Does Corporate Sustainability Management Affect Investment Efficiency?*

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Abstract

Purpose - We aim to verify whether CSM activities increase investment efficiency, and to verify whether the influence of CSM activities on investment efficiency is discriminatory depending on whether or not they belong to chaebol.
Design/methodology/approach - Using 4,701 Korean firm-year observations over the 2011-2017 period, we used multiple regression analysis. CSM is measured by the evaluation score of the Korea Corporate Governance Service (KCGS).
Findings - Our study confirms that CSM is a significantly positive relationship with investment efficiency. This shows that, as a result of CSM, the increased earnings quality acts as an incentive to increase investment efficiency. Next, in analysis of a dataset into two groups (a chaebol, non-chaebol), the results show that the relationship between CSM and investment efficiency differs among detailed indicator activities depending on whether or not they belong to chaebol.
Research implications or Originality - It is significant that this study focused on and analyzed CSM as a determinant of investment efficiency, and examined the effects of whether or not it belongs to chaebol in the relationship between CSM and investment efficiency. Our results, which suggested that CSM can increase investment efficiency, are expected to provide important implications not only for managers but also for investors and supervisors.

Ⅰ. Introduction

Corporate sustainability management (hereafter, CSM) is expected to have an impact on efficient investment decision-making, according to previous research findings that CSM reduce information asymmetry and increase the quality of accounting information (Choi and Moon, 2013; Lee and Song, 2014). In addition, under the corporate governance structure of chaebol (large family-owned business conglomerates), the impact of CSM on investment efficiency was predicted to be differentiated, and additional analysis was conducted depending on whether it belongs to chaebol (Jeon and Park, 2008; Jo, 2010).

CSM is a concept that includes corporate social responsibility (hereafter, CSR) that has become essential rather than optional. Furthermore, CSM is a new management paradigm required by companies under the global management environment (Lee and Lee, 2017). Emphasizing social responsibility for sustainable growth has emerged as a major research area. Therefore, the 'Sustainability Report', which includes social performance, e.g., social contribution funds and social consideration for the underprivileged, is becoming an essential element of corporate management (Han and Kang, 2014). CSR can be defined as all activities that promote the value of a sustainable company while simultaneously pursuing the interests of society as a whole. The various stakeholders involved contribute to, environmental management, ethical management, and social welfare while conducting production and operating activities (Chin et al., 2008). From the late 1990s, CSR began to emerge as a new paradigm for management, corporate ethics, corporate citizenship, corporate accountability, corporate sustainability; it can also be expressed as a triple bottom line (Elkington, 1999). In general, CSM has a slightly broader concept than CSR; the former is the ultimate goal to meet in business operations and the latter is an intermediate step towards the goal (Kim and Kim 2018). We use the concept of CSM because the two terms are interrelated and there is criticism that CSR is narrow in scope.

The literature on CSM has investigated the relationship between CSM and firm performance (Lins, 2017; Margolis et al., 2003; Margolis et al., 2007; Shen et al., 2016; Wu, 2013), firm risk (Ameur et al., 2020; Jo and Na, 2012), the impact of CSR on the cost of capital (Ghoul et al., 2011), debt maturity (Benlemlih, 2017), the capital structure (Girerd-Potin, 2011), and information asymmetry (Dhaliwal et al., 2011), earnings quality (Choi and Moon, 2013; Lee and Song, 2014). As such, CSM activities have been emphasized in previous studies, and its role is expected to be expanded. But some areas remain so far unexplored. Recent studies have been conducted in the relationship between CSM and investment efficiency (Samet and Jarboui, 2017). Our paper is related but different from previous literature. This study attempts to examine the relationship between CSM and investment efficiency and corporate governance in emerging markets. There is a difference from previous studies in that it uses data from the Korea Corporate Governance Service (KCGS) as a measure of CSM and examines the relationship with the corporate governance structure of chaebol.

Conflict exists between those who hold negative and positive views on the effectiveness of CSR activities. According to critics, CSR activities do not contribute to the enhancement of corporate value because the company incurs costs in social and environmental fields. In other words, the use of resources to implement CSR is considered an additional cost because it is contrary to the company's fundamental goal of generating profits. Therefore, this view takes the position that company's CSR activity should be avoided unless it matches the economic objective of maximizing the value of the company (Lee and Lee, 2017; McGuire, 1998; Waddock and Graves, 1997). On the contrary, proponents argue that CSR activities are a key source of continuous, long-term corporate competitiveness.

In other words, the company promotes consumer purchasing by improving the corporate and brand images through the implementation of CSR, or collects excellent talents and suppresses turnover. In addition, government and stakeholder groups can expect reduced regulation and a friendly attitude toward companies. As a result, it is argued that CSR activities can strengthen the foundation of corporate management by increasing the satisfaction of various stakeholders, including shareholders, consumers, partners, and the community (Brammer et al., 2005; Lee and Lee, 2017; Moore, 2001).

Investing despite having a negative net present value is called over-investment, and investing

despite having a positive net present value is called under-investment (Biddle et al., 2009; Lee and Paek, 2015). Efficient investment can be induced by improving the quality of accounting information. Improving the quality of accounting information leads to a decrease in information asymmetry (Bushman and Smith, 2001; Healy and Palepu, 2001), and plays a role in monitoring the adverse selection and moral hazard of the manager. In other words, an increase in earnings quality can increase investment efficiency (Biddle and Hilary, 2006; Biddle et al., 2009; Chen et al., 2011; McNichols and Stubben, 2008). CSM is predicted to increase investment efficiency for the following reasons (Kirsten et al., 2019). First, management decision-making efficiency may be improved by balancing and coordinating the interests and needs of various stakeholders (Edmans, 2011; Jensen, 2001; Porter and Kramer, 2011). Second, CSM activities improve the information environment and the quality of accounting information (Benlemlih and Girerd-Potin, 2017; Hoepner et al., 2016), thereby reduces information asymmetries between managers and shareholders.

On the other hand, there are two views on Korea's chaebol system. The positive view is that in past economic development, it played a leading role in driving the Korean economy. Others argue that the efficiency of corporate operations is hindered by a closed governance structure centered on large shareholders that causes damage to ordinary minority shareholders through selfish management favoring specific households. In addition, the monopolistic position of the large group of companies impedes balanced development of the national economy (Lee and Kim, 2017). In most companies taking the form of a corporation, the separation of ownership and management is a natural consequence, but it is impossible for all shareholders to participate in the management of the company, so the manager manages on behalf of the company. However, large-scale companies in Korea are often dominated by the chaebol and other owners and families, so it is necessary to look at the governance problem from a different perspective than in the United States and other countries. If the interests of controlling shareholders and external minority shareholders are consistent under the ownership structure of large corporate groups, they are expected to have a negative relationship with earnings management behavior. On the other hand, if irresponsibility shirking or pursuing private interests is widespread, the hypothesis of profit infringement will be supported.

The main purpose of this study is to document the relationship between CSM activities and corporate investment decisions in Emerging market context. In other words, we aim to investigate whether CSM activities are an efficient means of capital allocation. This study focused on CSM activities as a cause of increased investment efficiency and conducted research to explore their positive effects. Prior studies have found that companies with active sustainability management have high earnings quality. This study predicted and empirically analyzed whether the quality of earnings raised by CSM affects the level of investment efficiency. In addition, the relationship between CSM and investment efficiency can be differentiated depending on whether it belongs to chaebol. The proxy value of CSM was based on the ESG evaluation grade of the KCGS, and investment efficiency was measured by Cheng and Subramanyam (2008).

This study has the following additional contributions. First, it is significant in that it was additionally confirmed that investment efficiency can be determined according to the CSM . Second, it was verified that chaebol could affect the relationship between CSM and investment efficiency. Third, in the context of prior studies on CSM and financial reporting behavior, it was revealed that CSM may be a factor affecting management's actual investment decision-making. Fourth, this study expanded the prior research by looking at the perspective

of CSM and investment efficiency in emerging market. Finally, the link between non-financial performance and financial performance was identified by examining the direct relationship between CSM which is non-financial indicators and investment efficiency.

This study is organized as follows. In the next section (Chapter II), we present the literature review and hypotheses development. Chapter III describes the research design. Chapter IV reports empirical results. Finally, Chapter V concludes the research.

II. Literature Review and Hypotheses Development

1. Corporate Sustainability Management

Companies that fulfill social responsibility possess a competitive advantage because they maintain a productive and lasting relationship with stakeholders (Berman et al., 1999; McWilliams and Siegel, 2001; Russo and Fouts, 1997). The above proposition was established based on company stakeholder theory and holds that successful corporate management is impossible without the cooperation of stakeholders. They are those who directly or indirectly have a stake in a particular company; for example, employees, government, customers, managers, investors, and certain communities (Hwang, 2009).

However, the opposite theory may also be argued. In other words, companies that perform CSM incur additional costs compared to those that do not. This leads to a disadvantage in competition and a decrease in earnings. In terms of investors, there is a limit to the portfolio selection leading to a decrease in the return on investment. As a result, the financial performance of a company that fulfills its CSM obligation is bound to deteriorate (Goldreyer and Diltz, 1999). However, McWilliams and Siegel (2001) point out that although companies conducting CSM incur substantial costs, their earnings also increase. In contrast, companies that do not fulfill their CSM responsibilities will have lower expenditures but realize lower earnings. Thus, in practice, they argue that the relationship between CSM and financial performance is neutral.

Shin et al. (2011) analyzed the effect of CSM on firm value and found that CSM has a significant positive effect on corporate value by improving corporate image and building reputation. Choi and Moon (2013) considered that accounting information is more transparent for companies that actively perform CSM activities than those that do not. Moon et al. (2017) investigated the relationship between CSM and investment decision-making and found that firms with high CSM had higher investment efficiency than firms with low CSM. In addition, firms with low CSM showed higher propensity for over-investment as industry competitiveness increased, but firms with high CSM did not show this tendency. In other words, firms with high CSM have less information asymmetry than firms with low CSM, and the quality of accounting information is also high, which in turn means that investment efficiency is high.

Erhemjamts et al. (2013) report that CSM has an impact on corporate investment expenditures, and that firms that actively engage in CSM are more active and invest in capital other than CSM. Lee and Ko (2013) found that as CSM improves, it lowers the cost of implied capital. CSM interpreted that this is because it lowers the risk premium required by investors. The more transparent the information provided by a company, the lower the asymmetry and agency costs of the information, resulting in a lower risk level and capital cost (Bhattacharya et al., 2003; Easley and O'hara, 2005; Francis et al., 2005; Lambert et al., 2007). Firms with high CSM provide transparent information compared to firms with low CSM, which means

that information asymmetry and agency costs are lower, which then reduces capital costs.

Lim and Choi (2013) attempted to verify the relationship by expanding the scope from accounting transparency to real management measures. As a result of their analysis, companies with excellent CSM were found to have a negative relationship with earnings management, which is a substitute for internal ethics compared to those that do not. Companies with excellent CSM, which can be seen as externally ethical companies, were considered to have a positive effect on internal ethical consciousness. Park and Heo (2015) analyzed the effect of CSM on accounting transparency and cost of debt financing and found that CSM had a positive effect on earnings transparency. In addition, CSM was found to have a negative relationship with the cost of debt financing.

In sum, the previous literature suggests that the better the company is in sustainability management, the higher the earnings quality. For companies with excellent CSM, the earnings quality is high, and this is expected to increase investment efficiency.

2. Investment Efficiency

If the capital market is normal, a project with a positive net present value (NPV) is expected to be made with investment but many studies show that it is not (Bertrand and Mullainathan, 2003; Hubbard, 1998). Indeed, due to the imperfection of the capital market, projects with negative NPV are invested in (over-investment), and projects with positive NPV are not invested in (under-investment). According to agency theory, over and under-investment are described as information asymmetry problems between stakeholders. Jensen and Meckling (1976) and Myers (1977) address information imbalances such as moral hazard and reverse selection. The issue is related to investment efficiency. In addition, the moral hazard between management and shareholders distributes inappropriate profits to shareholders (Jensen and Meckling, 1976). It is explained as a phenomenon in which the management's own profits are maximized by passing the economic losses from over-investment to shareholders (Hope and Thomas, 2008).

Managers' information distortion using earnings management induces excessive investment (McNichols and Stubben, 2008). Chen et al. (2011) analyzed the relevance of the earnings quality on over and under-investment, focusing on individual companies in emerging markets. Their findings revealed the higher the earnings quality, the better managers can make informed investment decisions through recognition of better projects, which can lead to improved investment efficiency of companies (Bushman and Smith, 2001; McNichols and Stubben, 2008).

Park and Bae (2011) discovered that the financial reporting quality reduced under-investment, but the impact on the reduction of over-investment was negligible. The effect of corporate governance on over and under-investment was differentiated by proxy. Yim (2013) analyzed the investment efficiency of companies belonging to chaebol and found that companies belonging to chaebol are less prone to over and under-investment than non-chaebol.

Meanwhile, Shin and Oh (2017) found that there is a significant positive effect of earnings transparency on investment efficiency. Kim (2015) examined the effect of industrial concentration on investment efficiency and showed that the higher the industrial concentration, the more efficient investment made. In addition, when industrial concentration was relatively high, not only over-investment but also under-investment showed relatively low level. Cho and Kang (2016) investigated the relationship between competitive strength in the industry and the efficiency of capital investment and reported that the capital investment efficiency improved when the competition intensity in the industry was high. Lee and Paek (2015) demonstrated that

investment efficiency is related to the usefulness of accounting information such as earnings persistence and value relevance.

The improvement of accounting information and corporate governance can enhance investment efficiency. This increased investment efficiency contributes to the augmentation of corporate value by increasing earnings persistence and value relevance. Companies with excellent CSM have high earnings quality.

In addition, a company's inefficient choice of investment will be reduced to pursue managerial private interests. Therefore, this study sets the following hypothesis regarding CSM and investment efficiency.

H1: CSM **and investment efficiency have a significantly positive relationship.**

3. Corporate Sustainability Management, Investment Efficiency, and Chaebols

The large-scale business groups that exist mainly in Asian countries have complicated transactions between affiliated companies, as well as the problem of using them to achieve their private purposes. La Porta et al. (1999), Johnson et al. (2000), and Bae et al. (2002) investigated whether companies belonging to chaebol are transferring wealth through internal transactions and found that companies belonging to chaebol are indeed using such transactions as a means of exploiting the wealth of subsidiaries.

However, internal transactions of large groups of companies do not only have negative aspects; rather these increase the value of companies in certain cases. Propping is a typical example. Propping is a dictionary term that means to support or prevent from falling. In economic terms, it describes a transfer of financial resources between companies to prevent one firm from going bankrupt. In other words, when the subsidiary is in trouble, the parent company will support the subsidiary to benefit from the company that is not part of the chaebol group. Friedman et al. (2003) reported that improvement of the wealth of minority shareholders also occurred due to financing through large-scale business groups. Anon (1999) explained that propping was used in 1997 by Asian companies as a means to address the financial crisis. In addition, Bae et al. (2008) found that chaebol reported increased earnings and increased corporate value due to fraud among groups (Shin and Kim, 2016).

There are both positive and negative evaluations of the Korean chaebol system. One is a positive evaluation that it played a leading role in driving the economy in the past. The other is a negative evaluation that it has hindered the efficiency of corporate operation with a closed corporate governance structure centered on large shareholders, and damages ordinary minority shareholders through selfish management favoring specific households. It is also argued that the monopolistic position of the large group of companies hampers balanced development of the national economy . Controversial claims have been made as to whether large conglomerates, such as chaebol, have efficient ownership structures. First of all, in a situation where capital markets and labor markets are underdeveloped, such as developing countries, large business groups replace the functions of the insufficient external markets by forming internal markets for both capital and labor. As a result, the large corporate group system is a means to increase efficiency in the management of affiliates (Jeon and Park, 2008).

On the other hand, several studies have suggested that a chaebol represents a governance structure that hampers the efficiency of business operations. In other words, owners of large corporate groups may prefer to maximize the entire size of the business group or individual

interests rather than to maximize the corporate value (Jo, 2010). Particularly, Korean chaebols have relatively small stakes whereby individuals or households who take control of the company through the holding of mutual stocks among affiliates dominate, but the governance structure to check this is weak. Accordingly, it has been argued that serious agency problems such as conflicts with minority shareholders are occurring (Lee and Kim, 2017).

Firms belonging to chaebol are generally large and well-known, so the degree of information asymmetry is expected to be less than that of non-chaebol. Companies belonging to a chaebol are always subject to greater analysis and attention in the capital market than non-chaebol. As a result, the content and performance of management activities can be more clearly evaluated than those of non-chaebol in the capital market. On the other hand, it is possible that chaebol will have more information asymmetry than non-chaebol. Firms belonging to chaebol have a much more complicated ownership and governance structure than non-chaebol, so even experts from outside companies are often unable to grasp the facts even if they are always observed. In particular, Korean chaebol is connected by complex personal and family relationships and are engaged in numerous types of businesses. In addition, financial relationships are complicated by mutual payment guarantees or circular investments. Therefore, the management activities and performances of companies belonging to chaebol may be less transparent than non-chaebol (Lee and Kim, 2017).

Summarizing the results of the prior studies, there are two aspects of the information environment that characterizes chaebol. The higher the earnings quality, the greater the information asymmetry of companies belonging to chaebol. Conversely, the lower the earnings quality, the smaller the information asymmetry of companies belonging to chaebol. Prior studies report a positive relationship between earnings quality and investment efficiency.

As such, the earnings quality may be different. In other words, it can be expected that the impact of CSM on investment efficiency will vary, depending on whether companies belong to chaebol. If the earnings quality of companies belonging to chaebol is high, the effect of CSM on investment efficiency will be insignificant compared to a company belonging to non-chaebol. On the other hand, if the earnings quality of a large group of companies is low, the impact of CSM activities on earnings transparency will be more effective than that of small or moderately sized companies. In Korea, chaebols have a large share of the market share, and numerous external stakeholders are involved. In addition, it is believed that CSM activities play a large role in reducing negative perceptions of stakeholders related to the past chaebol. In this study, the hypothesis was established as follows from the viewpoint that the chaebol strengthens the relationship between CSM and investment efficiency.

H2: The chaebol group strengthens the positive relationship between CSM activities and investment efficiency.

Ⅲ. Research design

1. Regression Model

We test the relationship between CSM and investment efficiency using OLS regression analysis. Our regression model is as follows:

$$INV\_EF_{it+1} = \beta_0 + \beta_1 CSM_{it-1} + \beta_2 SIZE_{it} + \beta_3 LEV_{it} + \beta_4 LOSSDUM_{it}$$
$$+ \beta_5 TA_{it} + \beta_6 STD\_OCF_{it} + \beta_7 AGE_{it} + \beta_8 SLACK_{it} + \beta_9 OWN_{it}$$
$$+ \beta_{10} FOR_{it} + \beta_{11} BIG4_{it} + \sum YD + \sum ID + \varepsilon_{it+1} \qquad (1)$$

In the modeling formula, subscript i denotes an individual company, and subscript t denotes the year. The INV_EF in Equation (1) represents the level of investment efficiency. The CSM in Equation (1) represents the level of sustainability management. The higher the value, the better the sustainability management activities. CSM is a variable of interest in hypothesis 1, and the predictive sign of is positive.

We include several controls such as firm size, leverage, loss dummy, tangible asset, the standard deviation of the operating cash flow, firm age, cash ratio, ownership, foreign ownership, and big4. Control variables were selected with reference to prior studies (Biddle and Hilary, 2006; Chen et al., 2011; La Porta et al., 1999). Firm size and leverage are controlled as they affect investment efficiency. The larger the size of the company, the greater the number of stakeholders, which increases investment efficiency because it more effectively monitors the opportunistic behavior of managers. Since the default risk (LEV) has a certain effect on the actual investment behavior of managers, the debt ratio (LEV) is reflected as a controlling variable. In addition, loss firms dummy, volatility in operating cash flow, and listing age are included in our regression model as control variables (Biddle et al., 2009; Richardson, 2006). Firms that report loss (LOSS) are expected to invest less than firms that do not. Companies that generate stable operating cash flow are expected to have many investment opportunities. Companies with high volatility in operating cash flow are unlikely to predict investment performance, and investment resources are also highly volatile, so investment opportunities are expected to be small. Also, we included the level of cash holding (SLACK) as a control variable in order to control the funding capacity. We additionally included the tangible asset ratio (TA) as a control variable in order to control the effect of past capital investment (Biddle et al., 2009; Cho and Kang, 2016). The amount of free cash flow that exists in a company is closely related to the propensity of managers to overinvest. The ratio of tangible assets (TA) is directly related to facility investment, and companies that have had a high tendency to invest in the past are expected to have a high tendency to invest in the future. Finally, we included ownership and foreign ownership to control the effect of corporate governance. As the sustainability of a company with sound governance is likely to be high, the ownership and foreign ownership were included in the control variables. The higher the audit quality, the higher the reliability of financial information, so it was included in the control variable.

2. Measurement of Variables

2.1. Investment Efficiency

We use the investment efficiency model used by McNichols and Stubben (2008). In equation 2, the residual represents the optimal investment or the inefficient investment that occurred in excess of the optimal investment. If the residual is 0, it means that the optimal investment has been made. If the residual is greater than 0, it represents overinvestment, and if the residual is less than 0, it represents the underinvestment. Due to information asymmetry, there is a difference from the optimal investment level. Information asymmetry can be divided into moral hazard and adverse selection. Moral hazard causes overinvestment and adverse selection causes

underinvestment. Therefore, we divided the over-investment samples and the under-investment samples.

$$Invest_{it} = \beta_0 + \beta_1 Q_{it-1} + \beta_2 Q_{it-1} \times Quartile2_{i,t-1} + \beta_3 Q_{it-1} \times Quartile3_{i,t-1}$$
$$+ \beta_4 Q_{it-1} \times Quartile4_{i,t-1} + \beta_5 CF_{it} + \beta_6 Growth_{it-1} + \beta_7 Invest_{it-1} + \varepsilon_{it} \qquad (2)$$

where $Invest_{it}$ is a capital investment, (the amount of cash outflow for facility assets out of cash outflow from the investment activities of cash flow statement in t-1 year / tangible assets in year t-1); Q_{it-1} is Tobin's Q in year t-1, {(common stock price in year t-1 + total assets in year t-1 – book value in year t-1) / total assets in year t-2}; Q_{it-1} x $Quartile2_{it-1}$($Quartile3_{it-1}$, $Quartile4_{it-1}$) is Q_{it-1} times an indicator variable that takes 1 if Q_{it-1} is in the second (third, fourth) quartile of its industry-year, and 0 otherwise; CF_{it} is the ratio of operating cash flow to tangible assets; $Growth_{it}$ is the natural log of total assets at the end of year t-1 divided by total assets at the end of year t-2; $Invest_{it-1}$ is a capital investment in year t-1.

2.2. Corporate Sustainability Management

In this study, the ESG evaluation grade of the KCGS was used as a substitute for CSM. Here, sustainability management consists of environmental management (E), social responsibility (S), and transparent governance (G). The ESG rating of the KCGS covers approximately 900 listed companies. The rating is reported through the following steps. Basic evaluation and in-depth evaluation are performed by collecting basic data. After that, the evaluation is verified and the company's feedback is conducted. In KCGS' ESG evaluation model, the environmental sector (E) evaluates whether a company has a system that considers environmental sustainability and economic profitability in business management activities by integrating access to the environment with existing corporate strategies. It is divided into five categories: environmental strategy, environmental organization, environmental management, environmental performance, and stakeholder response. The social sector (S) evaluates corporate social responsibility activities for stakeholders who have direct and indirect stakes in the company's management activities in four categories: workers, partners and competitors, consumers, and communities. The governance structure (G) is divided into five categories: shareholder rights protection, board of directors, public announcement, auditing organization, and management error distribution. KCGS conducts evaluation of ESG by examining publicly available data such as business reports, sustainability reports, environmental reports, and annual reports, and reflecting corrections through direct participation by companies, such as surveys on those companies.

In the ESG evaluation model, each segment of the environment (E), society (S), and governance (G) scores 300 points, so the ESG integrated score becomes 900 points, and KCGS calculates and evaluates the scores for each segment of the evaluated company. Based on the score, the ESG integrated grade and each division grade will be announced. The announcement of the ESG rating is intended to enable capital market participants to more intuitively understand the level of risks arising from non-financial elements of the company and use it in investment decisions (Lee and Lee, 2017).

3. Sample distribution

The sample of this study is a non-financial business, which is a company settled at the end of December, among Korean KOSPI listed companies. The study period begins in 2011, when the KCGS began providing ESG evaluation grades. The data used are from 2011-2018 because we looked at the CSM of T period and the investment efficiency of t+1 period. In this study, the samples were classified according to the Korean Standard Industry Classification for classification by industry. There are 1,283 chaebol groups and 3,418 non-chaebol groups. We used SAS statistical package for the empirical analysis of this study. Panel A in 〈Table 1〉 is the sample distribution by year. The sample weights were similar by year. Panel B in 〈Table 1〉 shows the sample distribution by industry. There were many samples belonging to coke, chemicals (10.13%), and professional services (8.27%). There were only a few samples belonging to the publishing, broadcasting, video and telecommunications (2.68%) and non-metal (2.74%) industries.

Table 1. Sample Distribution

PANEL A: Sample by year

Year	N	Percent (%)	Over-investment	Percent (%)	Under-Investment	Percent (%)
2011	612	13.02	202	4.30	410	8.72
2012	621	13.21	216	4.59	405	8.62
2013	660	14.04	238	5.06	422	8.98
2014	672	14.29	212	4.51	460	9.79
2015	692	14.72	218	4.64	474	10.08
2016	711	15.12	191	4.06	520	11.06
2017	733	15.59	211	4.49	522	11.10
Total	4,701	100	1,488	31.65	3,213	68.35

PANEL B: Sample by industry

Industry	N	Percent (%)	Over-investment	Percent (%)	Under-Investment	Percent (%)
Food, Beverage	230	4.89	95	2.02	135	2.87
Fiber, Clothes, and Leathers	167	3.55	75	1.60	92	1.96
Timber, Pulp, and Furniture	178	3.79	84	1.79	94	2.00
Cokes and Chemical	476	10.13	243	5.17	233	4.96
Medical Manufacturing	234	4.98	85	1.81	149	3.17
Rubber and Plastic	148	3.15	80	1.70	68	1.45
Non-Metallic	129	2.74	61	1.30	68	1.45
Metallic	369	7.85	145	3.08	224	4.76
PC and Medical	284	6.04	109	2.32	175	3.72
Machine and Electronic	297	6.32	116	2.47	181	3.85
Other Transportation	331	7.04	124	2.64	207	4.40
Construction	192	4.08	29	0.62	163	3.47
Retail and Whole Sales	382	8.13	42	0.89	340	7.23
Transportation Services	149	3.17	64	1.36	85	1.81
Publishing and Broadcasting	126	2.68	43	0.91	83	1.77
Professional Services	389	8.27	34	0.72	355	7.55
Other	620	13.19	59	1.26	561	11.93
Total	4,701	100	1,488	31.65	3,213	68.35

IV. **Empirical Results**

1. Descriptive Statistics

〈Table 2〉 reports the descriptive statistics of the main variables. The investment efficiency (INV_EF) is -0.053 on average and has a median of -0.033. The total rating (TOTAL_SCORE) has a mean of 7.306 and a median of 7. The mean corporate governance rating (GOV_SCORE) is 6.755 and the median is 7. The social responsibility activity rating (SOC_SCORE) has an average of 7.410 and a median of 7. The environmental management rating (ENV_SCORE) has an average of 7.386 and a median of 7. The size of the company (SIZE) is 26.967 on average, the median is 26.836, the mean of the leverage (LEV) is 0.453 and the median is 0.462. LOSSDUM is 0.273 on average, consisting of companies with about 27% loss in the sample. The tangible assets ratio (TA) is about 36% and the cash ratio (SLACK) is 7%. The corporate age (AGE) averaged 2.856, the majority shareholder (OWN) averaged 43.86%, and the foreign ownership ratio (FOR) averaged 11%. 68% of companies were audited by BIG4 accounting firms.

Table 2. Descriptive Statistics (N=4,701)

Variable	Mean	Std.	Min	25%	Median	75%	Max
INV_EF	-0.053	0.051	-0.406	-0.077	-0.033	-0.033	0.000
TOTAL_SCORE	7.306	0.631	7.000	7.000	7.000	7.000	10.000
GOV_SCORE	6.755	1.275	5.000	5.000	7.000	7.000	10.000
SOC_SCORE	7.410	0.766	7.000	7.000	7.000	8.000	10.000
ENV_SCORE	7.386	0.675	7.000	7.000	7.000	8.000	10.000
CHAEBOL	0.273	0.446	0.000	0.000	0.000	0.000	1.000
SIZE	26.967	1.719	25.905	25.905	26.836	27.930	31.367
LEV	0.453	0.213	0.089	0.280	0.462	0.611	0.960
LOSSDUM	0.273	0.445	0.000	0.000	0.000	1.000	1.000
TA	0.364	0.261	0.000	0.215	0.360	0.483	9.066
STD_OCF	0.034	0.138	0.000	0.003	0.010	0.028	0.405
AGE	2.856	0.881	0.000	2.485	3.135	3.526	4.143
SLACK	0.073	0.068	0.000	0.026	0.054	0.097	0.855
OWN	43.863	16.762	7.540	31.510	44.510	55.230	83.300
FOR	10.735	13.681	0.000	1.432	4.977	14.799	62.780
BIG4	0.683	0.465	0.000	0.000	1.000	1.000	1.000

Notes: See Appendix A for variable definitions.

2. Pearson Correlations

〈Table 3〉 shows the results of pearson correlation analysis of the main variables. Investment efficiency (INV_EF) is significantly positively correlated with CSM (TOTAL_SCORE, GOV_SCORE, SOC_SCORE, ENV_SCORE), firm size (SIZE), leverage (LEV), tangible asset ratio (TA), corporate age (AGE), and the majority shareholder (OWN). This means that the more active CSM, the larger the firm size, the higher the debt ratio, the higher the tangible assets ratio, the longer the firm age, and the higher the ownership ratio, the higher the investment efficiency.

On the other hand, investment efficiency (INV_EF) shows a significant negative relationship

with the standard deviation of operating cash flow (STD_OCF), cash holding ratio (SLACK), foreign ownership ratio (FOR), and auditing of large accounting firms (BIG4).

Table 3. Pearson Correlations (N=4,701)

Variable	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
(1) INV_EF	0.003	0.046	0.004	0.035	–0.025	0.065	0.013	0.180	–0.050	0.035	–0.091	0.033	–0.067	–0.047
(2) TOTAL_SCORE		0.758	0.863	0.587	0.366	0.015	0.038	0.058	–0.077	–0.086	–0.048	–0.161	0.417	0.236
(3) ENV_SCORE			0.686	0.368	0.492	0.123	–0.025	0.118	–0.068	–0.041	–0.070	–0.140	0.365	0.217
(4) SOC_SCORE				0.462	0.377	0.038	–0.008	0.050	–0.056	–0.072	–0.035	–0.121	0.363	0.231
(5) GOV_SCORE					0.195	–0.117	0.020	0.003	–0.122	–0.117	–0.025	–0.102	0.316	0.233
(6) SIZE						0.386	–0.284	0.122	–0.075	0.027	–0.098	0.013	0.308	0.378
(7) LEV							0.127	0.150	0.152	0.053	–0.259	–0.087	–0.173	0.061
(8) LOSSDUM								–0.014	–0.003	0.074	–0.100	–0.165	–0.082	–0.092
(9) TA									–0.095	0.020	–0.229	0.062	–0.015	0.020
(10) STD_OCF										–0.090	0.101	–0.052	–0.171	–0.105
(11) AGE											–0.054	–0.126	–0.044	–0.096
(12) SLACK												–0.111	0.123	–0.014
(13) OWN													–0.223	0.056
(14) FOR														0.255
(15) BIG4														

Notes: 1. Coefficients shown in bold are significant at p < 0.05 (two-tailed test).
      2. Please see Appendix A for variable definitions.

3. Regression Results

3.1. CSM and Investment Efficiency (H1)

⟨Table 4⟩ reports regression results on the relationship between CSM and investment efficiency for full samples. In ⟨Table 4⟩, the regression coefficients (β_1) of CSM (TOTAL_SCORE, GOV_SCORE, SOC_SCORE, ENV_SCORE) indicating the effect of CSM on investment efficiency are 0.048, 0.040, 0.026, 0.002, respectively, 1%, 1%, 5%, at the 1% level, and were found to be a positive value.

This leads to a higher level of earnings for companies conducting CSM, and the increased earnings quality leads to a decrease in information asymmetry. In addition, the increased earnings quality is a result of supporting H1, indicating that it shows efficient investment by acting as a mechanism to effectively monitor the manager's investment behavior. This suggests that when individual companies have high levels of CSM, their investments are being made efficiently.

PANEL A of ⟨Table 5⟩ reports regression results on the relationship between CSM and investment efficiency for the over-investment samples. The regression coefficients (β_1) of CSM (TOTAL_SCORE, GOV_SCORE, SOC_SCORE, ENV_SCORE) indicating the effect of sustainability management on investment efficiency were 0.028, 0.037, 0.019, -0.007, respectively, and were not statistically significant.

Table 4. The Relevance CSM and Investment Efficiency: Full Samples

Variables	CSM=TOTAL_SCORE		CSM=ENV_SCORE		CSM=SOC_SCORE		CSM=GOV_SCORE	
	Coef.	t-stat.	Coef.	t-stat.	Coef.	t-stat.	Coef.	t-stat.
Intercept	−0.376	−1.580	−0.299	−1.280	−0.274	−1.170	−0.156	−0.680
CSM	0.048	2.720***	0.040	2.630***	0.026	2.100**	0.002	2.700***
SIZE	−0.006	−0.670	−0.006	−0.670	−0.003	−0.360	0.001	−0.020
LEV	−0.011	−0.550	−0.015	−0.670	0.006	2.840***	0.001	2.750***
LOSSDUM	−0.005	−0.230	0.002	0.070	0.001	0.050	0.002	0.100
TA	0.298	5.200***	0.295	5.050***	0.289	5.090***	0.275	5.020***
STD_OCF	−0.034	−0.250	−0.029	−0.230	−0.054	−0.410	0.058	0.450
AGE	−0.007	−0.540	−0.005	−0.380	−0.009	−0.720	−0.006	−0.530
SLACK	−0.073	−0.460	−0.079	−0.500	−0.098	−0.630	−0.151	−1.010
OWN	0.001	−0.320	0.001	−0.230	0.001	−0.580	0.001	−0.350
FOR	−0.002	−3.250***	−0.001	−2.740***	−0.002	−2.930***	−0.001	−1.580
BIG4	0.006	0.290	−0.005	−0.240	0.003	0.150	−0.002	−0.110
YD	Yes		Yes		Yes		Yes	
ID	Yes		Yes		Yes		Yes	
F-value	29.43***		29.23***		29.20***		29.13***	
Adj.R^2	21.47%		22.04%		20.98%		19.53%	

Notes: 1. This table reports the relevance CSM and investment efficiency for full samples. ***, **, and * represent significance at the 0.01, 0.05, and 0.1 level, respectively.
2. Please see Appendix A for variable definitions.

Table 5. The Relevance CSM and Investment Efficiency: Over and Under-investment Samples

PANEL A: Over-investment samples

Variables	CSM=TOTAL_SCORE		CSM=ENV_SCORE		CSM=SOC_SCORE		CSM=GOV_SCORE	
	Coef.	t-stat.	Coef.	t-stat.	Coef.	t-stat.	Coef.	t-stat.
Intercept	−1.267	−4.930***	−1.279	−5.010***	−1.126	−4.540***	−1.075	−4.680***
TOTAL_SCORE	0.028	1.050						
ENV_SCORE			0.037	1.440				
SOC_SCORE					0.019	0.910		
GOV_SCORE							−0.007	−0.610
CONTROLS	Yes		Yes		Yes		Yes	
YD	Yes		Yes		Yes		Yes	
ID	Yes		Yes		Yes		Yes	
F-value	15.20***		15.34***		14.75***		19.94***	
Adj.R^2	21.16%		21.93%		20.29%		18.55%	

PANEL B: Under-investment samples

Variables	CSM=TOTAL_SCORE		CSM=ENV_SCORE		CSM=SOC_SCORE		CSM=GOV_SCORE	
	Coef.	t-stat.	Coef.	t-stat.	Coef.	t-stat.	Coef.	t-stat.
Intercept	−1.100	−4.830***	−0.982	−4.460***	−0.976	−4.530***	−0.857	−4.280***
TOTAL_SCORE	0.056	2.880***						
ENV_SCORE			0.034	2.140**				
SOC_SCORE					0.023	2.120**		
GOV_SCORE							0.006	1.750*
CONTROLS	Yes		Yes		Yes		Yes	
YD	Yes		Yes		Yes		Yes	
ID	Yes		Yes		Yes		Yes	
F-value	16.48***		15.73***		16.70***		16.86***	
Adj.R^2	21.99%		21.90%		21.86%		20.47%	

Notes: 1. This table reports the relevance CSM and investment efficiency for over and under-investment samples. ***, **, and * represent significance at the 0.01, 0.05, and 0.1 level, respectively.
2. Please see Appendix A for variable definitions.

PANEL B of 〈Table 5〉 reports regression results on the relationship between CSM and invest-ment efficiency for under-investment samples. The regression coefficients (β_1) of CSM (TOTAL_SCORE, GOV_SCORE, SOC_SCORE, ENV_SCORE) indicating the effect of sustainability management on investment efficiency are 0.056, 0.034, 0.023, 0.006, respectively, 1%, 5%, 5%, 10% level, and were found to be a positive value.

Since the statistical significance was confirmed only in the under-investment samples above, it can be inferred that the relationship between CSM and investment efficiency is the result of under-investment samples.

3.2. CSM, Investment Efficiency, and *Chaebol*s (H2)

〈Table 6〉 shows the analysis results by classifying the full samples according to whether it belongs to chaebol. There are two directions for the information environment's perspective on whether it belongs to chaebol. PANEL A in 〈Table 6〉 reports regression results for compa-nies belonging to chaebol. The regression coefficient (β_1) of CSM (TOTAL_SCORE) on invest-ment efficiency; was 0.046, which was statistically positively significant at 10% level. The re-gression coefficients (β_1) of CSM (TOTAL_SCORE, ENV_SCORE, GOV_SCORE) were 0.046, 0.054 and 0.031, which were statistically significant at the 10%, 5% and 5% level, respectively. The regression coefficient (β_1) of CSM (SOC_SCORE) was -0.005, indicating a negative direction-ality, but it was not statistically significant.

PANEL B in 〈Table 6〉 reports regression results for companies that do not belong to chaebol. The regression coefficients (β_1) of CSM (TOTAL_SCORE, SOC_SCORE) on investment efficiency; were 0.059 and 0.048, which were statistically significant at the 5% and 1% level, respectively. The regression coefficient (β_1) of CSM (ENV_SCORE, GOV_SCORE) was 0.023 and 0.003, but it was not statistically significant.

In summary, the relationship between CSM and investment efficiency was found to be dis-criminatory depending on whether they belonged to a chaebol. In terms of total score, it was statistically strong in chaebol. When looking at the detailed scores, the chaebol showed a strong statistical significance in the environmental score and the corporate governance score, and the non-chaebol showed a strong statistical significance in the social responsibility score. In other words, the impact of CSM on investment efficiency is differentiated between chaebol and non-chaebol. It also means that the impact of CSM on investment efficiency may differ by detailed indicators because the corporate environment is different for each group. Sustainability management is reported to improve investment efficiency by reducing information asymmetry and improving the quality of accounting information. When accounting quality is low, the effect of CSM on investment efficiency is expected to be large. In this analysis, catego-rized into chaebol and non-chaebol, there was no statistical significance in social activities in the chaebol group and no statistical significance in environmental activities in the non-chae-bol group. This can be inferred that the level of accounting quality through social activities in chaebol is relatively higher than that of non-chaebol, and that in non-chaebol, the level of accounting quality through environmental activities is relatively higher than that of chaebol. This has implications for where management should focus on investing limited resources to improve investment efficiency through sustainability management activities.

Table 6. The Effect of Chaebols on the Relationship between CSM and Investment Efficiency: Full Samples

PANEL A: Chaebol (n=1,283)

Variables	CSM=TOTAL_SCORE		CSM=ENV_SCORE		CSM=SOC_SCORE		CSM=GOV_SCORE	
	Coef.	t-stat.	Coef.	t-stat.	Coef.	t-stat.	Coef.	t-stat.
Intercept	− 1.030	−1.910**	−0.935	−1.660*	−1.034	−1.960*	−1.660	−2.040**
TOTAL_SCORE	0.046	1.850*						
ENV_SCORE			0.054	2.040**				
SOC_SCORE					−0.005	−0.210		
GOV_SCORE							0.031	2.580**
CONTROLS	Yes		Yes		Yes		Yes	
YD	Yes		Yes		Yes		Yes	
ID	Yes		Yes		Yes		Yes	
F-value	7.66***		6.82***		7.50***		7.70***	
Adj.R^2	23.57%		21.95%		22.60%		21.63%	

PANEL B: Non-Chaebol (n=3,418)

Variables	CSM=TOTAL_SCORE		CSM=ENV_SCORE		CSM=SOC_SCORE		CSM=GOV_SCORE	
	Coef.	t-stat.	Coef.	t-stat.	Coef.	t-stat.	Coef.	t-stat.
Intercept	− 1.154	−3.900***	−1.073	−3.340***	−1.233	−3.830***	−0.812	−2.840***
TOTAL_SCORE	0.059	2.100**						
ENV_SCORE			0.023	0.950				
SOC_SCORE					0.048	2.640***		
GOV_SCORE							0.003	0.036*
CONTROLS	Yes		Yes		Yes		Yes	
YD	Yes		Yes		Yes		Yes	
ID	Yes		Yes		Yes		Yes	
F-value	21.43***		15.73***		21.28***		21.12***	
Adj.R^2	22.22%		21.90%		21.60%		19.56%	

Notes: 1. This table reports the relevance CSM and investment efficiency for full samples. ***, **, and * represent significance at the 0.01, 0.05, and 0.1 level, respectively.
2. Please see Appendix A for variable definitions.

〈Table 7〉 shows the analysis results by classifying the over-investment samples according to whether it belongs to chaebol. PANEL A in 〈Table 7〉 reports regression results for companies belonging to chaebol. The regression coefficient (β1) of CSM (ENV_SCORE) was 0.101, which was a positively significant value at the 5% level.

PANEL B of 〈Table 7〉 reports regression results for companies belonging to non-chaebol. The regression coefficients (β_1) of CSM (TOTAL_SCORE, ENV_SCORE , SOC_SCORE, GOV_SCORE) were 0.019, -0.010, 0.039, 0.001, but they were not statistically significant.

Table 7. The Effect of Chaebols on the Relationship between CSM and Investment Efficiency: Over-investment Samples (n=1,488)

PANEL A: Chaebol (n=305)

Variables	CSM=TOTAL_SCORE		CSM=ENV_SCORE		CSM=SOC_SCORE		CSM=GOV_SCORE	
	Coef.	t-stat.	Coef.	t-stat.	Coef.	t-stat.	Coef.	t-stat.
Intercept	− 2.638	−3.180***	−3.031	−3.380***	−2.506	−3.050***	−2.752	−3.400***
TOTAL_SCORE	0.027	0.620						
ENV_SCORE			0.101	2.210**				
SOC_SCORE					−0.013	−0.340		
GOV_SCORE							0.006	0.220
CONTROLS	Yes		Yes		Yes		Yes	
YD	Yes		Yes		Yes		Yes	
ID	Yes		Yes		Yes		Yes	
F-value	5.07***		4.97***		4.62***		4.19***	
Adj.R^2	29.70%		29.77%		26.87%		22.66%	

PANEL B: Non-Chaebol (n=1,183)

Variables	CSM=TOTAL_SCORE		CSM=ENV_SCORE		CSM=SOC_SCORE		CSM=GOV_SCORE	
	Coef.	t-stat.	Coef.	t-stat.	Coef.	t-stat.	Coef.	t-stat.
Intercept	− 1.701	−3.460***	−1.497	−3.320***	−1.590	−3.520***	−1.200	−2.960***
TOTAL_SCORE	0.019	0.440						
ENV_SCORE			−0.010	−0.290				
SOC_SCORE					0.039	1.280		
GOV_SCORE							0.001	0.080
CONTROLS	Yes		Yes		Yes		Yes	
YD	Yes		Yes		Yes		Yes	
ID	Yes		Yes		Yes		Yes	
F-value	11.15***		11.75***		10.81***		10.79***	
Adj.R^2	21.86%		23.75%		20.80%		19.06%	

Notes: 1. This table reports the relevance CSM and investment efficiency for over-investment samples. ***, **, and * represent significance at the 0.01, 0.05, and 0.1 level, respectively.

2. Please see Appendix A for variable definitions.

〈Table 8〉 shows the results of additional analysis by classifying the under-investment samples according to whether they belong to chaebol. PANEL A in 〈Table 8〉 presents regression results for companies belonging to chaebol. The regression coefficients (β1) of CSM (TOTAL_SCORE, GOV_SCORE) were 0.059 and 0.055, respectively, and were found to be positively significant at 10% and 5% levels.

PANEL B of 〈Table 8〉 presents regression results for companies belonging to non-chaebol. The regression coefficients (β_1) of CSM (TOTAL_SCORE, ENV_SCORE, SOC_SCORE) were 0.095, 0.050, and 0.059, respectively, and were positively significant at 5%, 5%, and 5% levels, respectively.

The chaebol group was statistically significant in terms of total score, environment, and governance structure, and when the sample was divided into over-investment samples and under-investment samples, environmental scores were significant only in the over-investment samples. This is an empirical result showing that the significance of environmental activities and investment efficiency of chaebol is the result of over-investment samples. The significance of the governance structure was considered to be significant only in the under-investment sam-

ples, so the statistical significance was the result of the under-investment samples.

In the case of under-investment samples, the effect of the improvement of governance on investment efficiency was significant only in the chaebol group. This means that the chaebols report high quality of accounting information due to the improvement of corporate governance structure, which can be advantageous in securing capital that will lead to actual investment when companies have appropriate investment opportunities. On the other hand, in non-chaebol , the quality of earnings from improved corporate governance did not lead to optimal investment. This can be inferred because of the difficulty of securing capital for non-chaebol group compared to chaebol group.

Investment inefficiency may differ from the optimal level due to information asymmetry, so there is a possibility of over-investment or under-investment. Under-investment in relation to reverse selection and over-investment in relation to moral hazard are induced. In the results of this study, the statistical significance between sustainability management and under-investment samples was shown to be strong. It can be inferred that sustainability management is working as a significant device in solving the under-investment problem related to reverse selection among information asymmetry. In addition, as the statistical significance of the non-chaebol group is stronger among the under-investment samples, it is inferred that the benefits of the under-investment problem through sustainability management activities are greater.

Table 8. The Effect of Chaebols on the Relationship between CSM and Investment Efficiency: Under-investment Samples (n=3,213)

PANEL A: Chaebol (n=978)

Variables	CSM=TOTAL_SCORE		CSM=ENV_SCORE		CSM=SOC_SCORE		CSM=GOV_SCORE	
	Coef.	t-stat.	Coef.	t-stat.	Coef.	t-stat.	Coef.	t-stat.
Intercept	− 0.053	−0.070	0.073	0.100	−0.211	−0.300	−0.465	−0.700
TOTAL_SCORE	0.059	1.700*						
ENV_SCORE			0.021	0.520				
SOC_SCORE					0.004	0.120		
GOV_SCORE							0.055	2.380**
CONTROLS	Yes		Yes		Yes		Yes	
YD	Yes		Yes		Yes		Yes	
ID	Yes		Yes		Yes		Yes	
F-value	4.59***		4.04***		4.73***		5.24***	
Adj.R^2	23.11%		21.21%		23.14%		24.11%	

PANEL B: Non-Chaebol (n=2,235)

Variables	CSM=TOTAL_SCORE		CSM=ENV_SCORE		CSM=SOC_SCORE		CSM=GOV_SCORE	
	Coef.	t-stat.	Coef.	t-stat.	Coef.	t-stat.	Coef.	t-stat.
Intercept	− 1.007	−2.020**	−0.638	−1.370	−0.813	−1.760*	−0.316	−0.780
TOTAL_SCORE	0.095	2.810**						
ENV_SCORE			0.050	1.840**				
SOC_SCORE					0.059	2.480**		
GOV_SCORE							0.005	0.380
CONTROLS	Yes		Yes		Yes		Yes	
YD	Yes		Yes		Yes		Yes	
ID	Yes		Yes		Yes		Yes	
F-value	12.08***		11.92***		12.27***		11.75***	
Adj.R^2	23.95%		24.72%		23.75%		20.72%	

Notes: 1. This table reports the relevance CSM and investment efficiency for under-investment samples. ***, **, and * represent significance at the 0.01, 0.05, and 0.1 level, respectively.

2. Please see Appendix A for variable definitions.

Ⅴ. Conclusion

In recent years, CSR has become a growing concern and is considered a critical business activity. Employee morale is also increased through CSR activities, which may lead to improved productivity (Lee and Ko, 2013). Prudent investment decision-making is one of the important tasks for management. The aftermath of investments done properly or inappropriately is directly related to the long-term sustainability of a firm, so firms are bound to pay much attention to ensuring efficient investment decisions are made (Choi and Bae, 2014; Harris and Raviv, 1996; Klammer et al., 1991; McConnell and Muscarella, 1985).

CSM is used as a means to differentiate firms and as a strategy for continuous growth to improve the future financial corporate performance. According to the previous studies, CSM has an effect on alleviating information asymmetry and improving the quality of accounting information. Further, reduced information asymmetry and high quality of accounting information play a role in enhancing the firms' investment efficiency. If there is a significant difference in information asymmetry and quality of accounting information between a firm with high CSM and a firm with low CSM, there will also be a significant difference in investment efficiency. Therefore, this study aimed to verify how CSM affects management's investment decision-making by examining the relationship between CSM and investment efficiency. This study also investigated the effect of chaebol on the relationship between CSM and investment efficiency.

Our study showed that CSM is significantly positively correlated with investment efficiency. Specifically, it was significant in four measures: total score for sustainable management, environmental management, social responsibility, and corporate governance. This demonstrates that, as a result of CSM, the increased earnings quality acts as an incentive to increase investment efficiency. In the analysis of dividing into the over and under-investment, the statistical significance is found only in under-investment. Next, in the analysis of a dataset including two groups (chaebol and non-chaebol), there was a significant difference in the relationship between CSM and investment efficiency. In regard to the total score, it was statistically more significant in chaebol. In detail, the environmental and corporate governance scores were statistically more significant in the chaebol, and the social responsibility score was statistically more significant in a non-chaebol. The results indicate that the relationship between CSM and investment efficiency differs among detailed indicator activities depending on whether they belong to chaebol.

Our study suggested that managers of firms with excellent CSM are making effective investment decisions for sustainability rather than opportunistic decisions. This means that the more firms are active in social investment, the more they make efficient investment decisions in economic investment. Consistent with previous studies reporting that CSM influenced manager's ethical financial reporting behavior, our findings suggested that CSM influences manager's non-opportunistic investment decision-making. Sustainability management will improve the earnings quality and improved earnings quality will increase investment efficiency. According to this logic, it is predicted that the relationship between sustainability management and investment efficiency will be strengthened in groups with low earnings quality. When the sample was divided into the chaebol and non-chaebol group, the relationship between CSM and invest-

ment efficiency was statistically more significant in the non-chaebol group based on the total score. This suggests that the chaebol group has higher quality of accounting information than the non-chaebol group. In detailed activities, the chaebol group was statistically more significant in environmental activities, and the non-chaebol group was statistically more significant in social activities. In other words, the chaebol group can improve the earnings quality more than that of the non-chaebol group by reinforcing environmental activities, and thus has a greater impact on investment efficiency. On the other hand, non-chaebol groups can improve the earnings quality more than those of the chaebol groups by reinforcing social activities, which for them have a greater impact on investment efficiency. The above results show that the effects of CSM on information asymmetry and accounting quality are different for each detailed activity, and the effects on chaebol and non-chaebol groups are also different. This implies that managers should make decisions about where to focus limited resources, as the impact on investment efficiency may vary by detailed activity of CSM and by type of group: chaebol or non-chaebol.

It is significant that this study focused on and analyzed CSM as a determinant of investment efficiency, and examined how chaebol membership affects the relationship between CSM and investment efficiency. Our results, which suggested that CSM can increase investment efficiency, are expected to provide important implications not only forto managers, but also forto investors and supervisors. Owner and agency problems arise with respect to ownership control. Other countries have reported that the agency problem between investors and managers is large, and studies related to corporate governance structure to resolve the disagreement between them are mainly conducted. In Korea, the issue of agency between controlling and minority shareholders is a major concern for chaebol. Entities belonging to chaebol have been criticized for expanding the wealth of the majority shareholder and sacrificing the interests of minority shareholders by exercising more "voting rights" than the "ownership." In particular, this negative problem can increase in severity if there is no organization that can control or check the discretion of the majority shareholder. As a result of this study, it is believed that other countries will be able to refer not only to the agency problem between investors and managers, but also to the agency problem between majority and minority shareholders. The practical implication is that for investors, the evidence that firms with excellent CSM invest more efficiently. Further, external auditors can perform more mitigating audit procedures related to investments when auditing firms with excellent CSM.

Regarding the limitations of this study, first, it was not possible to consider all of the problems of additional omitted variables affecting investment efficiency and various proxy values for CSM. Second, considering the evaluation grade of CSM, there may be convenience of samples because most of them are companies with low sustainability. Third, endogenous issues may exist in relation to the level of CSM and investment efficiency. As a future study, it is possible to consider various CSM indicators and implications according to industry characteristics.

Appendix A. Variable Definitions

Dependent Variables

    INV_EF   Investment efficiency, investment efficiency model used by McNichols and Stubben (2008)

Explanatory Variables

    CSM   Corporate sustainable management, ESG ratings (ESG integration sector, governance sector, social sector, and environmental sector) of the KCGS (Korean Corporate Governance Service).

Control variables

Variable	Definition
SIZE	natural log of total assets;
LEV	leverage, total debts / total assets;
LOSSDUM	1 if net income is negative, and 0 otherwise;
TA	tangible assets / total assets;
STD_OCF	the standard deviation of the operating cash flows of the cash flow statement for the five years from t-4 to t, scaled by the total assets;
AGE	the natural log of the number of years between t-1 year and initial listing year;
SLACK	cash / total assets;
OWN	ownership ratio;
FOR	Foreign ownership ratio;
BIG4	l if the firm audited by a Big 4 auditor, and 0 otherwise;
YD	year dummy;
ID	industry dummy.

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