a factor that lowers the level of earnings management.

Rhee et al. (2021) report that companies with high levels of ESG activities have low-volatility of operating income. And Ji (2019) reports that there is a positive (+) relation between ESG activities and the earnings quality. And Cheung and Rhee (2020) report that ESG activities reduce the information asymmetry. Following this logic, a firms' ESG activities can be a factor in lowering investors' heterogeneous beliefs. Therefore, we established the following hypothesis.

Research hypothesis : A firms' ESG activities will have a negative relation with investors' heterogeneous beliefs.

# Ⅲ. Research Methodology

## 1. Research model

In this study, the following equation (1) is established to test the effect of a firms' ESG activities on investors' heterogeneous beliefs.

$$TV_{i,t} = \beta_0 + \beta_1 ESG_{i,t} + \beta_2 BIG_{i,t} + \beta_3 LEV_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 GRW_{i,t} + \beta_6 HIS_{i,t} + \beta_7 SMO_{i,t} + \beta_8 EXP_{i,t} + \beta_9 FOR_{i,t} + \beta_{10} ROA_{i,t} + \beta_{11} YD_{i,t} + \beta_{12} IND_{i,t} + \epsilon_{i,t} \quad (1)$$

TV : Trading volume (a proxy for investors' heterogeneous beliefs)
TV1 : Trading volume1 (average daily trading volume)
TV2 : Trading volume2 (abnormal daily average trading volume)
ESG : ESG index
BIG : Audit quality(auditor size (1 if auditor is big4, 0 otherwise))
LEV : Debt ratio (total $debt_t$/total $assets_t$)
SIZE : Size (ln (total $assets_t$))
GRW : Sales growth rate(($sales_t - sales_{t-1}$)/$sales_{t-1}$)
HIS : History (ln(number of months listed))
SMO : Income smoothing ((Standard deviation of '(net income before tax/average total assets)' for 5 years/'(cash flow from operating activities/average total assets)' standard deviation for 5 years)×(−1))
EXP : Export rate
FOR : Average foreign share
ROA : Return on asset (net $income_t$/total $assets_t$)
YD : Year dummy
IND : Industry dummy

If $\beta_1$ in equation (1) presents a positive (+) sign, it can be interpreted that a firms' ESG activities increase investors' heterogeneous beliefs. Conversely, when $\beta_1$ in equation (1) shows a negative (−) sign, it indicates that a firms' ESG activities act as an incentive to lower investors' heterogeneous beliefs.

BIG is to control the effect of audit quality on trading volume. Jung (2016a) explains that investors' heterogeneous beliefs decrease when auditors provide high audit quality to audited companies. In this regard, BIG is expected to have a negative (−) sign in equation (1).

Jung (2016b) reports that high bankruptcy risk increases differing beliefs among investors. This study includes LEV in equation (1) to control the effect of bankruptcy risk on trading volume, and LEV is expected to have a positive (+) sign.

SIZE is to control the effect of firm size on trading volume (Chung 1990), and GRW is to control the effect of sales growth rate on trading volume. Bhushan (1989) reports that the information environment has a positive (+) relation with size. Considering the method of measuring sales growth rate, a firm with a small size can have a high sales growth rate. Therefore, SIZE and GRW are expected to have negative (−) and positive (+) signs in equation (1), respectively.

Chung (1990) explains that firms with a long history have excellent information environments. In this case, a firm with a long history is expected to have a low trading volume. According to Jung (2020), empirical results suggest that there is no relation between a firm's history and trading volume. Although this study includes HIS in equation (1) to control the effect of history on trading volume, but does not predict the expected sign.

SMO is to control the effect of income smoothing on trading volume. Specifically, the SMO includes in equation (1) is measured using the methodology of Yang et al. (2007). Jung and Mun (2021) limit the sample to the logistics industry, but reported that high-level earnings management increases investors' heterogeneous beliefs. Consistently, Sohn et al. (2009) explain that high quality of accounting information is an incentive to reduce trading volume. In this respect, the SMO includes in equation (1) is expected to have a negative (−) sign.

EXP is to control the effect of a firm's reputation on trading volume. Lin and Shiu (2003) and Ahn et al. (2005) explain that companies with a high export ratio can have a good reputation. It is judged that a good reputation can cause low information risk. EXP includes in equation (1) is expected to have a negative (−) sign.

Kim and Kim (2007) explain that a high foreign ownership ratio can be a factor in lowering agency costs. Therefore, Byun and Jung (2017) report that a high foreign ownership ratio reduces trading volume. In this study, FOR is includes in equation (1) to control the effect of agency cost on trading volume, and FOR is expected to have a negative (−) sign.

The ROA includes in equation (1) is intended to control the effect of profitability on investors' heterogeneous beliefs. Beaver (1968) explained that abnormal-net income implies an information effect. In this case, ROA is expected to have a positive (+) sign. YD and IND include in equation (1) are for controlling year and industry effects.

## 2. A proxy (measurement) of investors' heterogeneous beliefs (trading volume)

Bamber (1987) explains that trading volume increases when investors' heterogeneous beliefs (disagreement) about a target firm increase. In this respect, studies related to trading volume use trading volume as a proxy for investors' heterogeneous beliefs (Ziebart 1990 ; Chung 1990 ; Ajinkya et al. 1991 ; Choi and Shin 1997 ; Sohn et al. 2009 ; Jung and Lee 2016).

This study applies the methodology of Jung and Lee (2016) in relation to measuring trading volume. Specifically, this study intends to measure the trading volume (TV) with TV1 and TV2. The measurement method of TV1 and TV2 is presented in the equation below.

$$TV1_{i,NF} = \left[\sum_{t=1}^{n} V_{it}\right] \times \frac{1}{T_{NF}} \quad (2)$$

$$TV2_{i,NF} = \left[\sum_{t=1}^{n} (V_{it} - V_{mt})\right] \times \frac{1}{T_{NF}} \quad (3)$$

TV1 : Daily average trading volume (trading volume1)
TV2 : Abnormal daily average trading volume (trading volume2)
$V_{i,t}$ : Trading volume of firm i on day t/number of listed shares of firm i on day t
$V_{mt}$ : Total trading volume of the market (securities) on day t/Total number of listed shares in the market (securities) on day t
$T_{NF}$ : Number of trading days

TV1 in equation (2) above represents the daily average trading volume. However, TV1 in equation (2) does not indicate whether an individual firm's stock trading volume has a positive (+) abnormal trading volume or a negative (−) abnormal trading volume. Therefore, this study attempts to additionally measure the abnormal daily average trading volume as shown by TV2 in equation (3).

In this case, if TV2 of an individual firm is higher than zero (0), it can be interpreted as a positive (+) abnormal trading volume. Conversely, if the TV2 of an individual firm is lower than zero (0), it can be interpreted that a negative (−) abnormal trading volume has occurred.

## 3. Sample selection

From 2016 to 2021, we try to select as a sample that satisfy the following conditions for non-financial firms among KOSPI-listed firms.

(1) Firms that can collect trading volume, foreign ownership ratio, audit firm, financial data, and listing date data from NICE's Kis-Value
(2) Firms that can acquire the ESG index of the Korea Institute of Corporate Governance and Sustainability (Hereinafter referred to as 'KCGS')
(3) Excluding firms whose fiscal year is not December, firms whose audit opinion is not unmodified, and firms whose capital is negative (−).

There are 3,049 firms (firm-year) that satisfied all of the conditions presented above. <Table 1> presents the distribution by year for the final sample of 3,049 firms (firm-year). Although not

provided in <Table 1>, it is found that about 73% of sample companies belonged to ‘professional, scientific and technical services’ and ‘wholesale and retail’.

〈Table 1〉 Distribution by year

| | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | Total |
|---|---|---|---|---|---|---|---|
| Total | 384 | 481 | 407 | 481 | 646 | 650 | 3,049 |

# Ⅳ. Empirical Test

## 1. Descriptive statistics and correlation test of major variables

<Table 2> is the descriptive statistics of the variables shown in equation (1). In <Table 2>, the mean of TV1 is 0.0140, and the median is 0.0054. And the standard deviation of TV1 is 0.0245. The mean of TV2 is −0.0027, and the median is −0.0086. And the standard deviation of TV2 is 0.0236. In particular, the median number of TV2 is lower than zero, suggesting that more than 50% of sample firms have a negative (−) abnormal trading volume.

Jung and Lee (2016) report the mean and median of TV1 as 0.0130 and 0.0063, respectively, and report the standard deviation as 0.0210. And Jung and Lee (2016) report the mean and median of TV2 as −0.0030 and −0.0072, respectively, and the standard deviation is reported as 0.0211. The TVs presented in <Table 2> are judged to be similar to those of Jung and Lee (2016).

In the case of ESG, the mean (median) is 1.9298 (1.0000), and the standard deviation is 1.1546. The minimum and maximum of ESG are 0.0000 and 5.000, respectively. The mean of ESG presented in <Table 2> appears to be higher than the median.

The mean (median) of BIG presented in <Table 2> is 0.6297 (1.0000), and the mean (median) of LEV is 0.3897 (0.3925). The mean (median) of SIZE is 27.1123 (26.7960), and the mean (median) of GRW is 0.0539 (0.0258).

The mean (median) of HIS and SMO is 5.3947 (5.6419) and −1.4249 (−0.9402), respectively, and the mean (median) of EXP and FOR is 0.2168 (0.0493) and 0.1121 (0.0601), respectively. Finally, the mean (median) of ROA is 0.0206 (0.0237).

<Table 2> Descriptive statistics of major variables

| | | Mean | Std. | Min | 25% | Median | 75% | Max |
|---|---|---|---|---|---|---|---|---|
| T | TV1 | 0.0140 | 0.0245 | 0.0000 | 0.0026 | 0.0054 | 0.0136 | 0.4360 |
| V | TV2 | −0.0027 | 0.0236 | −0.0238 | −0.0120 | −0.0086 | −0.0026 | 0.4133 |
| ESG | | 1.9298 | 1.1546 | 0.0000 | 1.0000 | 2.0000 | 3.0000 | 5.0000 |
| BIG | | 0.6297 | 0.4830 | 0.0000 | 0.0000 | 1.0000 | 1.0000 | 1.0000 |
| LEV | | 0.3897 | 0.2106 | 0.0005 | 0.2067 | 0.3925 | 0.5428 | 0.9800 |
| SIZE | | 27.1123 | 1.5121 | 23.2390 | 26.0568 | 26.7960 | 27.9407 | 33.0676 |
| GRW | | 0.0539 | 0.3214 | −0.9994 | −0.0637 | 0.0258 | 0.1282 | 5.7308 |
| HIS | | 5.3947 | 0.8654 | 0.6931 | 4.9273 | 5.6419 | 5.9839 | 6.6567 |
| SMO | | −1.4249 | 1.7503 | −18.7403 | −1.5466 | −0.9402 | −0.5120 | −0.0327 |
| EXP | | 0.2168 | 0.2910 | 0.0000 | 0.0000 | 0.0493 | 0.3868 | 1.0000 |
| FOR | | 0.1121 | 0.1315 | 0.0000 | 0.0218 | 0.0601 | 0.1563 | 0.7923 |
| ROA | | 0.0206 | 0.0855 | −0.6293 | 0.0031 | 0.0237 | 0.0515 | 0.6828 |

Explanation of variables : TV : proxies for investors' heterogeneous beliefs (TV1 : average daily trading volume and TV2 : abnormal daily average trading volume), ESG : ESG index, BIG : audit quality (auditor size), LEV : debt ratio (total $debt_t$/total $assets_t$), SIZE : size (ln (total $assets_t$)), GRW : sales growth rate (($sales_t - sales_{t-1}$)/$sales_{t-1}$), HIS : history (ln(number of months listed)), SMO : income smoothing, EXP : export rate, FOR : average foreign share, ROA : return on asset (net $income_t$/total $assets_t$).

<Table 3> shows the results of the correlation test between the variables shown in equation (1), and TV (TV1 and TV2) has a significant negative (−) correlation with ESG. Although this is a result that does not consider the effect of directionality and control variables, it can be interpreted that the trading volume, which represents heterogeneous beliefs among investors, has a negative (−) correlation with ESG.

Meanwhile, TVs (TV1 and TV2) show significant negative (−) correlations with BIG, SIZE, SMO, FOR, and ROA, and significant positive (+) correlations with LEV, HIS, and EXP. This study shows that the correlation between specific variables is high. Therefore, we check the value of the VIF. As a result of the confirmation, the value of VIF is less than 3.00, which seems to be lower than the 10 (ten) at which multicollinearity problems can occur.

〈Table 3〉 Correlation between major variables

| | TV1 | TV2 | ESG | BIG | LEV | SIZE | GRW | HIS | SMO | EXP | FOR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| TV2 | 0.9715*** | | | | | | | | | | |
| ESG | −0.1588*** | −0.2121*** | | | | | | | | | |
| BIG | −0.2440*** | −0.2112*** | 0.3541*** | | | | | | | | |
| LEV | 0.1173*** | 0.1173*** | 0.1175*** | 0.0097 | | | | | | | |
| SIZE | −0.2976*** | −0.3030*** | 0.6345*** | 0.4636*** | 0.1528*** | | | | | | |
| GRW | 0.0101 | 0.0012 | 0.0252 | 0.0076 | −0.0162 | 0.0236 | | | | | |
| HIS | 0.1059*** | 0.0778*** | −0.0287 | −0.1238*** | 0.0001 | −0.0381** | −0.0085 | | | | |
| SMO | −0.0528*** | −0.0408** | 0.005 | 0.0274 | 0.0692*** | 0.0192 | −0.0243 | −0.0236 | | | |
| EXP | 0.0575*** | 0.0639*** | 0.0041 | −0.0247 | 0.0061 | 0.0119 | 0.0018 | −0.0075 | 0.0542*** | | |
| FOR | −0.2091*** | −0.1943*** | 0.3482*** | 0.2919*** | −0.1290*** | 0.5242*** | 0.0089 | 0.0037 | 0.0638*** | 0.0292 | |
| ROA | −0.1182*** | −0.1068*** | 0.0763*** | 0.1059*** | −0.2508*** | 0.1537*** | 0.2068*** | −0.0093 | 0.0677*** | −0.0398** | 0.1860*** |

1) *** and ** are significant at the 1% and 5% levels.

2) Variables are described in <Table 2>.

## 2. Main results

<Table 4> shows the results of testing the relation between ESG and investors' heterogeneous beliefs. Model 1 in <Table 4> is the result of testing by measuring investors' heterogeneous beliefs with TV1, and model 2 is the result of testing by measuring investors' heterogeneous beliefs with TV2.

According to <Table 4>, the regression sign of ESG shows a significant negative (−) sign in both model 1 and model 2. This suggests that high ESG activities reduce investors' heterogeneous beliefs.

Looking at the results of the control variables, the regression sign of BIG shows a significant negative (−) sign in both model 1 and model 2. This result shows that the expected sign is consistent, indicating that high audit quality reduces heterogeneous trust among investors.

The regression sign of LEV shows a significant positive (+) sign in both model 1 and model 2. High−bankruptcy risk lead to an increase in investors' heterogeneous beliefs and an increase in trading volume. The regression sign of SIZE shows a significant negative (−) sign in both model 1 and model 2. A large firm size can be interpreted as having an excellent information environment and having low investors' heterogeneous beliefs.

The regression sign of HIS is found to be a significant positive (+) sign in both model 1 and model 2. This study does not predict the expected sign for HIS. However, the empirical results show that the age of a firm has a positive (+) relation with the trading volume. This suggests that when the amount of information exposed to the market increases due to the age of a firm, it acts as an incentive to increase trading volume.

The regression sign of SMO shows a significant negative (−) sign in both model 1 and model 2, consistent with the expected sign. We believe that high quality of accounting information leads to low trading volume. The regression sign of EXP appears as a positive (+) sign opposite to the expected sign in both model 1 and model 2. According to these results, it can be interpreted that the trading volume increases when overseas sales are higher than domestic sales among the components of sales.

Summarizing the results in <Table 4>, it appears that firms that perform high−level ESG activities have lower investors' heterogeneous beliefs about intrinsic value. This suggests that, in the case of firms that perform ESG activities, information risk may be low due to the high quality of accounting information. In other words, <Table 4> shows that firms that perform high−ESG activities have high quality of accounting information, so investors' heterogeneous beliefs about intrinsic value are decreasing.

〈Table 4〉 Relation between ESG and investors' heterogeneous beliefs

$$TV_{i,t} = \beta_0 + \beta_1 ESG_{i,t} + \beta_2 BIG_{i,t} + \beta_3 LEV_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 GRW_{i,t} + \beta_6 HIS_{i,t} + \beta_7 SMO_{i,t} + \beta_8 EXP_{i,t} + \beta_9 FOR_{i,t} + \beta_{10} ROA_{i,t} + \beta_{11} YD_{i,t} + \beta_{12} IND_{i,t} + \epsilon_{i,t}$$

| | model 1(TV1), n=3,049 | | model 2(TV2), n=3,049 | |
|---|---|---|---|---|
| | Coef. | t-value | Coef. | t-value |
| (Inter) | 0.1076 | 10.13*** | 0.0959 | 9.03*** |
| ESG | -0.0009 | -1.96** | -0.0009 | -1.96** |
| BIG | -0.0029 | -3.01*** | -0.0029 | -3.01*** |
| LEV | 0.0200 | 9.26*** | 0.0200 | 9.26*** |
| SIZE | -0.0042 | -10.20*** | -0.0042 | -10.20*** |
| GRW | 0.0006 | 0.50 | 0.0006 | 0.50 |
| HIS | 0.0015 | 3.18*** | 0.0015 | 3.18*** |
| SMO | -0.0006 | -2.64*** | -0.0006 | -2.64*** |
| EXP | 0.0049 | 3.48*** | 0.0049 | 3.48*** |
| FOR | 0.0012 | 0.33 | 0.0012 | 0.33 |
| ROA | -0.0024 | -0.48 | -0.0024 | -0.48 |
| YD | included | | | |
| IND | included | | | |
| F-value | 31.10*** | | 19.71*** | |
| Adj.$R^2$ | 0.1980 | | 0.1330 | |

1) *** and ** are significant at the 1% and 5% levels.
2) Variables are described in <Table 2>.

## 3. Additional test

ESG ratings are not announced for all KOSPI-listed firms. In this case, the results in <Table 4> may occur due to sample bias. In this regard, this study retested equation (1) by removing the top and bottom 1% of ESG values for sample firms. <Table 5> is the result of retesting equation (1) by removing the top and bottom 1% of ESG values.

According to <Table 5>, the regression sign of ESG shows a significant negative (-) sign in both model 1 and model 2. Consistent with <Table 4>, high-ESG activities appear to reduce investors' heterogeneous beliefs.

KCGS discloses the values of individual indicators constituting ESG. Specifically, KCGS provides values for individual indicators for E (Environmental responsibility), S (Social responsibility), and G (Corporate governance).

〈Table 5〉 Additional test 1 : Relation between ESG and investors' heterogeneous beliefs
(Result of removing the top and bottom 1% of ESG values)

| | model 1(TV1), n=2,989 | | model 2(TV2), n=2,989 | |
|---|---|---|---|---|
| | Coef. | t-value | Coef. | t-value |
| (Inter) | 0.1078 | 10.03*** | 0.0961 | 8.94*** |
| ESG | −0.0011 | −2.12** | −0.0011 | −2.12** |
| BIG | −0.0028 | −2.86*** | −0.0028 | −2.86*** |
| LEV | 0.0201 | 9.17*** | 0.0201 | 9.17*** |
| SIZE | −0.0042 | −10.11*** | −0.0042 | −10.11*** |
| GRW | 0.0006 | 0.48 | 0.0006 | 0.48 |
| HIS | 0.0016 | 3.23*** | 0.0016 | 3.23*** |
| SMO | −0.0006 | −2.57** | −0.0006 | −2.57*** |
| EXP | 0.0049 | 3.43*** | 0.0049 | 3.43*** |
| FOR | 0.0012 | 0.31 | 0.0012 | 0.31 |
| ROA | −0.0024 | −0.43 | −0.0022 | −0.43 |
| YD | included | | | |
| IND | included | | | |
| F-value | 30.01*** | | 19.01*** | |
| Adj.$R^2$ | 0.1953 | | 0.1383 | |

1) *** and ** are significant at the 1% and 5% levels.
2) Variables are described in <Table 2>.

We separate the elements that make up the ESG index included in equation (1) to additionally test the effect of each ESG constituent element on investors' heterogeneous beliefs. For this additional test, we establish equation (4) below.

$$TV_{i,t} = \beta_0 + \beta_1 E_{i,t} + \beta_2 S_{i,t} + \beta_3 G_{i,t} + \beta_4 BIG_{i,t} + \beta_5 LEV_{i,t} + \beta_6 SIZE_{i,t} + \beta_7 GRW_{i,t} + \beta_8 HIS_{i,t} + \beta_9 SMO_{i,t} + \beta_{10} EXP_{i,t} + \beta_{11} FOR_{i,t} + \beta_{12} ROA_{i,t} + \beta_{13} YD_{i,t} + \beta_{14} IND_{i,t} + \epsilon_{i,t} \quad (4)$$

E : Environmental responsibility
S : Social responsibility
G : Governance
For other variables, see equation (1).

The mean (median) of E is 1.8249 (2.0000), and the mean (median) of S is 2.1325 (2.0000). And the mean (median) of G is 2.3313 (2.0000). For these variables, the minimum and maximum

values are 0.0000 and 5.0000, respectively.

<Table 6> is the result of testing the above formula (4). In <Table 6>, the regression signs of E (Environmental responsibility) and S (Social responsibility) are found to be insignificant in both model 1 and model 2. This can be interpreted as the fact that a firm's environmental responsibility activities and social responsibility activities have nothing to do with trading volume.

〈Table 6〉 Additional test 2 : Relation between individual ESG indicators and investors' heterogeneous beliefs (empirical results of equation (4))

$$TV_{i,t} = \beta_0 + \beta_1 E_{i,t} + \beta_2 S_{i,t} + \beta_3 G_{i,t} + \beta_4 BIG_{i,t} + \beta_5 LEV_{i,t} + \beta_6 SIZE_{i,t} + \beta_7 GRW_{i,t} + \beta_8 HIS_{i,t} + \beta_9 SMO_{i,t} + \beta_{10} EXP_{i,t} + \beta_{11} FOR_{i,t} + \beta_{12} ROA_{i,t} + \beta_{13} YD_{i,t} + \beta_{14} IND_{i,t} + \epsilon_{i,t}$$

| | model 1(TV1), n=3,049 | | model 2(TV2), n=3,049 | |
|---|---|---|---|---|
| | Coef. | t-value | Coef. | t-value |
| (Inter) | 0.1100 | 10.06*** | 0.0983 | 8.99*** |
| E (Environmental responsibility) | −0.0000 | −0.07 | −0.0000 | −0.07 |
| S (Social responsibility) | −0.0001 | −0.15 | −0.0001 | −0.15 |
| G (Governance) | −0.0015 | −2.56** | −0.0015 | −2.56** |
| BIG | −0.0029 | −3.01*** | −0.0029 | −3.01*** |
| LEV | 0.0198 | 9.14*** | 0.0198 | 9.14*** |
| SIZE | −0.0042 | −9.78*** | −0.0042 | −9.78*** |
| GRW | 0.0006 | 0.47 | 0.0006 | 0.47 |
| HIS | 0.0015 | 3.10*** | 0.0015 | 3.10*** |
| SMO | −0.0006 | −2.53** | −0.0006 | −2.53** |
| EXP | 0.0050 | 3.48*** | 0.0050 | 3.48*** |
| FOR | 0.0016 | 0.41 | 0.0016 | 0.41 |
| ROA | −0.0022 | −0.42 | −0.0022 | −0.42 |
| YD | included | | | |
| IND | included | | | |
| F-value | 28.95*** | | 18.40*** | |
| Adj. $R^2$ | 0.1985 | | 0.1335 | |

1) *** and ** means significant at the 1% and 5% levels, respectively.
2) Refer to <Table 2> for description of variables.

The regression sign of G (Governance) shows a significant negative (−) sign in both model 1 and model 2. This indicates that good corporate governance works as an incentive to reduce investors' heterogeneous beliefs, and thus trading volume is decreasing. Combining <Table 4> and

<Table 6>, the result that a firms' ESG activities reduce investors' heterogeneous beliefs is judged to be the result of the effect of governance (G) among the components of ESG.

<Table 4> and <Table 6> above are the results of testing equations (1) and (4) using the ordinary least squares (OLS) method. In the case of TV1, which is the dependent variable of equations (1) and (4), it is a cutoff variable with a value greater than zero (0, zero). Gujarati (2011) suggests using the tobit test when the dependent variable is a cutoff variable. In this regard, this study additionally tests equations (1) and (4) using the Tobit test.

<Table 7> is the result of the Tobit test of equations (1) and (4). Specifically, model 1 and model 2 in <Table 7> are the results of testing equation (1) and equation (4) using TV1 as the dependent variable.

〈Table 7〉 Additional test 3 : Relation between ESG and investors' heterogeneous beliefs (tested by Tobit test)

| | model 1(TV1, equation (1)) | | model 2(TV1, equation (4)) | |
|---|---|---|---|---|
| | Coef. | t-value | Coef. | t-value |
| (Inter) | 0.1076 | 10.18*** | 0.1099 | 10.11*** |
| ESG | −0.0009 | −1.97** | | |
| E (Environmental responsibility) | | | −0.0001 | −0.07 |
| S (Social responsibility) | | | −0.0001 | −0.15 |
| G (Governance) | | | −0.0015 | −2.57*** |
| BIG | −0.0029 | −3.02*** | −0.0029 | −3.03*** |
| LEV | 0.0200 | 9.30*** | 0.0198 | 9.18*** |
| SIZE | −0.0042 | −10.26*** | −0.0042 | −9.83*** |
| GRW | 0.0006 | 0.50 | 0.0006 | 0.47 |
| HIS | 0.0015 | 3.19*** | 0.0015 | 3.12*** |
| SMO | −0.0006 | −2.65*** | −0.0006 | −2.55** |
| EXP | 0.0049 | 3.50*** | 0.0050 | 3.49*** |
| FOR | 0.0012 | 0.33 | 0.0016 | 0.41 |
| ROA | −0.0024 | −0.48 | −0.0022 | −0.42 |
| YD | included | | | |
| IND | included | | | |
| LR $chi^2$ | 697.91*** | | 701.64*** | |

1) *** and ** means significant at the 1% and 5% levels, respectively.

2) Refer to <Table 2> for description of variables.

First, the ESG regression signs of model 1 suggests significant negative (−) signs. This is consistent with the results in <Table 4>, indicating that high ESG activities reduce investors' heterogeneous beliefs, resulting in a decrease in trading volume.

The regression signs of E (Environmental responsibility) and S (Social responsibility) of model 2 are found to be insignificant, but the regression signs of G (Governance) are all significant negative (−) signs. This result is consistent with <Table 6>, indicating that responsibility to the environment and society does not affect trading volume, but good corporate governance reduces investors' heterogeneous beliefs, indicating that trading volume is decreasing.

# Ⅴ. Conclusion

We hypothesize that firms with high−ESG activities would have reduce investors' heterogeneous beliefs and conducted an empirical test. We use trading volume as a proxy for investors' heterogeneous beliefs.

As a result of the test, it is found that ESG activities have a negative (−) relation with trading volume. According to these results, high−ESG activities indicate that investors are acting as an incentive to lower information risk. Therefore, high−ESG activities appear to reduce trading volume.

Additionally, we separate ESG indicators into environmental responsibility (E), social responsibility (S), and governance (G) to test how each indicator relates to investors' heterogeneous beliefs. In other words, we perform an additional test by separating the ESG components into E, S, and G.

As a result of the additional test, governance (G) is found to have a negative (−) relation with trading volume, but environmental responsibility (E) and social responsibility (S) are found to have no relation with trading volume. According to the test of additional test, the main result that there is a negative (−) relation between a firm's ESG activities and investors' heterogeneous beliefs appears to be the effect of governance among ESG components.

This study is expected to have a contribution in that it tests how investors judge a firms' ESG activities and reflect them in their investment decisions. In addition, among the conflicting theories related to ESG activities, we believe that there will be a contribution in that it presents data that a high level of ESG activities may have a low information risk perceived by investors. However, this study has a limitation in that there is a loss of sample in the process of collecting data on a firms' ESG activities.

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# 기업의 ESG 활동이 투자자들 간의 상이한 믿음에 미치는 영향*

정현욱** · 변선영***

〈요 약〉

본 연구는 기업의 활발한 ESG 활동은 투자자들 간의 상이한 믿음을 감소시킬 것이라는 가설을 설정하고 실증분석을 수행하였다. 그리고 본 연구는 거래량을 투자자들 간의 상이한 믿음의 대용치로 사용하였다.

분석결과, 기업의 ESG 활동은 거래량과 음(−)의 관련성을 가지는 것으로 나타났다. 이는 토빗분석을 수행하여도 일관된 것으로 나타났다. 이러한 결과는 ESG 활동의 점수가 높은 기업의 경우 투자자들은 질이 높은 회계정보를 산출할 유인이 높은 것으로 판단하여 결과적으로 거래량이 감소하는 것으로 해석할 수 있을 것이다. 즉, 투자자들은 ESG 활동의 점수가 높은 기업의 경우 정보위험이 낮을 것으로 인식하여 결과적으로 거래량이 감소하는 것으로 해석할 수 있을 것이다.

본 연구는 ESG 구성요소를 환경에 대한 책임(E), 사회에 대한 책임(S) 및 지배구조(G)로 분리하여 추가분석을 수행했다. 추가분석 결과, 지배구조 지표는 거래량과 음(−)의 관련성을 가지는 것으로 나타났지만, 환경에 대한 책임과 사회에 대한 책임은 거래량과 관련성을 가지지 않는 것으로 나타났다. 이러한 결과에 따르면, 기업의 ESG 활동과 투자자들의 상이한 믿음 간에는 음(−)의 관련성을 가지고 있다는 메인(main) 결과는 ESG 구성요소 중 지배구조의 효과로 나타난 것으로 판단된다.

본 연구는 투자자들이 기업의 ESG 활동을 어떻게 판단하고 투자의사결정에 반영하고 있는지를 분석하였다는 점에서 공헌점이 있을 것으로 기대된다. 또한, 본 연구는 기업의 ESG 활동과 관련된 상반된 이론 중 ESG 활동의 수준이 높은 기업의 경우 투자자가 인지하는 정보위험이 낮을 수 있다는 자료를 제시한다는 점에서 기여점이 있을 것으로 판단된다.

〈주제어〉 ESG 활동, 투자자들 간의 상이한 믿음, 거래량, 정보위험

* 이 논문은 동아대학교 교내연구비 지원에 의하여 연구되었음.
** 동아대학교 경영대학 경영학과, 부교수, biglotos@dau.ac.kr, 주저자
*** 동아대학교 경영대학 국제무역학과, 부교수, byeunsy@dau.ac.kr, 교신저자