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Would Overconfident CEOs Engage More in Environment, Social, and Governance Investments? With a Focus on Female Representation on Boards

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Abstract: This study examines the relationship between CEO overconfidence, environment, social, and governance investments, and firm value. Drawing on insights from upper echelon and agency theory, greater female representation on boards is expected to act as an independent monitoring mechanism to control and reconcile CEO overconfidence which leads to enhancement of corporate value induced by environment, social, and governance investments. Empirical evidence in this study finds that, on average, overconfident managers tend to engage in ESG investments in South Korea. Furthermore, in firms with high environment, social, and governance investments, the negative association between CEO overconfidence and firm value is mitigated, showing that environment, social, and governance investments are effective moderators in controlling and constraining managerial overconfidence. Finally, we find that the joint impact of CEO overconfidence and environment, social, and governance investments on corporate value is distinctive in firms with female board representation. Taken together, we find that negative effects associated with CEO overconfidence can be alleviated by the role of female leadership that links corporate environment, social, and governance investments to firm value.

Keywords: CEO overconfidence; environment, social and governance investments; female executives; firm value



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1. Introduction

Global interests in environment, social, and governance (ESG) investments are enormously growing. Over the past two decades, there has been tremendous growth in the number of companies measuring and disclosing ESG data, which are environmental data such as carbon emissions and water pollution, social data such as employee welfare and customer-related information, and governance data such as board composition. In the early 1990s, fewer than 20 companies reported on ESG investments, but by 2019, nearly 9000 companies began publishing reports on sustainability or integration. Impact investors who invest their resources to raise environmental and social issues also grew rapidly. In 2006, the United Nations Principles for Responsible Investment (UNPRI) signatories were launched, which also pledged to incorporate ESG issues into future investment analysis and ownership practices. By 2017, about 1700 signatories from over 50 countries have been accumulated for this signature, and their total assets are managing around \$68 trillion [1].

The high interest in ESG investment was also enough to attract the attention of academia. In recent studies, it is reported that companies that have invested in ESG sectors are showing positive economic effects. First, firms with better ESG investments are expected to have a competitive advantage in terms of reputation capital, investor attractiveness, customer satisfaction, and sustainable innovation [2–4], which leads to positive equity market consequences [5–7]. Second, the empirical findings in literature document that firms

with outstanding performance in ESG investments can diminish financing costs [8–11]. For instance, Dhaliwal et al. (2011) show that firms that issue their initial sustainability reports benefit a substantial decrease in the cost of equity capital from better performance in ESG investments [12]. Similarly, Ghoul et al. (2011) represent that firms that care for environmental performance are associated with lower costs of equity capital [13]. As a study on the aspect of private debt financing, prior studies show that the costs of bank loans for firms with better corporate social responsibility (CSR) performance is lower than for more irresponsible firms, suggesting that encouragement of ESG investments will lead to lower cost of debt capital [14]. Finally, value investors are increasingly convinced that the more ESG investments that focus on corporate sustainability and eco-friendly growth, the more they will eventually enjoy long-term benefits. When a company invests in ESG, it can be said that it is an act of paying attention to the external environment surrounding the company and signaling the will to try to be good to others. This is because ESG investments are incurring a high cost in short-term period, so managers may be reluctant to invest. Nevertheless, companies investing in ESG will be able to reduce long-term financing costs which can be arisen from perceived default risk by signaling the company's willingness to pursue sustainability even at the expense of immediate cost. This signaling impact will be more pronounced for firms with opaque information environments that are subject to more information asymmetry. In conclusion, prior studies emphasize that ESG investments reinforce corporate intangible assets such as reputation capital [15,16], which leads to creation of investors' wealth in the long run [17].

Recent research starts to investigate some managerial characteristics that impact corporate strategic decision and policy [18,19]. This paper concentrates on the CEO's personal trait of overconfidence. Managerial overconfidence is a tendency that describes the psychological aspects of personality characteristics. Specifically, it refers to the tendency of managers to have excessive confidence in their abilities or outcomes, which may lead to errors or bias in corporate decision-making [20]. Under the view of the upper echelons theory, managerial personal values, dispositions, and their past experiences affect the decisions of CEOs, and they are likely to adopt the corporate strategies that fit their personal preferences [21]. Given that managers are key influencers in the choices made by corporations, it seems plausible that strategic engagement in ESG investments are influenced by the managerial preference system and personal psychological traits [22]. Intangible strategic decisions such as engagement in ESG investments provide a considerable opportunity for overconfident CEOs who have higher demand for attention and compliment as well as a strong desire to strengthen their affirmative self-images. This is because ESG investments are value-loaded initiatives that appear to promote social benefits. Besides, investing activities for ESG are sensitive to audiences in respect, media attention, and compliment, all of which are external sources to bring attention [23]. Finally, firms with considerable ESG investments can enjoy various avenues to change current status delivering stability and diversity to the opportunities that overconfident CEOs have to reveal themselves to attentive and reactive investors.

Early research argued that CEO overconfidence negatively affects corporate organizational outcomes through engaging in immoral activities and fraud, manipulating financial reporting, tax avoidance, and boosting destructive workplaces [24–26]. However, little consideration has been paid to its potential effect on firm value and strategic decision making; that is, overconfidence can rather encourage successful leadership and control [27]. Motivated by this perspective, this study attempts to verify the impact of managers' overconfidence on corporate ESG investments. If overconfident managers are motivated by private benefits arising from ESG investments, they will over-commit to engagement in ESG investments as such overinvestments rather enrich their reputation as eco-friendly citizens and create a warm-glow effect. This is in line with prior studies that found that managements are likely to incorporate in CSR activities as a tool of insurance to alleviate unfavorable image arising from negative events [28]. Second, this study examines whether ESG investments that are coupled with managerial overconfidence still maximize firm

value. Whether or not the reason that companies make ESG investments is driven by negative aspects such as managerial overconfidence, these investments can maximize corporate value as far as ESG investments are a dominant sustainable strategy for a long-term survival. Finally, we investigate the moderating effect of female board representation on the relationship between managerial overconfidence, ESG investments, and corporate value. Prior studies suggest that women are more concerned with the stakeholders' welfare and provide a wider range of eco-efficacy solutions by bringing different perspectives, which leads to efficient board decision making [29]. Furthermore, literature finds that female executives are less overconfident and more probable to search for expert advice than their male director [30,31]. These traits are expected to decrease dark side effects from CEO overconfidence and increase the efficiency in ESG investments.

The empirical findings in this study yield contribution to the existing prior studies in several important ways. According to Maccoby (2000), an overconfident CEO is positively associated with the introduction of pioneering and risky projects, whilst also implying that these projects are less probable to achieve success [27]. Since managerial CSR activities often lead to a new reputation capital development or the creation of intangible assets by reducing litigation risks, the study in Maccoby (2000) provides a theoretical foundation for the relationship between managerial overconfidence and the intangible ESG investments [27]. Due to the fact that CEO overconfidence is likely to overvalue the future cash flow regarding the risky projects, it is intriguing to investigate the effect of managerial overconfident tendency on the positive drift of long-term performance for firms with significant amount of ESG investments.

Second, the paper shows significant contribution to the stream of gender literature that investigates the role of female management in determining corporate investments policy and decision making. The presence of female executives is critical in reducing CEO overconfidence, especially when the corporation is led by male managers. Regarding ongoing debates in many countries on assigning gender quotas for board of directors, the empirical findings in this study offer timely and proper evidence to enlighten standard setters and policy makers on the complementary role of gender diversity in the board room. By articulating eco-efficacy through ESG investments, firms with the greater female representation in boards constrain CEO overconfidence, which leads to positive firm value long-term.

Finally, the paper contributes to the literature discovering the role of female leadership in the male-dominant board room by using the Korean novel data. South Korea is known for "son preference" since the introduction of Confucianism. According to the OECD (Organization for Economic Cooperation and Development) Glass Ceiling Index, among the OECD countries, Korean women are likely to be treated unequally at the workplace [32]. Similarly, there is a huge difference in the wage between female and male workers, suggesting that women have little power in corporate decision making [33]. In addition, the ratio of female representation on boards is ranked at the bottom among Asian countries. All of these findings indicate that Korean male dominant business environment provides an intriguing setting in which to investigate whether positive evidence in Western countries on female representation on boards also applies to a male-dominate culture.

The remaining parts of this paper are organized as follows. Section 2 describes the theoretical background of the paper and develops the hypotheses. In Section 3, the paper shows the stage of research design and the sampling process. Section 4 provides the empirical results of the study, and Section 5 concludes the paper with mentioning contributions and limitations.

2. Theoretical Backgrounds and Hypothesis Development

2.1. Prior Research on Managerial Overconfidence

The managerial overconfidence generally divides into two types. The first type is "the tendency of overconfidence on ability," where managers who have this tendency recognize their ability to manage the firm higher than their real objective ability [34]. The second type is "the tendency of overconfidence on control," where managers who have this tendency

think they can make excessive influence on the firms' events [35,36]. For example, although they can only make limited influence in response to effects of industrial and economic fluctuations, there are cases where the manager is illumined to have a considerable amount of control. Generally, managers who have the tendency of overconfidence also have "the tendency of overconfidence on ability and control". This tendency is considered as a major human attribute that causes the manager to make irrational decisions. Many prior studies show various results of this sort of tendency in causing negative effects on firm value. They usually focus on the firm's investment behaviors and the form of financial reports.

Firstly, a series of prior studies report that the tendency of overconfidence by the manager hinders the making of rational investment decisions [18,37–39]. In detail, among the manager's tendencies of overconfidence, due to "overconfidence of ability," the manager is illumined that he or she can solve a certain risk in the investment plan, although in reality it is not solvable. As a result, the overall risk of the investment plan is underestimated, which creates cases where the Net Present Value (named 'NPV') is originally negative but is wrongly categorized as a positive NPV. Thus, the manager does not dismiss investment plans that have a negative NPV, leading to the form of excessive investment. Under such logic, Malmendier and Tate (2005) proceeded a theoretical study that showed that the manager's tendency of overconfidence spurs excessive capital expenditure [38]. In a similar vein, Malmendier and Tate (2008) reported empirical results on cases where the manager who has overconfidence tends to make excessive acquisition and merger (M&A) decision [39].

In this sense, managerial overconfidence can be a significant driver of corporate ESG investments. It indicates that firms may engage in ESG investments neither by moral obligation nor pursuit of financial motivation but to meet the needs in managers' psychological aspects. These tendencies make CEOs pursue ESG investment goals in the long-term perspective and promise excessive resources in ESG activities, even in situations where it entails a negative operating income in short-term.

2.2. Hypothesis Development

There is a growing interest in exploring the drivers and motivations of ESG disclosures in recent years [22]. On the one hand, there are considerable studies that concentrate on the external motivation of ESG disclosure such as shareholders' pressures [40,41], institutional forces [42], and legal obligations [43]. On the other hand, little research on the internal motivation of disclosing ESG investments has been conducted. This research consists of board structure and features, administrative team's commitment to business ethics, and board of directors' political ideologies [40,43]. What has been mostly omitted from this line of research is the role of the organization in a comprehensive perspective and of its key influencers and constituencies. Moreover, personal interests and psychological personal traits of CEOs on ESG investment have seldom been discovered.

CEO overconfidence is a psychological trait that affects CSR activities [38,39]. Overconfident managers generally overvalue their ability to capture accurate information on future cash flows created by the profitable investment projects. Prior studies report that people with narcissistic personalities have a strong demand for attention and praise. For narcissistic managers, CSR activities offers substantial opportunities to garner admiration. According to Petrenko et al. (2015), there are three reasons to connect narcissistic managers to CSR activities. First, CSR engagement is value-loaded strategies that appear to look good socially [22]. Second, CSR activities are associated with sensitive audiences in adulation, media attention, and compliment. Finally, firms with considerable ESG investments can enjoy various avenues to change current status delivering stability and diversity to the opportunities that overconfident CEOs have to reveal themselves to attentive and reactive investors. With a sample that covers Fortune 500 firms for 10 years, Petrenko et al. (2015) provide evidence that there is a positive relationship between CEO narcissism and CSR activities [22]. In addition, firms with high CSR activities can strengthen their reputation by attracting and retaining loyal customers and the alleviation of financial and political

risk [44,45]. To summarize, as far as most of the corporate stakeholders are probable to assess firms with active CSR activities as being more responsible, an overconfident CEO is incentivized to engage in these activities. Given the fact that CSR is one of the efficient channels to enhance ESG and there is a positive association between both overconfidence and narcissism, and narcissism and CSR, this paper proposes the following hypothesis:

Hypothesis 1. *There will be a positive association between CEO overconfidence and ESG investments.*

Recent studies concentrate on the positive effect of CSR activities as a corporate hedging strategies on firm value [46–48]. Given the predominant research that implies corporate social responsibility activities are related to value creation of firms, the relationship between CEO overconfidence, ESG investments, and firm value is ambiguous. If CEO overconfidence dominates this link, we expect the positive relationship between more confident CEOs and undertaking ESG investments, which leads to decreasing corporate value. However, if the risk management view that corporate social responsibility activities have hedging effects dominates, the more overconfident CEOs are likely to underestimate the corporate risks, resulting in undertaking high ESG investments compared to firms with less confident CEOs. Given the fact that ESG investments are hedging tools, we expect higher corporate value for firms with overconfident CEOs who undertake high levels of ESG investments. Based on the aforementioned arguments, this paper suggests the second hypothesis.

Hypothesis 2. *ESG investments will positively moderate the association between CEO overconfidence and corporate value.*

Gender can take an independent position in affecting managerial decision-making [49]. There is evidence from previous studies that women are more ethical than men. Previous studies have shown that women tend to emphasize morally acceptable behaviors for ethical values, and put less emphasis on selfish interests than men. In other words, female managers seem to have higher expectations for ethical values than male managers [49]. Using data from US firms, Betz et al. (1989) reported that since women are more ethical and socially responsible than men, they do not inflate costs and are less involved in illegal activities, such as buying stocks using inside information [50]. Similarly, Ruegger and King (1992) reported that women, compared to men, tended to disapprove of the use of obscure corporate information that could mislead investors [51]. Taken together, it seems that women are likely to be more sensitive to ethical judgments or behavior than men [52].

Extending the influence of gender diversity to board of directors, female board of directors are significant in determining corporate firm policies [53,54]. Prior research investigated the effect of diversity in board members on corporate financial consequences [53,55]. If there is higher female representation in member of board of directors, firms are likely to produce better stock returns and greater market assessment [55]. In contrast, Adams et al. (2009) criticize that this positive association maintains only for firms with inferior corporate governance system [53]. Moreover, a non-linear relationship exists between the number of female boards and financial performance. In detail, if only a small number of 1 to 2 female executives are formally included in the board members, this does not bring about financial performance, whereas if 3 or more female executives are included, the financial performance would finally increase [56]. Regarding specific corporate policies, firms with greater female representation on a board involve in more innovations [57], more share buybacks [58], and less empire building via acquisitions [30,54].

Furthermore, female executives and directors are likely to show less overconfidence than their male colleagues [30,54]. It appeared that firms with greater female executives have a tendency to engage in fewer M&A deals and debt issuances [51], and are less likely to overestimate on acquisition gains [30]. Besides, there is predominant evidence to show that female board representation is positively related to CSR ratings [59,60]. According to Bear et al. (2010), firms with more female representation on board members are likely

to be recorded as CSR initiatives in the Kinder Lydenberg Domini (KLD) ratings [59]. In a similar vein, Post et al. (2011) provides evidence that the presence of three or more women executives is related to higher scores in environmental section [60]. Therefore, we argue that firms with female representation on boards are more likely to moderate risk from overconfident managers. Based on arguments discussed above, the last hypothesis is presented as follows:

Hypothesis 3a. *Female executives will intensify the ESG investments as a moderator.*

Hypothesis 3b. *Female executives will augment the corporate value as a moderator.*

3. Research Design

3.1. Measurements of CEO Overconfidence

To measure CEO overconfidence, we adopt McNichols and Stubben's (2008) model, which modifies Tobin's Q and controls for asset growth, the degree of past investment, and the variation within the relationship between Tobin's Q and investment [61]. This model includes asset growth at the beginning of the year to control for the possibility of high investment of growth firms. We include past investment to control a firm-specific factor of the investment decision, and add a change component to the equation as the overconfidence is estimated from the residual investment resulting from measurements of incremental parts to the persistent portion of the previous year's investment. Finally, to permit for variations across corporations in the same industry-year given the relation of investment with Tobin's Q, McNichols and Stubben (2008) increase the traditional Tobin's Q model by containing incremental coefficients for quartiles of Tobin's Q [61]:

$$INV_t = \alpha_0 + \beta_1 Q_{t-1} + \beta_2 Q_QRT2_{t-1} + \beta_3 Q_QRT3_{t-1} + \beta_4 Q_QRT4_{t-1} + \beta_5 CFO_t + \beta_6 GROWTH_t + \beta_7 INV_1 + \varepsilon_t \quad (1)$$

where INV = Capital expenditure, Q_QRT2 (Q_QRT3 , Q_QRT4) = $Q \times$ an indicator variable for partitioning Tobin's Q into quartiles (1 if Q belongs to the second (third, fourth) quartile of its industry-year distribution and 0 otherwise), CFO = Cash flows from operations/total assets, and $GROWTH$ = $\ln(\text{total assets}/\text{total assets at the beginning of the year})$.

In this study, residuals obtained from estimating Equation (1) were used to measure CEO overconfidence. OC (CEO overconfidence) is equal to 1 if residuals are greater than zero, and 0 otherwise.

3.2. Research Model

The first hypothesis forecasts that managerial overconfidence is associated with corporate ESG investments. To analyze Hypothesis 1, we employ the following OLS (ordinary least squares) regression model by using Equation (2);

$$ESG_{t+1} = \alpha_0 + \beta_1 OC_t + \beta_2 SIZE_t + \beta_3 LEV_t + \beta_4 QUICK_t + \beta_5 TA_t + \beta_6 MTB_t + \beta_7 ROA_t + \beta_8 TANG_t + \beta_9 FOR_t + \beta_{10} DA_t + \sum IND + \sum YR + \varepsilon_t \quad (2)$$

where ESG = logarithm value of ESG scores obtained from Korea Corporate Governance Service (KCGS), OC = a measure of managerial overconfidence which is equal to 1 if residual from McNichols and Stubben (2008)'s excess investment regression is greater than zero, and 0 otherwise, $SIZE$ = $\log(\text{total assets})$, LEV = $(\text{total liabilities}/\text{total assets})$, $QUICK$ = $(\text{current assets} - \text{inventories})/(\text{current liabilities})$, TA = $(\text{net income} - \text{cash flow from operation})/(\text{total assets})$, MTB = $(\text{market value of equity})/(\text{book value of equity})$, ROA = $(\text{net income}/\text{total assets})$, $TANG$ = $(\text{tangible assets}/\text{total assets})$, FOR = foreign investors' ownership, and DA = discretionary accrual measured by model in Kothari et al. (2005).

The dependent variable in Equation (2) is corporate ESG investments measured as ESG scores obtained from Korea Corporate Governance Service (KCGS). Korea Corporate Governance Service (KCGS) has not only assessed governance index from 2003, but has

also supplemented social and environmental index following the investment proliferation of ESG. Since 2011, it has settled the principals of OECD governance and ESG assessment models suitable for international standard, such as ISO26000. Therefore, it has assessed the ESG levels of all listed companies in the Korean stock market and has reported their aggregate levels and levels of each index based on 4 levels. Specifically, Environment (E) involves environmental organization, environmental management, environmental performance, and response to stakeholders. Social (S) entails responding to laborers, cooperative and competing firms, consumers, and the local society. Governance (G) involves estimating the protection of shareholders' rights, the board structure, auditing authorities, and disclosure. This study used the aggregate ESG measure for empirical tests. We use a lagged dependent variable to control the endogeneity problem. In addition, the regression model includes year fixed dummy variables and industry fixed dummy variables to control for variations across firms within the identical industry-year data. As far as managerial overconfidence is positively associated with ESG investment, each coefficient will show a positive value with a significance.

Second hypothesis predicts whether ESG investments moderate the negative association between managerial overconfidence and firm value. To test Hypothesis 2, we use the OLS regression based on the following Equation (3):

$$FV_{t+1} = \alpha_0 + \beta_1 OC_t + \beta_2 ESG_t + \beta_3 OC \times ESG_t + \beta_4 SIZE_t + \beta_5 LEV_t + \beta_6 QUICK_{t+1} + \beta_7 TA_t + \beta_8 MTB + \beta_9 ROA + \beta_{10} TANG_t + \beta_{11} FOR_1 + \beta_{12} DA_1 + \sum IND + \sum YR + \varepsilon_t \quad (3)$$

where FV = Tobin's Q as measured by (market value of equity + total liability)/(beginning book value of equity). WOMAN = a dummy variable which is equal to 1 if board of directors incorporate at least one more woman director, and 0 otherwise.

The dependent variable in Equation (3) is corporate value measure by Tobin's Q. Similar to Equation (2), we employ a lagged variable to examine the long-term impact of managerial overconfidence with ESG investments on firm value. The key independent variable in Equation (3) is the interaction term of $OC \times ESG$.

The third hypothesis predicts that positive (negative) association between CEO overconfidence, ESG investments, and firm value decreased (intensified) with female representation on boards; we form this relationship so as to investigate whether female executives within the boards affect the monitoring role. To test Hypothesis 3, we use sub-sample analyses by using Equation (3). A sub-sample is divided into two groups—one group with woman representation on the board of directors and the other without woman executives. Similarly, if female representation is helpful for monitoring overconfident CEOs, the coefficients in Equation (3) of each group will show a significantly positive value.

All of the research models in our study contains proper control variables that can possibly affect ESG investments and firm value. Motivated by prior studies on the determinants of ESG investments and firm value. Those factors are firm size (SIZE), leverage (LEV), current ratio (QUICK), total accrual (TA), market-to-book (MTB), return on assets (ROA), tangible assets ratio (TANG), foreign ownership, and discretionary accrual (DA) measured by Kothari et al. (2005) [62]. The estimation model for DA is presented below in Equation (4).

$$\frac{TA_t}{A_{t-1}} = \alpha_0 + \beta_1 \frac{1}{A_{t-1}} + \beta_2 \frac{\Delta S_t - \Delta AR_t}{A_{t-1}} + \beta_3 \frac{PPE_t}{A_{t-1}} + \beta_4 ROA_t + \varepsilon_t \quad (4)$$

where TA = Net income – cash flow from operations, S = Sales revenue, AR = Accounts receivables, PPE = Plant, property, and equipment, ROA = (Net income)/(total assets), and A = Total assets.

In detail, we employ a cross-sectional model of discretionary accruals (DA) and predict the model for all industries based on its two-digit industry code. The final data comprises firms with 20 or more firm-year observations to confirm a sufficient sample for parameter

valuation. The residuals from the above estimation model of Equation (4) are employed to predict the discretionary accruals. The definition of other control variables is described below each table.

3.3. Sample Selection

Table 1 shows the sample selection procedure of the paper. Non-financial firms that are listed in the two Korean stock market (Korea Stock Exchange (KSE) and Korea Securities Dealers Automated Quotation (KOSDAQ) as of 31 December 2019 are involved in the sample. Initially, we deleted the data which has missing observations necessary to calculate overconfidence and control variables. The final sample of 3129 firm-years satisfies the following standards.

1. firms excluding financial institution
2. firms that their financial information is available from the KIS database that is developed by Korea Investors Service, Inc.
3. firms with ESG data that purchased from KCGS.

For the mitigation of the influence of outliers, the extreme top and bottom 1% of the variables are winsorized. Table 1 describes the sample selection process and industry distribution of this paper.

Table 1. The Data Description.

Panel A: Sample Selection		
Initial Sample		6928
Less:		
(Firms without environment, social, and governance (ESG) score data)		(2538)
(Firms without December fiscal year-end)		(78)
(Financial industry)		(11)
(Firms without necessary data for variables)		(1172)
Final sample		3129
Panel B: Sample Distribution by Industry		
Industry	Number of Firms	%
Food/Tobacco	171	5.5
Textiles/Bags/Shoes	119	3.8
Paper/Wood/Pulp	104	3.3
Chemicals/Plastics	669	21.3
Nonmetals	20	0.6
Primary metals/Metals Working in Process	252	8.1
Machinery/Biotech	733	23.4
Construction	58	1.9
Wholesale/Retail	283	9.0
Service	720	23.1
Total	3129	100

4. Empirical Findings

4.1. Descriptive Statistics and Correlation Analysis

In Table 2, we present the descriptive statistics for the main variables employed in the regression analyses. The mean of our key independent variable, managerial overconfidence (OC), is 0.802, and the value is distributed from 0 to 1. It indicates that the average sample

has fairly overconfident CEOs. The mean (median) of the first dependent variable, ESG, which is measured by the log value of ESG scores, is 3.381 (3.401), implying that ESG distribution generally shows a normal distribution. Second dependent variable to measure for corporate value is FV, showing the mean of 1.083. Finally, the mean of WOMAN is 0.633, which indicates that about 60% of sample firms have female executives on their boards.

Table 2. Descriptive Statistics.

Variables	Mean	STD	Q1	Median	Q3
OC	0.802	0.398	0.000	1.000	1.000
ESG	3.381	0.384	3.135	3.401	3.611
FV	1.083	2.495	0.378	0.631	1.156
WOMAN	0.633	2.298	0.000	0.000	1.000

Notes: Variable definition: OC = a measure of managerial overconfidence which is equal to 1 if residual from Mc-Nichols and Stubben (2008)'s excess investment regression is greater than zero, and 0 otherwise; ESG = logarithm value of ESG scores obtained from KCGS; FV = Tobin's Q as measured by (market value of equity + total liability)/beginning book value of equity; WOMAN = a dummy variable which is equal to 1 if the board of directors incorporates at least one more woman director, and 0 otherwise.

Table 3 shows the correlation matrix of the main variables used in the paper. There is a positively significant relationship between managerial overconfidence (OC) and ESG investment, indicating that overconfident CEOs are more likely to engage in ESG investment compared to less overconfident managers. As expected, there is a negative correlation between CEO overconfidence and FV with 1% significance, suggesting that CEO overconfidence rather deteriorates long-term firm value. Lastly, there is a positive correlation between CEO overconfidence and WOMAN with no significance. Overall, none of the correlations among the variables are high enough to cause problem, and the tests of variance inflation factors related to the regression models do not show that multicollinearity is a concern.

Table 3. A Correlation Matrix.

	(1)	(2)	(3)	(4)
OC (1)	1.000	0.187 (<0.0001)	−0.057 0.001	0.020 0.294
ESG (2)		1.000	−0.065 0.002	0.157 (<0.0001)
FV (3)				0.062 0.001
WOMAN (4)				1.000

See Table 2 for definitions of the variables.

4.2. Main Results and Discussion

Table 4 documents the empirical results of our multivariate analyses testing the Hypothesis 1 employing Equation (2). The coefficient of CEO overconfidence (OC) shows a positively and statistically significant value. These findings imply that managerial overconfidence is positively associated with corporate engagement in ESG investments on average. While many studies report that ESG investments are performed to contribute to corporate value and society, ESG investments are also conducted as a tool for defending managerial decision making based on private interests and opportunistic intention. Building on the reasoning of the upper echelons view, managers have a crucial influence on strategic decision, and thus firms' propensity to engage in ESG investments may be affected by CEOs' preferences and priorities that are driven from their intrinsic values and personal characteristics [21,22].

Collectively, overconfident CEOs are likely to pursue positive attention by engagement in constructive ESG investment with efforts to avoid the emergence of ESG concerns. Therefore, we conclude that overconfident managers are motivated to engage in positive

and constructive ESG investments, which supports Hypothesis 1 that shows a positive relationship between CEO overconfidence and corporate ESG investments.

Table 4. The Impact of Managerial Overconfidence on ESG Investment.

Variables	Coeff.	t-stat.
Intercept	−1.426	−12.94 ***
OC	0.053	3.75 ***
SIZE	0.168	40.20 ***
LEV	−0.004	−1.01
QUICK	−0.002	−2.86 ***
TA	−0.379	−2.57 **
MTB	0.001	0.33
ROA	0.265	2.58 ***
TANG	0.209	4.91 ***
FOR	0.071	1.53
DA	0.137	0.92
Industry Dummy	Included	
Year Dummy	Included	
R ²	0.57	
F-stat.	186.68 ***	
N	3129	

, and * indicate significance at the 5%, and 1% levels, respectively. ESG = logarithm value of ESG scores obtained from Korea Corporate Governance Service (KCGS); OC = a measure of managerial overconfidence which is equal to 1 if residual from McNichols and Stubben (2008)'s excess investment regression is greater than zero, and 0 otherwise; SIZE = log (total assets); LEV = (total liabilities/total assets); QUICK = (current assets – inventories)/(current liabilities); TA = (net income – cash flow from operation)/(total assets); MTB = (market value of equity)/(book value of equity); ROA = (net income/total assets); TANG = (tangible assets/total assets); FOR = foreign investors' ownership; DA = discretionary accrual measured by model in Kothari et al. (2005).

Next, Table 5 represents the evidence for testing Hypothesis 2 using Equation (3) resulting from the OLS regressions with Tobin's Q for the dependent variable. Hypothesis 2 predicts whether ESG investments can moderate the negative relationship between managerial overconfidence and firm value. The coefficient of the interaction term between CEO overconfidence and ESG investments is positively and statistically significant at 5% level, indicating that the negative relationship between managerial overconfidence and firm value is attenuated with an increase in ESG investments.

To discuss deeply on Table 5, these findings are interpreted as the hedging effect of ESG investments dominates the relationship of CEO overconfidence with ESG investments. In other words, the more likely that overconfident managers would use strategic ESG investments to draw attention from stakeholders, the less they participate in negative ESG investments or try to eliminate ESG concern, resulting in contribution to enhance firm value. Consistent with predominant prior studies on ESG investments, ESG investments improve reputation capital, investor attractiveness, customer satisfaction, and sustainable innovation [2–4], which leads to enhancement of firm value [5–7]. Supporting the second hypothesis, this study suggests that ESG investments even undertaken by overconfident CEOs positively moderate the relationship between CEO overconfidence and corporate value.

Table 6 documents the results of multivariate analysis testing the Hypothesis 3 using sub-sample analyses. Hypothesis 3 tests on whether female representation on boards play an important role in moderating the negative relationship between CEO overconfidence and corporate value. The first column of Table 5 shows the results using the sample with female executives and the second column presents the results from no female executive data. The coefficient of the interaction term between CEO overconfidence and ESG investments is positively significant at the 5% level, providing the evidence that the negative correlation between CEO overconfidence and firm value is diminished with female corporate leadership. This is more evident from the results of second column which suggests that a negative relationship between overconfident CEO and firm value is more pronounced in firms where there is no gender diversity in board members.

Table 5. The Impact of ESG Investments on the Relationship between Managerial Overconfidence and Firm Value.

Variables	Coeff.	t-stat.
Intercept	0.522	0.53
OC	−0.305	−2.41 **
ESG	0.443	2.31 **
OC × ESG	0.454	2.25 **
SIZE	−0.011	−0.31
LEV	−0.292	−7.49 ***
QUICK	0.035	4.28 ***
TA	−1.275	−1.06
MTB	0.720	30.66 ***
ROA	−0.479	−0.57
TANG	0.063	0.18
FOR	−0.383	−1.01
DA	1.677	1.38
Industry Dummy	Included	
Year Dummy	Included	
R ²	0.27	
F-stat.	48.81 ***	
N	3129	

, and * indicate significance at the 5%, and 1% levels, respectively. FV = Tobin's Q as measured by (market value of equity + total liability)/beginning book value of equity. (3) See Table 4 for definitions of other variables.

Table 6. The Moderating Role of Female Executives on the Relationship between Managerial Overconfidence and Firm Value.

Variables	Firms with Female Executives		Firms without Female Executives	
	Coeff.	t-stat.	Coeff.	t-stat.
Intercept	−2.304	−0.60	1.984	4.41 ***
OC	−1.017	−2.24 **	−0.029	−0.59
ESG	1.559	2.30 **	−0.006	−0.08
OC × ESG	1.549	2.13 **	−0.010	−0.13
SIZE	0.101	0.69	−0.063	−3.69 ***
LEV	−0.348	−2.03 **	−0.249	−15.07 ***
QUICK	0.097	3.07 ***	0.002	0.70
TA	−4.025	−0.80	−0.858	−1.73 *
MTB	0.959	13.01 ***	0.504	44.61 ***
ROA	−1.396	−0.39	0.058	0.16
TANG	0.361	0.25	−0.074	−0.51
FOR	−1.672	−1.13	0.237	1.43
DA	6.612	1.39	0.038	0.08
Industry Dummy	Included		Included	
Year Dummy	Included		Included	
Adj. R ²	0.23		0.59	
F-value	10.94 ***		109.61 ***	
Observations	765		2364	

*, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. FV = Tobin's Q as measured by (market value of equity + total liability)/beginning book value of equity. (3) See Table 4 for definitions of other variables.

Collectively, these findings imply that boards with strong female leadership have independence to control and reconcile overconfident CEOs and do properly monitor and supervise strategic investment decision such as ESG that can contribute to enhancing corporate value. In other words, engagement in ESG investments, which are not adequately supervised by independent and flexible board members, can only waste settling costs in the short term, and destroy firm value in the long-term. Consistent with the prior studies as

reported in the context of investment decision [54], if the representation of female executives curbs the overconfident tendency in male CEOs in articulating corporate strategies, then the role of female executives is more pronounced if the ESG investments are conducted by overconfident managers. All of these results provide supports for Hypothesis 3 by demonstrating that board gender diversity play a complementary role in corporate strategic decision making, consistent with the ethicality and diversity explanations in Adams and Ferreira (2009) research [53].

4.3. Additional Tests: Firm-Fixed Effect Model

Table 7 represents the empirical results of the multivariate test of first and second hypotheses based on a fixed effects model. By using firm-fixed effects models we can control for problem of omitted variables that are driven by unobserved heterogeneity where this heterogeneity is continuous over time. As far as we can adjust through the group-level mean value, this kind of heterogeneity can be eliminated from the sample to some degree.

Table 7. Fixed Effect Model.

Panel A. Hypothesis 1			
Variables	Coefficient		t-stat.
Intercept	−1.426		−12.94 ***
OC	0.053		3.75 ***
Controls		Included	
Adjusted R ²		0.58	
F-stat.		186.68 ***	
observations		3129	
Panel B. Hypothesis 2			
Variables	Coefficient		t-stat.
Intercept	0.522		0.53
OC	−0.305		−2.41 **
ESG	0.443		2.31 **
OC × ESG	0.454		2.25 **
Controls		Included	
Adjusted R ²		0.28	
F-stat.		48.81 ***	
observations		3129	

, and * indicate significance at the 5%, and 1% levels, respectively. FV = Tobin's Q as measured by (market value of equity + total liability)/beginning book value of equity. (3) See Table 4 for definitions of other variables.

As a result, panel A of Table 7 shows the results on Hypothesis 1 using a firm-fixed effect model. The coefficient of OC is significantly positive, suggesting that overconfident managers are more engaging in ESG investments. Next, panel B of Table 7 represents the empirical findings of Hypothesis 2, and the coefficient of interaction term remains positive and significant. Overall, it remains consistent in the use of alternative regression model to control for endogeneity problem even with the strong values in t-statistics.

4.4. Additional Tests: ESG Components

As we discussed in the theoretical background section, ESG has three different sectors. Korea Corporate Governance Service (KCGS) has assessed governance structure from 2003. And it also evaluated environmental and social responsibility scores following the investment proliferation of ESG. It has adopted and applied the principals of OECD governance and ESG assessment models that is in accordance with international standard, such as ISO26000 from 2011. As such, it has been evaluating each ESG level for the listed firms in Korean stock market and has disclosed the reports regarding overall levels and levels for each area, according to 4 levels. To be more specific on ESG investments, Environment (E)

index incorporates environmental organization, environmental management, environmental performance, and communication with stakeholders. Social (S) index is categorized into responding to laborers, cooperative and competing firms, consumers, and the local society. The last index is Governance (G) index which consists of assessing the protection of shareholders' rights, the board, auditing body and disclosure. This study has tested which sectors among the components of ESG investment were more preferred and invested by overconfident managers.

As a result, the coefficient on OC in panel A of Table 8 shows the highest significance, whereas the coefficient on OC in panel C represents the lowest value. Overconfident managers showed investing preference in the order of environment, social, and governance investments. Consistent with narcissistic behavior, the results prove that overconfident managers undertake more social and environment investments, such as environmental protection activities, community engagement, customer relations, and union relations rather than governance structure. This is because environmental investments are likely to draw public attention and compliments from stakeholders more compared to governance investments.

Table 8. ESG components.

Panel A. Environmental Investments			
Variables	Coefficient		t-stat.
Intercept	−7.360		−16.69 ***
OC	0.187		3.26 ***
Controls		Included	
Adjusted R^2		0.40	
F-stat.		94.15 ***	
observations		3129	
Panel B. Social Investments			
Variables	Coefficient		t-stat.
Intercept	−3.610		−21.24 ***
OC	0.037		2.02 **
Controls		Included	
Adjusted R^2		0.51	
F-stat.		145.91 ***	
observations		3129	
Panel C. Governance Investments			
Variables	Coefficient		t-stat.
Intercept	1.717		17.22 ***
OC	0.024		1.69 *
Controls		Included	
Adjusted R^2		0.36	
F-stat.		77.55 ***	
observations		3129	

*, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

5. Conclusions

There is a growing trend to explore the drivers and motivations of corporate ESG investments in recent days [22]. The focus of existing literature on motive for ESG investments has been mostly concentrated on external drivers and motivation of ESG investments [22]. These strands of research investigate the influence of shareholders' pressures [40,41], institutional forces [42], and legal obligations [43] on ESG investments. Even though corporate ESG investments are largely explained by the external drivers, the exclusive concentration on external factors cannot provide a complete image on drivers of ESG investments. This paper fills this gap in the prior studies and suggests that greater emphasis on the drivers of

the key decision creator in the corporation, that is, the CEO, should be placed in explaining to what extent the CEO engages in ESG investments and what kinds of ESG investments the CEO would prefer to highlight. This is because the CEO is a vital character that can undertake the corporate decision toward adopting ESG investments. In addition, the study tries to demonstrate that there are innovative avenues to induce the effect of psychological features of CEO on strategic decision towards positive way that are modest yet powerful.

In a sample that covered 3129 firm-year observations listed in the Korean Stock market, this paper documents the following empirical results: First, a CEO's overconfidence is positively associated with ESG investments. These results indicate that overconfident managers take strategic decision to invest in ESG in order to draw attention and praise from related stakeholders that inflate their affirmative self-view. Second, a negative relationship between CEO overconfidence and long-term firm value is moderated with an increase in ESG investments. Given the fact that ESG investments are hedging tools that moderate the relationship between CEO overconfidence and firm value, for firms with overconfident CEOs who undertake high levels of ESG, investments can benefit in enhancement of the long-term firm value. Finally, this paper provides an evidence that a positive relationship between CEO overconfidence, ESG investments, and firm value strengthens with an increased female representation within the board. These findings imply that firms with a gender diverse board adequately supervise and monitor over confident CEOs that undertake imperative positions in ESG investment decisions, thereby increasing firm value in the long term. These empirical findings remain robust with the use of firm fixed effect model to mitigate the endogeneity issues. And among the ESG investments, overconfident managers appeared to prefer E and S investments rather than G investments.

The empirical results in the paper offers quite some helpful practical suggestions. From the viewpoint of standard setting and regulatory institutions, the fact that managerial personal traits are inflected in corporate strategic decision derive the correction in governmental social and green policies highlighting positive ESG investments. Furthermore, from the perspectives of corporate governance, the results highlight that institutional requirements of board diversity should be developed to enhance and maintain board independence. This paper is significantly important in that this is the first attempts to investigate the effect of female representation on boards on CEO overconfidence in the Korean stock market. The existing papers are characterized by inconclusive, ambiguous, or contradictory empirical results regarding the relationship between managerial personal traits, ESG investments, and firm value. Even though we do not try to directly investigate the firm value of ESG investments in the study, we believe that our study has significant implications for conveying creative insights on the ESG investments and firm value. The fact that overconfident managers are a significant driver of corporate ESG investments indicates that firms may pursue ESG investments neither because of financial motivation nor out of moral compulsion but to meet the managers' psychological demands. Managers may dream ESG goals and commit excessive resources consumption at the expense of shareholders even in cases where negative performance is expected. Agency theory has long reported that managements act in ways to maximize their personal interests and not the benefits of shareholders [63]. An understanding of psychological features offers us with a creative explanation of these types of misalignments, thereby deriving the need for independent monitoring mechanism such as gender diversity on boards.

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