



**Dimensions of Social and Environmental Performance and Firms' Reputation: Evidence from Misconducts**

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**ABSTRACT**

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This study examines whether firms with good reputation, better environmental and social performance help them to protect their value in case of the occurrence of ESG-related misconducts. Using a sample of firms listed at Taiwan Stock Exchange and are mandatory to issue ESG report during the period 2005 to 2019, the findings show that firms with better environmental and social performance are less likely to engage in ESG misconducts. Moreover, firms with the higher level of water consumption and employee turnover rate, and the lower level of salary are more likely to associate with misconducts.

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*Keywords: CSR, ESG, misconduct, reputation risk, firm performance*

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## 1. Introduction

The question on whether firms engage in CSR can protect their reputation, thereby enhancing the value of firms, has been being still controversial and discussed. Several studies document that engaging in CSR activities provides insurance-like protection while firms face the effect of negative events (Lins, Servaes, and Tamayo, 2017; Shiu and Yang, 2017; Wans, 2017; Christensen, 2016). These studies suggest that CSR engagement enhance firms' value. In addition, firms with strong reputation concern are more likely to provide high quality of financial information and are less likely to misstate their financial statements (Cao et al., 2012; Wans, 2017). But Bartov, Marra, and Momenté (2020) find that high CSR firms have more negative stock price response following the announcement of restatement stem from accounting fraud (other than the inadvertent error). Their findings suggest that firms' CSR performance may not necessarily enhance firms' value.

Many prior studies examine whether firms issue CSR report can protect the firm's reputation and firms' value by investigating the association between CSR reporting (or whether CSR report is assured or not) and the market reaction for firms with ESG-related misconducts (Do and Wu, 2019; Christensen, 2016). Some studies further examine the association between firms' CSR performance, instead of issuing CSR report, and their firms' returns following the misconduct announcement (Bartov, Marra, and Momenté, 2020), or investigating which dimensions of social performance and environmental performance help firms prevent from the occurrence of future ESG-related misconducts. However, few study explores that firms engaging in which dimension of social activities and environmental activities are more likely to manage their operating risk relating to CSR issues well, and thereby reducing the likelihood of the occurrence of future misconducts as well as to explore which dimensions of CSR are a value driver to the company.

To fill the research gap, this study examines whether firms with good reputation and better environmental and social performance help to prevent them from the occurrence of ESG-related misconducts and protect firm value when ESG-related misconducts happen. This study has threefold of exploring (1) whether firms with better environmental and social performance are less likely to engage in ESG misconducts, (2) which dimensions of environmental and social performance play an insurance role to protect firm value by reducing the negative stock price reaction when the ESG misconducts occur, (3) whether firms with good reputation and better environmental and social performance are less likely to be associated with misconducts, and experiencing less negative stock price reaction following the occurrence of ESG-related misconducts.

This study will take sample of firms listed at Taiwan Stock Exchange and are mandatory to issue ESG report during the period 2005 to 2019 as data source for analysis. To strengthen the competitiveness of Taiwan's capital market and support corporation to commit to sustainable corporate development, the Financial Supervisory Commission (FSC) propose "Corporate Governance 3.0-Sustainable Development Roadmap", a three-year roadmap (2021 to 2023) to encourage corporation to commit to sustainable corporate development. The commission requires firms engage in ESG performance and disclose ESG-related useful information for investors' decision-making to enhance firms' information transparency, as well as, to establish a competent ESG ecosystem to promote sustainability related products and strengthen the communication with stakeholders, and to enhance the disclosure of sustainability reports referring to Task Force on Climate-related Financial Disclosures (TCGD) and Sustainability Accounting Standards Board (SASB) and assured by the third-party.

## 2. Literature Review

## 2.1 Socially responsible firms and misconducts

Firms with social responsibility investment often try to maintain their standards to help prevent future misconducts or accusations that could damage their brand and erode stakeholder trust. Their reputational incentives, scrutiny, culture, stakeholder expectations, and organizational policies all work together to promote social responsibility discipline in firms with high ratings and make misconduct less probable. Schnietz and Epstein (2005) found that businesses with strong corporate ethics and CSR reputation had higher financial performance, including lower incidence of governance problems. Firms that have built a strong reputation for social responsibility have more to lose if they engage in irresponsible or unethical practices. The risk of reputational damage helps deter misconduct. Goss and Roberts (2011) also suggests CSR activities signal ethics/integrity to lenders and investors, allowing easier access to capital at better terms due to perceived lower risk. When firms build stakeholder trust through social responsibility efforts, those stakeholders expect them to maintain high standards. Meeting expectations encourages proper conduct.

Moreover, highly-rated firms tend to face greater scrutiny of their practices. This higher level of observation makes it more difficult for them to get away with unethical practices without getting caught. And firms with strong social responsibility ratings often have cultures that genuinely value ethics and social impacts. Employees are more likely to make decisions aligned with those values rather than cutting corners. The culture discourages misconduct. Jiao (2010) proves that firms with poor CSR ratings were more likely to be involved in misconduct like earnings management and accounting fraud. Therefore, leading firms frequently have solid policies, reporting structures, compliance programs, and control systems aimed at ensuring responsible practices are followed. These mechanisms help prevent irresponsible behavior and make misconduct less likely. Christensen (2016) also finds that firms with corporate accountability activities can protect firm value and CSR firms are less likely to involve CSR-related misconducts (e.g., bribery, kickbacks, discrimination), and suggest managers can manage firms' operations better while they engage in the process of CSR reporting.

In Taiwan, Du and Wu (2019) examine the association between the credibility of CSR reporting assured by the third party and the CSR related misconducts, and show the results that CSR report may not be creditable unless CSR report is assured with the third party. They also find that CSR report assured by a third party experience a less stock price reaction for firms with the first-time offender of misconduct but not for repeat offender of misconduct. Following those findings, this study develops the hypothesis:

*H1: Socially responsible (irresponsible) firms are less (more) likely to be associated with misconducts.*

## 2.2 Socially responsible firms, misconducts and market reaction

Engaging in CSR activities provides insurance-like protection while firms face the effect of negative events (Lins, Servaes, and Tamayo, 2017; Shiu and Yang, 2017; Wans, 2017; Christensen, 2016). Therefore, managers may use corporate social responsibility (CSR) activities to build their firms' reputation, and then managers in the socially responsible firms are less likely to engage in the socially unacceptable activities (Kim, et al., 2012). Cao et al. (2012) provide evidence that firms with strong reputation concern are more likely to provide high quality of financial information and are less likely to misstate their financial statements.

Wans (2017) suggests that CSR engagement is a form of reputation insurance, since CSR activities may create firms' reputation, good images about firm products, which leads consumers buy more their products (Brown and Dacin, 1997), thus, increases firm value. In

addition, through CSR activities, firms may easily attract highly talented employees, since job seekers generally are more likely to pursue jobs from the socially responsible firms than from firms with poor CSR or bad reputation (Behrend et al., 2009; Tsai et al., 2014). Therefore, this study develops the following hypothesis:

*H2: A socially responsible (irresponsible) firm experiences a less (more) negative market reaction following the revelation of CSR-related misconduct.*

### **2.3 Firm reputation, socially responsible firms and market reaction**

Firms may use the issuance of CSR report to improve firms' reputation, which may provide insurance-like protection for firms to reduce negative consequences in the occurrence of bad events (Lins, Servaes, and Tamayo, 2017; Shiu and Yang, 2017; Christensen, 2016; Godfrey et al., 2009). Firms with strong reputation concern are more likely to provide high quality of financial information and are less likely to misstate their financial statements (Cao et al., 2012). In contrast, a scandal could significantly damage their brand and erase years of effort building trust and reputation with stakeholders. And the lawsuits may damage firms' reputation (MacDonald, 2012).

Klettner et al. (2014) found strong governance with board independence and stakeholder representation and focus on their reputation is negatively associated with unethical business practices. Good governance includes having strong oversight mechanisms like experienced boards of directors, independent audits, and internal controls. This oversight makes it more difficult for misconduct to occur without being detected. Thus, well-governed companies tend to be transparent about their operations, policies, risks, and other material issues. This transparency deters misconduct since problems are more likely to be uncovered and exposed publicly. Solid governance usually involves extensive codes of conduct, strong internal controls, detailed compliance programs, and training on ethics - making employees more aware of proper protocols. Therefore, a good governance with firm reputation increases the chance of detection, creates accountability, deters risky incentives, fosters ethical cultures, and gives employees tools to self-govern appropriately. These factors reinforce integrity and make misconduct less likely. However, firms with higher CSR performance experiences less negative stock price response following the inadvertent error of restatement announcement. High CSR firms have more negative stock price response following the announcement of restatement stem from accounting fraud, therefore, firms' CSR performance may not necessarily enhance firms' value (Bartov, Marra, and Momenté, 2020). Then, this study expects:

*H3a: Firms listed at corporate governance index with better social and environmental performance are less likely to be associated with misconducts*

*H3b: Firms listed at corporate governance index with better social and environmental performance experiences a less negative market reaction following the revelation of ESG-related misconducts.*

## **3. Research Design**

### **3.1 Sample and Data**

The sample consists firms listed at Taiwan stock exchange (TWSE) which conduct ESG misconducts from 2014 to 2019 in which CSR/ESG reports are compulsory. ESG misconduct data, the dimensions of ESG and financial data is collected from Taiwan Economic Journal (TEJ) database. ESG misconduct data includes the violation of environmental protection and safety for the environment performance, labor relation and safety for the social performance, and illegal violations. The dimension of environmental performance data includes information

of the quantity of Carbon-Emission, Energy-Consumption, and Water-Usage. Social performance data includes Employee-Turnover rate, and the level of salary information. Governance data includes the percentage of female directors, and information from the corporate governance evaluation system. After excluding missing data, firm's voluntarily issuing CSR report, and requiring all available data, this study consists of 226 firm-year observation of misconduct data, ESG data, and financial data. To mitigate the effect of outliers on the inference, this study winsorizes all continuous variables at the top and bottom 1% level.

### 3.2 Regression Models

To test *H1*, whether socially responsible firms in comparison with socially irresponsible firms are less likely to engage in ESG-related misconduct, this study investigates the association between the dimensions of firms' social performance (e.g., employee turnover, the level of salary) and environmental performance (e.g., the level of carbon emission; water usage, and energy consumption) and the occurrence of misconduct of firms. The information of misconducts related to CSR issues (e.g., violation of environmental issue, labor relation and illegal events) is used as dependent variables to proxy for misconducts.

The following Logistic Models are applied to test *H1*. This study uses the aggregate of environmental and social performance (*ES Index*) in Model 1 (a) to measure firms' total environmental and social performance. *E Index* and *S Index* in Model 1(b) is used to measure firms' environmental performance, as well as, social performance. Furthermore, Carbon-Emission, Energy-Consumption, Water-Usage is used to measure the dimension of environmental, and Employee-Turnover and Salary in Model 1 (c) for measuring firms' social performance.

$$\begin{aligned} Misconduct_{t+1}(0, 1) = & \beta_0 + \beta_1 ES\ Index_t + \beta_2 Female_t + \beta_3 Governance + \beta_4 Reputation_t + \\ & \beta_5 Assurance_t + \beta_6 Blockholder_t + \beta_7 ROA_t + \beta_8 SIZE_t + \beta_9 Growth_t + \beta_{10} \\ & R\&D\ intensity_t + \beta_{11} Competition_t + \beta_{12} Institution_t + \beta_{13} Industry + \\ & \beta_{14} YEAR + \varepsilon_t \end{aligned}$$

Model 1(a)

$$\begin{aligned} Misconduct_{t+1}(0, 1) = & \beta_0 + \beta_1 E\ Index_t + \beta_2 S\ Index + \beta_3 Female_t + \beta_4 Governance + \beta_5 \\ & Reputation_t + \beta_6 Assurance_t + \beta_7 Blockholder_t + \beta_8 ROA_t + \beta_9 SIZE_t + \\ & \beta_{10} Growth_t + \beta_{11} R\&D\ intensity_t + \beta_{12} Competition_t + \beta_{13} Institution_t + \\ & \beta_{14} Industry + \beta_{15} YEAR + \varepsilon_t \end{aligned}$$

Model 1(b)

$$\begin{aligned} Misconduct_{t+1}(0, 1) = & \beta_0 + \beta_1 Carbon-Emission_t + \beta_2 Energy-Consumption_t + \\ & \beta_3 Water-Usage_t + \beta_4 Employee-Turnover_t + \beta_5 Salary_t + \beta_6 Female_t + \\ & \beta_7 Governance + \beta_8 Reputation_t + \beta_9 Assurance_t + \beta_{10} Blockholder_t + \\ & \beta_{11} ROA_t + \beta_{12} SIZE_t + \beta_{13} Growth_t + \beta_{14} R\&D\ intensity_t + \\ & \beta_{15} Competition_t + \beta_{16} Institution_t + \beta_{17} Industry + \beta_{18} YEAR + \varepsilon_t \end{aligned}$$

Model 1(c)

Where Misconduct is an indicator variable that equals 1 if a firm engages in misconduct in year  $t+1$ , and 0 otherwise. Carbon-Emission is the level of Carbon-Emission divided by sales. Energy-Consumption is the level of Energy-Consumption divided by sales. Water-Usage is the level of Water-Usage divided by sales. Employee-Turnover is the rate of Employee-Turnover. Salary is the level of salary. The E index measures how environmentally responsible a company is compared to others in its industry. To calculate a company's E index, we look at the company's carbon emissions, water usage, and energy consumption; then compare these to other companies in the same industry to see what quartile the company falls into for each metric (bottom 25%, top 25%, etc); assign scores to each quartile (Bottom

quartile = 1, Second quartile = 2, Third quartile = 3, Top quartile = 4), then average the 3 scores. This gives the company's E index, with higher scores indicating more environmentally responsible performance compared to industry peers.

The S index measures how socially responsible a company is compared to others in its industry. To calculate a company's S index, we look at the company's employee turnover rate and average salary, then compare these metrics to other companies in the same industry to determine which quartile the company falls into for each (bottom 25%, top 25%, etc); assign scores for each quartile (Bottom quartile turnover rate = 1, Top quartile turnover rate = 4, Bottom quartile salary = 1, Top quartile salary = 4), then average the two scores. This gives the S index, with higher scores indicating more socially responsible performance versus industry peers. ES index: which is add the dummy variables of bottom (top) quartile of the level of carbon emission, water usage and energy consumption, employee turnover rate, and the top (bottom) quartile of the level of salary divided by 5 as responsible (irresponsible) firms.

Female data is a dummy variable that equals one if the ratio of female director more than the median equal one. Governance is a dummy variable that equals one if a firm got A based on the corporate governance evaluation system and zero otherwise. Reputation is an indicator that equals one if a firm listed at the corporate governance index. Assurance is a dummy variable equal one if a firms' CSR report is assured by the outside of party and zero otherwise. Blockholder (blockholder ownership) is an indicator that equals one if outside shareholders hold the firm's share more than ten percent of total share and zero otherwise.

Following prior studies (Christensen 2016; Du and Wu, 2019), this study controls several variables that may affect the likelihood of engaging in firms' misconduct. This study uses return on assets (ROA) to proxy for the financial performance, which may have a likelihood to give firms an incentive to conduct misconduct, and to control firms' size (SIZE), since large firms are less likely to conduct misconduct due to the consideration of reputation costs (Do and Wu, 2019). This study also controls firms' growth opportunities (Growth), R&D intensity, market share (Competition). Following Christensen (2016), this study also controls the percentage of institutional ownership to measure for good governance, as well as, controls industry, and firm-year, since firms with different industries and across different time may engage misconducts vary (Du and Wu, 2019). ROA is measured as net income divided by total assets. Firm SIZE is measured as the natural log of total assets. Growth is measured as market value divided by book value. R& D intensity is measured as research and development expense divided by sales. Competition is the market concentration, Herfindahl-Hirschman Index, calculated as the sum of the squares of the market shares of firms in an industry. Institution is the percentage of institutional ownership.

The variable interest of Model 1(a) is the coefficient of  $\beta_1$ . This study expects the coefficient of ES Index is negative and significant, if the socially responsible firms (firms with the aggregate of the top 25% of social performance and environmental performance in their industry) are less likely to associate with misconducts. This study also expects the coefficient of Female, Governance, Reputation, Assurance, Competition, and Institution as negative and significant, if firms with more female directors, firms with better corporate governance performance that firms listed at corporate governance index. Firms' CSR report is assured by the outside of the third party, firms with high market concentration, and firms with more institutional investors are less likely to conduct ESG misconducts.

The variable interest of Model 1(b) is the coefficient of  $\beta_1$  and  $\beta_2$ . This study expects the coefficient of E Index and S Index are negative and significant, if the socially responsible firms is less likely to associate with misconducts. The variable interest of Model 1(c) is the

coefficient of  $\beta_1$ ,  $\beta_2$ ,  $\beta_3$ ,  $\beta_4$ , and  $\beta_5$ . This study expects the coefficient of Carbon-Emission, Energy-Consumption, Water-Usage, Employee-Turnover, and salary as negative (positive) for responsible (irresponsible) firms, if the socially responsible firms is less likely to associate with misconducts.

To test  $H_2$ , whether a firm's social performance and environmental performance as reputation-insurance after the occurrence of misconduct, this study examines the association between the socially irresponsible (responsible) firm and the cumulative abnormal return of misconduct firms. The measurement of the socially responsible firm and irresponsible firms is based on firms' social performance (e.g., employee turnover rate, the level of salary) and environmental performance (e.g., the level of carbon emission, water usage, and energy consumption). The rate of employee turnover is used to proxy for firms' social performance, and the level of carbon emission, water usage, energy consumption is used to proxy for firms' environmental performance. The top (bottom) quartile of employee turnover rate, carbon emission, water usage, energy consumption and bottom (top) quartile of the level of salary are used to proxy the socially irresponsible (responsible) firm within the same industry.

To predict  $H_2$ , this study expects that there is a less negative or positive market reaction subsequent to the occurrence of misconducts for socially responsible firm relative to socially irresponsible firms. The following regression model is employed following prior studies (Du and Wu, 2020; Christensen, 2016).

$$CAR (-1, +1)_{t+1} = \beta_0 + \beta_1 ES Index_t + \beta_2 Female_t + \beta_3 Governance_t + \beta_4 Reputation_t + \beta_5 Assurance_t + \beta_6 Blockholder_t + \beta_7 ROA_t + \beta_8 SIZE_t + \beta_9 Growth_t + \beta_{10} R\&D intensity_t + \beta_{11} Competition_t + \beta_{12} Institution_t + \beta_{13} Industry_t + \beta_{14} YEAR_t + \varepsilon_t$$

Model 2(a)

Where CAR is the cumulative abnormal return over the three-trading-day window of (-1, +1), the day  $t$  is the first date that misconduct event reveal it to the public. The variable interest of Model 2(a) is the coefficient of  $\beta_1$ , *ES Index* which measures firms' aggregate of environmental and social performance. This study expects the coefficient of E Index and S Index is positive and significant, if the socially responsible firms (firms with the top 25% of social performance and environmental performance) experience a less market reaction relative to socially irresponsible firms (firms with the bottom 25% of social performance and environmental performance) subsequent to the occurrence of misconducts.

$$CAR (-1, +1)_{t+1} = \beta_0 + \beta_1 E Index_t + \beta_2 S Index_t + \beta_3 Female_t + \beta_4 Governance_t + \beta_5 Reputation_t + \beta_6 Assurance_t + \beta_7 Blockholder_t + \beta_8 ROA_t + \beta_9 SIZE_t + \beta_{10} Growth_t + \beta_{11} R\&D intensity_t + \beta_{12} Competition_t + \beta_{13} Institution_t + \beta_{14} Industry_t + \beta_{15} YEAR_t + \varepsilon_t$$

Model 2(b)

The variable interest of Model 2(b) is the coefficient of  $\beta_1$  and  $\beta_2$ . This study expects the coefficient of E Index and S Index which measures firms' environmental performance and social performance, respectively, are positive and significant, if the socially responsible firms (firms with the top 25% of the aggregate of social performance and environmental performance) experience positive market reaction or less negative market reaction and generate a cumulative abnormal return relative to socially irresponsible firms (firms with the bottom 25% of the aggregate of social performance and environmental performance in their industry) subsequent to the occurrence of misconducts.

$$CAR (-1, +1)_{t+1} = \beta_0 + \beta_1 Carbon-Emission_t + \beta_2 Energy-Consumption_t + \beta_3 Water-Usage_t + \beta_4 Employee-Turnover_t + \beta_5 Salary_t + \beta_6 Female_t + \beta_7 Governance_t + \beta_8 Reputation_t + \beta_9 Assurance_t + \beta_{10} Blockholder_t + \beta_{11} ROA_t + \beta_{12} SIZE_t +$$

$$\beta_{13}Growth_t + \beta_{14}R\&D\ intensity_t + \beta_{15}Competation_t + \beta_{16}Institution_t + \beta_{17}Industry + \beta_{18}YEAR + \varepsilon_t$$

Model 2(c)

The variable interest of Model 2c is the coefficient of  $\beta_1, \beta_2, \beta_3, \beta_4,$  and  $\beta_5$ . This study expects the coefficient of Carbon-Emission, Energy-Consumption, Water-Usage Employee-Turnover, and salary is positive and significant, if the socially responsible firms (firms with the top 25% of social performance and environmental performance) experience a less market reaction relative to socially irresponsible firms (firms with the bottom 25% of social performance and environmental performance) subsequent to the occurrence of misconducts.

To test H3a which explores whether firms with higher reputation (listed at the corporate governance index) are less likely to associate with ESG-related misconducts, this study proxy for firms' reputation using measures based on firms listed at Corporate Governance Index. The authors firstly examines the effect of firms' reputation on the aggregate of environmental and social performance and firms' ESG-related misconducts by developing the Model 3 (a)

$$\begin{aligned} Misconduct_{t+1}(0, 1) = & \beta_0 + \beta_1 ES\ Index_t + \beta_2 ES\ Index * Reputation_t + \beta_3 Female_t + \beta_4 \\ & Governance + \beta_5 Reputation_t + \beta_6 Assurance_t + \beta_7 Blockholder_t + \\ & \beta_8 ROA_t + \beta_9 SIZE_t + \beta_{10} Growth_t + \beta_{11} R\&D\ intensity_t + \\ & \beta_{12} Competation_t + \beta_{13} Institution_t + \beta_{14} Industry + \beta_{15} YEAR + \varepsilon_t \end{aligned}$$

Model 3 (a)

The variable interest of Model 3(a) is the interaction term of coefficient of  $\beta_2$ , this study expects the coefficient of  $\beta_2$  is negative and significant if high reputation firms with the top 25% of the aggregate of social and environmental performance in their industry are less likely to conduct ESG misconducts.

This study further examines the effect of firms' reputation on each of environmental performance and social performance and firms' ESG-related misconducts by developing the following model.

$$\begin{aligned} Misconduct_{t+1}(0, 1) = & \beta_0 + \beta_1 E_t + \beta_2 E\ Index * Reputation_t + \beta_3 S_t + \beta_4 S\ Index * Reputation_t \\ & + \beta_5 Female_t + \beta_6 Governance + \beta_7 Reputation_t + \beta_8 Assurance_t + \beta_9 \\ & Blockholder_t + \beta_{10} ROA_t + \beta_{11} SIZE_t + \beta_{12} Growth_t + \beta_{13} R\&D\ intensity_t + \\ & \beta_{14} Competation_t + \beta_{15} Institution_t + \beta_{16} Industry + \beta_{17} YEAR + \varepsilon_t \end{aligned}$$

Model 3(b)

The variable interest of Model 3(b) is the interaction term of coefficient of  $\beta_2$ , and  $\beta_4$ , this study expects the coefficient of  $\beta_2$  and  $\beta_4$  are negative and significant, if high reputation firms with a higher environmental index and social index (with the top 25% of the aggregate of environmental and social performance in their industry) are less likely to conduct ESG-related misconducts.

To examine the effect of firms' reputation on environmental and social dimension and ESG-related misconducts, the following model was developed.

$$\begin{aligned} Misconduct_{t+1}(0, 1) = & \beta_0 + \beta_1 Carbon-Emission_t + \beta_2 Energy-Consumption_t + \\ & \beta_3 Water-Usage_t + \beta_4 Employee-Turnover_t + \beta_5 Salary_t + \beta_6 \\ & Carbon-Emission * Reputation_t + \beta_7 Energy-Consumption * Reputation_t \\ & + \beta_8 Water-Usage * Reputation_t + \beta_9 Employee-Turnover * Reputation_t + \\ & \beta_{10} Salary * Reputation_t + \beta_{11} Female_t + \beta_{12} Governance + \beta_{13} \\ & Reputation_t + \beta_{14} Assurance_t + \beta_{15} Blockholder_t + \beta_{16} ROA_t + \beta_{17} SIZE_t + \\ & \beta_{18} Growth_t + \beta_{19} R\&D\ intensity_t + \beta_{20} Competation_t + \beta_{21} Institution_t + \end{aligned}$$



$$\beta_{22}Industry + \beta_{23}YEAR + \varepsilon_t$$

Model 3(c)

The variable interest of Model 3(c) is the interaction term of coefficient of  $\beta_6, \beta_7, \beta_8, \beta_9,$  and  $\beta_{10}$ , this study expects the coefficient of  $\beta_6, \beta_7, \beta_8, \beta_9,$  and  $\beta_{10}$ , is negative and significant, if high reputation firms with a low level of Carbon-Emission, Energy-Consumption, Water-Usage and have lower rate of Employee-Turnover and high level of employees' salary are less likely to conduct ESG misconducts

To test H3b, whether firms with high reputation experience a less negative market reaction following the occurrence of CSR-related misconducts, and to identify what type of social performance, diversity, and legal responsibilities, and environmental performance as reputation-insurance after the occurrence of misconduct. This study employs the following regression model:

$$CAR (-1, +1)_{t+1} = \beta_0 + \beta_1 ES Index_t + \beta_1 ES Index * Reputation_t + \beta_3 Female_t + \beta_4 Governance + \beta_5 Reputation_t + \beta_6 Assurance_t + \beta_7 Blockholder_t + \beta_8 ROA_t + \beta_9 SIZE_t + \beta_{10} Growth_t + \beta_{11} R\&D intensity_t + \beta_{12} Competition_t + \beta_{13} Institution_t + \beta_{14} Industry + \beta_{15} YEAR + \varepsilon_t$$

Model 4(a)

The variable interest of Model 4(a) is the interaction term of coefficient of  $\beta_1$ , this study expects the coefficient of  $\beta_1$  is positive and significant, if high reputation firms are more likely to reduce market negative reaction and generate a positive abnormal return.

$$CAR (-1, +1)_{t+1} = \beta_0 + \beta_1 E_t + \beta_2 E Index * Reputation_t + \beta_3 S_t + \beta_4 S Index * Reputation_t + \beta_5 Female_t + \beta_6 Governance + \beta_7 Reputation_t + \beta_8 Assurance_t + \beta_9 Blockholder_t + \beta_{10} ROA_t + \beta_{11} SIZE_t + \beta_{12} Growth_t + \beta_{13} R\&D intensity_t + \beta_{14} Competition_t + \beta_{15} Institution_t + \beta_{16} Industry + \beta_{17} YEAR + \varepsilon_t$$

Model 4(b)

The variable interest of Model 4(b) is the interaction term of coefficient of  $\beta_2,$  and  $\beta_4$ . This study expects the coefficient of  $\beta_2,$  and  $\beta_4,$  are positive and significant if high reputation firms are more likely to reduce market negative reaction and generate a positive abnormal return.

$$CAR (-1, +1)_{t+1} = \beta_0 + \beta_1 Carbon-Emission_t + \beta_2 Energy-Consumption_t + \beta_3 Water-Usage_t + \beta_4 Employee-Turnover_t + \beta_5 Salary_t + \beta_6 Carbon-Emission * Reputation_t + \beta_7 Energy-Consumption * Reputation_t + \beta_8 Water-Usage * Reputation_t + \beta_9 Employee-Turnover * Reputation_t + \beta_{10} Salary * Reputation_t + \beta_{11} Female_t + \beta_{12} Governance + \beta_{13} Reputation_t + \beta_{14} Assurance_t + \beta_{15} Blockholder_t + \beta_{16} ROA_t + \beta_{17} SIZE_t + \beta_{18} Growth_t + \beta_{19} R\&D intensity_t + \beta_{20} Competition_t + \beta_{21} Institution_t + \beta_{22} Industry + \beta_{23} YEAR + \varepsilon_t$$

Model 4(c)

The variable interest of Model 4(c) is the interaction term of coefficient of  $\beta_5, \beta_6, \beta_7, \beta_8, \beta_9,$  and  $\beta_{10}$ . This study expects the coefficient of  $\beta_5, \beta_6, \beta_7, \beta_8, \beta_9,$  and  $\beta_{10}$  is positive and significant if high reputation firms are more likely to reduce market negative reaction and generate a positive abnormal return.

## 4. Empirical results

### 4.1 Descriptive Statistics

Table 1 reports the descriptive statistics for variables used in this study, which shows that the

mean of Misconduct is 0.413, indicating 41 percentage of firm-year in the sample, firms are conducting misconduct following the mandatory to report CSR/ESG performance. The mean of accumulated abnormal return (CAR) is -0.221 and the standard deviation (2.451) is pretty high, indicating large amounts of variability among the data of CAR. The mean of good environmental performance firms regarding to the lower level of Carbon-Emission, Energy-Consumption, and Water-Usage is 0.164, 0.253, and 0.271, respectively, which indicates that 16, 25, and 27 percentage of firm-year in the sample, firms are engaged in the lower level of Carbon-Emission, Energy-Consumption, and Water-Usage consumption, respectively. The mean of bad environmental performance regarding to the high level of Carbon-Emission, Energy-Consumption, and Water-Usage is 0.347, 0.216, and 0.253, respectively. This means that 35, 22, 25 percentage of firm-year in the sample, firms are engage in high level of Carbon-Emission, Energy-Consumption, and Water-Usage consumption, respectively. The mean of good social performance firm regarding to the lower level of Employee-Turnover rate is 0.320 and the high level of salary is 0.320 and 0.107, respectively. The mean of bad social performance firm regarding to the high level of Employee-Turnover rate is 0.084 and the lower level of salary is 0.013, respectively.

**Table 1 Descriptive statistics**

	Mean	Median	Maximum	Minimum	Std. Dev.
CAR	-0.221	-0.377	11.585	-8.604	2.451
Misconduct	0.413	0.000	1.000	0.000	0.494
Return	0.012	0.000	0.193	-0.101	0.057
Good ES	0.558	0.500	1.500	0.000	0.416
Bad ES	0.427	0.500	2.500	0.000	0.498
Good E	0.689	1.000	3.000	0.000	0.768
Bad E	0.756	0.000	3.000	0.000	0.934
Good S	0.427	0.000	2.000	0.000	0.513
Bad S	0.098	0.000	2.000	0.000	0.312
Good Carbon-Emission	0.164	0.000	1.000	0.000	0.372
Good Energy-Consumption	0.253	0.000	1.000	0.000	0.436
Good Water-Usage	0.271	0.000	1.000	0.000	0.446
Good Employee-Turnover	0.320	0.000	1.000	0.000	0.468
Good Salary	0.107	0.000	1.000	0.000	0.309
Bed Carbon-Emission	0.347	0.000	1.000	0.000	0.477
Bad Energy-Consumption	0.156	0.000	1.000	0.000	0.363
Bad Water-Usage	0.253	0.000	1.000	0.000	0.436
Bad Employee-Turnover	0.084	0.000	1.000	0.000	0.279
Bad Salary	0.013	0.000	1.000	0.000	0.115
Female	0.693	1.000	1.000	0.000	0.462
Governance	0.720	1.000	1.000	0.000	0.450
Reputation	0.360	0.000	1.000	0.000	0.481
Assurance	0.756	1.000	1.000	0.000	0.431
Blockholder	0.738	1.000	1.000	0.000	0.441
ROA	0.029	0.012	0.176	-0.077	0.043
SIZE	8.581	8.655	9.965	5.785	0.970
Growth	1.108	0.792	8.041	0.379	0.924
R&D intensity	0.284	0.000	1.000	0.000	0.452
Competition	0.277	0.149	1.000	0.038	0.270
Institution	0.203	0.199	0.728	0.000	0.139

## 4.2 Correlation results

Table 2 provides the Pearson correlations coefficients that shows that good social performance in lower employee turnover rate is positively correlated with accumulated

abnormal return. In addition, good environmental performance in the lower level of carbon emission and good social performance in the high level of salary are negatively correlated with misconducts. Moreover, firms with high proportion of female directors and firms with high competition capability are negatively correlated with misconducts.

**Table 2 Correlation**

	CAR	Misco	Return	GoodES	BadES	X6	X7	X8	X9	X10	X11	X12	X13	X14	X15	X16	X17	X18	X19	X24	X25	X26	X27	X29	X32	X33	X34	X36	X37	X38
CAR	1	0.115	0.051	0.139	0.047	0.03	0.053	0.181	-0.01	-0.03	-0	0.081	0.186	0.02	0.11	-0.02	0.009	0.003	-0.03	-0.06	-0.06	0.055	0.004	0.018	-0.07	0.015	-0.01	-0.08	-0.02	0.009
Misconduct	0.115	1	0.2	0.09	-0.031	0.164	-0.061	-0.1	0.084	-0.2	0.175	0.28	0.005	-0.17	-0.04	-0.14	0.03	0.102	-0.02	-0.24	0.142	0.104	0.12	0.275	-0.22	0.288	-0.12	0.011	-0.19	0.104
Return	0.051	0.2	1	0.184	-0.088	0.202	-0.067	-0.003	-0.081	0.014	0.063	0.275	0.015	-0.03	0.005	-0.08	-0.08	-0.1	0.013	-0.14	0.209	0.1	-0.09	0.15	-0.1	0.099	0.033	-0.05	-0.14	0.222
Good ES	0.139	0.09	0.184	1	-0.438	0.797	-0.412	0.428	-0.164	0.27	0.51	0.65	0.329	0.212	-0.45	-0.15	-0.27	-0.16	-0.06	-0.04	0.111	0.141	-0.22	0.156	-0.02	0.115	-0.1	-0.1	-0.08	-0.04
Bad ES	0.047	-0.03	-0.09	-0.438	1	-0.47	0.95	0.001	0.348	-0.13	-0.35	-0.37	0.044	-0.07	0.718	0.668	0.693	0.286	0.251	0.106	-0.04	0.036	0.239	-0.08	0.254	-0.14	0.254	0.153	0.063	-0.08
Good E	0.03	0.164	0.202	0.797	-0.474	1	-0.5044	-0.2052	-0.0029	0.321	0.743	0.73	-0.18	-0.07	-0.57	-0.21	-0.28	-0	-0	-0.22	0.057	0.22	-0.12	0.048	-0.05	0.185	-0.09	-0.16	-0.03	0.053
Bad E	0.053	-0.06	-0.07	-0.412	0.95	-0.5	1	0.088	0.036	-0.14	-0.36	-0.4	0.119	-0.03	0.792	0.678	0.712	-0.01	0.114	0.125	-0	0.038	0.25	-0.06	0.323	-0.14	0.308	0.197	0.091	-0.08
Good S	0.181	-0.1	-0	0.428	0.001	-0.21	0.088	1	-0.261	-0.04	-0.29	-0.04	0.805	0.443	0.123	0.073	-0.01	-0.25	-0.1	0.272	0.094	-0.1	-0.17	0.181	0.03	-0.09	-0.02	0.071	-0.08	-0.14
Bad S	-0.01	0.084	-0.08	-0.164	0.348	-0	0.036	-0.261	1	0.015	-0.02	0.001	-0.22	-0.11	-0.08	0.101	0.08	0.931	0.461	-0.04	-0.12	0.002	0.013	-0.07	-0.16	-0.03	-0.11	-0.1	-0.07	-0.03
Good Carbon-Emission	-0.03	-0.2	0.014	0.27	-0.128	0.321	-0.141	-0.042	0.015	1	-0.12	-0.16	0.056	-0.15	-0.32	0.074	-0.01	-0.05	0.158	0.243	-0.36	-0.23	-0.33	-0.14	-0.07	-0.27	-0.14	-0.2	-0	-0.11
Good Energy-Consum	-0	0.175	0.063	0.51	-0.346	0.743	-0.362	-0.286	-0.019	-0.12	1	0.403	-0.31	-0	-0.4	-0.25	-0.13	0.007	-0.07	-0.32	0.204	0.308	0.212	-0	0.173	0.371	0.059	-0.07	0.096	0.106
Good Water-Usage	0.081	0.28	0.275	0.65	-0.373	0.73	-0.398	-0.04	0.001	-0.16	0.403	1	-0.05	0.016	-0.32	-0.18	-0.36	0.031	-0.07	-0.27	0.202	0.272	-0.14	0.204	-0.19	0.181	-0.1	-0.03	-0.14	0.083
Good Emplo-Turnover	0.186	0.005	0.015	0.329	0.044	-0.18	0.119	0.805	-0.215	0.056	-0.31	-0.05	1	-0.18	0.101	0.1	0.06	-0.21	-0.08	0.27	-0.04	-0.2	-0.32	0.062	0.067	-0.24	-0.04	0.201	-0.05	-0.17
Good Salary	0.02	-0.17	-0.03	0.212	-0.065	-0.07	-0.033	0.443	-0.108	-0.15	-0	0.016	-0.18	1	0.051	-0.03	-0.1	-0.11	-0.04	0.042	0.215	0.131	0.197	0.206	-0.05	0.217	0.034	-0.19	-0.06	0.028
Bed Carbon-Emission	0.11	-0.04	0.005	-0.45	0.718	-0.57	0.792	0.123	-0.079	-0.32	-0.4	-0.32	0.101	0.051	1	0.357	0.306	-0.09	-0	-0.08	0.038	0.096	0.219	0.073	0.122	-0.09	0.236	0.058	-0.03	0.106
Bad Energy-Consum	-0.02	-0.14	-0.08	-0.148	0.668	-0.21	0.678	0.073	0.101	0.074	-0.25	-0.18	0.1	-0.03	0.357	1	0.229	0.002	0.271	0.046	-0.01	0.164	0.073	0.005	0.303	-0.13	0.367	0.056	-0.13	-0.02
Bad Water-Usage	0.009	0.03	-0.08	-0.266	0.693	-0.28	0.712	-0.006	0.08	-0.01	-0.13	-0.36	0.06	-0.1	0.306	0.229	1	0.08	0.021	0.321	-0.05	-0.16	0.236	-0.21	0.306	-0.08	0.097	0.312	0.337	-0.27
Bad Emplo-Turnover	0.003	0.102	-0.1	-0.158	0.286	-0	-0.006	-0.253	0.931	-0.05	0.007	0.031	-0.21	-0.11	-0.09	0.002	0.08	1	0.104	-0.08	-0.06	0.039	0.061	-0	-0.16	-0	-0.1	-0.09	-0.06	0.021
Bad Salary	-0.03	-0.02	0.013	-0.063	0.251	-0	0.114	-0.097	0.461	0.158	-0.07	-0.07	-0.08	-0.04	-0	0.271	0.021	0.104	1	0.077	-0.19	-0.09	-0.11	-0.2	-0.03	-0.07	-0.06	-0.07	-0.04	-0.13
Female	-0.06	-0.24	-0.14	-0.035	0.106	-0.22	0.125	0.272	-0.039	0.243	-0.32	-0.27	0.27	0.042	-0.08	0.046	0.321	-0.08	0.077	1	-0.07	-0.3	-0.15	-0.18	0.129	-0.23	-0.07	0.184	0.235	-0.3
Governance	-0.06	0.142	0.209	0.111	-0.042	0.057	-0.004	0.094	-0.122	-0.36	0.204	0.202	-0.04	0.215	0.038	-0.01	-0.05	-0.06	-0.19	-0.07	1	0.447	0.359	0.461	0.027	0.613	0.137	-0.24	-0.24	0.358
Reputation	0.055	0.104	0.1	0.141	0.036	0.22	0.038	-0.101	0.002	-0.23	0.308	0.272	-0.2	0.131	0.096	0.164	-0.16	0.039	-0.09	-0.3	0.447	1	0.319	0.426	-0.04	0.429	0.208	-0.33	-0.33	0.398
Assurance	0.004	0.12	-0.09	-0.22	0.239	-0.12	0.25	-0.172	0.013	-0.33	0.212	-0.14	-0.32	0.197	0.219	0.073	0.236	0.061	-0.11	-0.15	0.359	0.319	1	0.131	0.095	0.503	0.246	-0.17	0.049	0.173
Blockholder	0.018	0.275	0.15	0.156	-0.078	0.048	-0.059	0.181	-0.072	-0.14	-0	0.204	0.062	0.206	0.073	0.005	-0.21	-0	-0.2	-0.18	0.461	0.426	0.131	1	-0.26	0.466	-0.04	-0.25	-0.57	0.6
ROA	-0.07	-0.22	-0.1	-0.024	0.254	-0.05	0.323	0.03	-0.156	-0.07	0.173	-0.19	0.067	-0.05	0.122	0.303	0.306	-0.16	-0.03	0.129	0.027	-0.04	0.095	-0.26	1	-0.25	0.699	0.36	0.456	-0.12
SIZE	0.015	0.288	0.099	0.115	-0.135	0.185	-0.135	-0.091	-0.027	-0.27	0.371	0.181	-0.24	0.217	-0.09	-0.13	-0.08	-0	-0.07	-0.23	0.613	0.429	0.503	0.466	-0.25	1	-0.11	-0.47	-0.46	0.466
Growth	-0.01	-0.12	0.033	-0.098	0.254	-0.09	0.308	-0.02	-0.112	-0.14	0.059	-0.1	-0.04	0.034	0.236	0.367	0.097	-0.1	-0.06	-0.07	0.137	0.208	0.246	-0.04	0.699	-0.11	1	0.121	0.174	0.028
R&D intensity	-0.08	0.011	-0.05	-0.1	0.153	-0.16	0.197	0.071	-0.103	-0.2	-0.07	-0.03	0.201	-0.19	0.058	0.056	0.312	-0.09	-0.07	0.184	-0.24	-0.33	-0.17	-0.25	0.36	-0.47	0.121	1	0.567	-0.4
Competition	-0.02	-0.19	-0.14	-0.076	0.063	-0.03	0.091	-0.077	-0.07	-0	0.096	-0.14	-0.05	-0.06	-0.03	-0.13	0.337	-0.06	-0.04	0.235	-0.24	-0.33	0.049	-0.57	0.456	-0.46	0.174	0.567	1	-0.45
Institution	0.009	0.104	0.222	-0.036	-0.083	0.053	-0.079	-0.138	-0.029	-0.11	0.106	0.083	-0.17	0.028	0.106	-0.02	-0.27	0.021	-0.13	-0.3	0.358	0.398	0.173	0.6	-0.12	0.466	0.028	-0.4	-0.45	1

### 4.3. Regression results

#### 4.3.1. ESG performance and the occurrence of misconduct

Table 3 presents the regression results for Model 1 to test H1. Panel A of Table 3 reports the association between the occurrence of misconduct and the aggregate of environmental and social index. It shows that the coefficient of ES index is not associated with ESG-related misconducts for firms with top 25% of environmental and social performance, but significant and positively associated with ESG misconducts for firms with bottom 25% of environmental and social performance. In addition, the coefficient of Female is negative and significantly associate with ESG-related misconduct for firms with top and bottom 25% of environmental and social performance. The result on panel B of Table 3 shows that the coefficient of E index and S index is not associated with misconducts for firms with better environmental and social performance, while the S index is positive and significantly associated with misconduct for firms with bad social performance. Moreover, the result on panel C of Table 3 shows that the coefficient of Energy-Consumption is positive and significantly associated with misconduct for firms with lower level of energy consumption. But the coefficient of Water-Usage, Employee-Turnover, and Salary are positive and significantly associated with misconducts for firms with high level of water usage and employee turnover rate, and firms with lower level of salary.

These findings support H1 in which firms with better environmental and social performance relative to socially irresponsibility are less likely to engage in misconducts. In particular, firms with the high level of water consumption and employee turnover rate, as well as, low level of salary are more likely to associate with misconducts.

**Table 3 ESG performance and the occurrence of ESG-related misconduct (test H 1)**

Panel A: The association between misconduct and aggregate of environmental and social index

Variable	Responsible firms misconduct Top 25% ES performance firm		Irresponsible firms misconduct Lower 25% ES performance firm	
	Coef	z-Stat	Coef	z-Stat
Intercept	-17.63	-4.07 ***	-19.18	-4.26 ***
ES index	0.56	0.76	1.09	1.83 *
Female	-1.09	-2.09 **	-1.30	-2.48 ***
Governance	-1.80	-1.65	-1.70	-1.42
Reputation	-0.78	-1.15	-0.53	-0.76
Assurance	3.47	1.85 *	2.56	1.41
Blockholder	1.24	0.99	0.99	0.83
ROA	33.63	1.91 *	29.44	1.67 *
SIZE	2.02	3.53 ***	2.26	3.78 ***
Growth	-0.09	-0.29	0.11	0.39
R&D intensity	-1.69	-1.67	-0.99	-0.95
Competition	-6.07	-2.75 ***	-5.89	-3.10 ***
Institution	-6.20	-1.70 *	-6.23	-1.65
INDUSTRY		Included		Included
YEAR		Included		Included
Obs		226		226
McFadden Adj <sup>2</sup>		0.49		0.49

ES index: E is a firm's environmental performance. S is a firm's social performance. E is calculated as the quartile of Environment performance in the same industry, the bottom (top) quartile of the level of carbon emission, water usage and energy consumption in the same industry equal one, respectively, and then add the three amounts divided by 3 to proxy for

responsible (irresponsible) firms for environmental performance. S is calculated as the quartile of social performance in the same industry, the bottom (top) quartile of employee turnover rate in the same industry equal one to proxy for a responsible (irresponsible) firm, the top (bottom) quartile of the level of salary in the same industry equal one to proxy for a responsible (irresponsible) firm, and then add the two amounts divided by 2 to proxy for social performance. ES index is add the dummy variables of bottom (top) quartile of the level of carbon emission, water usage and energy consumption, employee turnover rate, and the top (bottom) quartile of the level of salary divided by 5 as responsible (irresponsible) firms.

Panel B The association between environmental index, social index and misconduct

Variable	Responsible firms misconduct		Irresponsible firms misconduct	
	Top 25% E and S performance firm		Lower 25% E and S performance firm	
	Coef	z-Stat	Coef	z-Stat
Intercept	-13.62	-3.57 ***	-15.62	-3.97 ***
E index	0.25	0.68	0.20	0.58
S index	-0.15	-0.25	2.13	2.85 **
Female	-1.19	-2.33 **	-1.53	-3.07 ***
Governance	-1.48	-1.54	-1.50	-1.45
Reputation	-0.91	-1.34	-0.77	-1.11
Assurance	3.14	1.90 *	3.01	1.87
Blockholder	1.55	1.34	1.18	1.06
ROA	28.60	2.09 **	25.12	2.09 **
SIZE	1.62	3.24 ***	1.90	3.96 ***
Growth	-0.10	-0.34	0.16	0.58
R&D intensity	-1.51	-1.39	-0.81	-0.78
Competition	-5.83	-2.99 ***	-5.77	-3.30 ***
Institution	-6.39	-1.71 *	-6.62	-1.84 *
INDUSTRY	Included		Included	
YEAR	Included		Included	
Obs	226		226	
McFadden Adj <sup>2</sup>	0.48		0.50	

Panel C: The association between environmental dimension, social dimension and misconduct

Variable	Responsible firms misconduct		Irresponsible firms misconduct	
	Top 25% E&S performance firm		Lower 25% E&S performance firm	
	Coef	z-Stat	Coef	z-Stat
Intercept	-10.72	-2.80 ***	-9.80	-2.46 ***
<i>Carbon-Emission</i>	0.00	-0.01	-0.58	-0.86
<i>Energy-Consumption</i>	2.52	3.43 ***	-2.39	-1.79 *
<i>Water-Usage</i>	-1.68	-1.66	2.24	2.06 **
<i>Employee-Turnover</i>	0.03	0.04	1.83	2.37 **
<i>Salary</i>	-1.55	-1.37	4.02	2.46 ***
Female	-1.56	-2.18 **	-2.18	-3.67 ***
Governance	-0.93	-1.00	-1.71	-1.34
Reputation	-1.14	-1.41	-0.95	-1.32
Assurance	2.96	1.94 **	3.32	1.69 *
Blockholder	1.77	1.47	1.12	0.85
ROA	24.43	1.76 *	32.39	1.84 *
SIZE	1.33	2.68 ***	1.33	2.59 ***
Growth	-0.02	-0.05	0.13	0.40
R&D intensity	-1.64	-1.53	-1.50	-1.23
Competition	-7.90	-3.32 ***	-7.99	-3.06 ***

Institution	-7.25	-1.82 *	-5.51	-1.17
INDUSTRY	Included		Included	
YEAR	Included		Included	
Obs	226		226	
McFadden Adj <sup>2</sup>	0.49		0.49	

**Table 4: Effect of environmental and social performance on accumulated abnormal return after the revelation of ESG-related misconduct for social responsible and irresponsible firm (Test H 2)**

Panel A: The association between total environmental and social index, and abnormal return

Variable	Responsible firms CAR		Irresponsible firms CAR	
	Top 25% ES performance firm		Lower 25% ES performance firm	
	Coef	t-Stat	Coef	t-Stat
Intercept	1.10	0.37	0.95	0.32
ES index	0.68	1.59	0.61	1.57
Female	-0.53	-1.31	-0.66	-1.58
Governance	-0.60	-1.18	-0.61	-1.20
Reputation	0.10	0.20	0.17	0.33
Assurance	0.86	1.36	0.52	0.81
Blockholder	-0.30	-0.51	-0.09	-0.15
ROA	-5.59	-0.60	-3.25	-0.35
SIZE	-0.33	-0.88	-0.32	-0.88
Growth	0.41	2.27 **	0.47	2.38
R&D intensity	-0.06	-0.08	0.12	0.15
Competition	0.01	0.01	0.21	0.15
Institution	0.93	0.50	0.30	0.15
INDUSTRY	Included		Included	
YEAR	Included		Included	
Obs	226		226	
Adj <sup>2</sup>	0.13		0.13	

Panel B: The association between environmental index, social index, and abnormal return

Variable	Responsible firms CAR		Irresponsible firms CAR	
	Top 25% E and S performance firm		Lower 25% E and S performance firm	
	Coef	t-Stat	Coef	t-Stat
Intercept	0.45	0.18	1.06	0.43
E index	0.04	0.18	0.22	1.03
S index	1.25	2.68 **	0.17	0.41
Female	-0.69	-1.68 *	-0.56	-1.35
Governance	-0.85	-1.72 *	-0.60	-1.23
Reputation	0.51	1.09	0.29	0.59
Assurance	0.75	1.24	0.36	0.56
Blockholder	-0.54	-0.83	-0.03	-0.05
ROA	-8.75	-1.09	-7.53	-0.88
SIZE	-0.09	-0.29	-0.11	-0.38
Growth	0.39	2.10	0.33	1.68
R&D intensity	-0.87	-1.52	-0.99	-1.65
Competition	0.78	0.69	0.83	0.69
Institution	1.00	0.54	-0.02	-0.01
INDUSTRY	Included		Included	
YEAR	Included		Included	
Obs	226		226	

	0.07		0.03	
Panel C: The association between environmental dimension, social dimension and abnormal return				
Variable	Responsible firms CAR		Irresponsible firms CAR	
	Top 25% E&S performance firm		Lower 25% E&S performance firm	
	Coef	t-Stat	Coef	t-Stat
Intercept	0.48	0.18	0.60	0.23
<i>Carbon-Emission</i>	-0.42	-0.79	0.48	1.11
<i>Energy-Consumption</i>	-0.05	-0.11	-0.09	-0.15
<i>Water-Usage</i>	0.39	1.01	0.15	0.33
<i>Employee-Turnover</i>	1.53	3.33 ***	0.43	0.85
<i>Salary</i>	-0.34	-0.40	-0.67	-0.65
Female	-0.60	-1.37	-0.47	-1.16
Governance	-1.00	-2.01 **	-0.68	-1.39
Reputation	0.45	1.00	0.32	0.65
Assurance	0.82	1.38	0.24	0.36
Blockholder	-0.30	-0.44	-0.10	-0.17
ROA	-9.27	-1.16	-5.96	-0.69
SIZE	-0.11	-0.37	-0.04	-0.12
Growth	0.41	2.31 **	0.30	1.53
R&D intensity	-1.01	-1.74 *	-0.99	-1.64
Competition	1.24	1.06	0.70	0.58
Institution	0.78	0.42	-0.25	-0.14
INDUSTRY	Included		Included	
YEAR	Included		Included	
Obs	226		226	
Adj <sup>2</sup>	0.08		0.02	

### 4.3.3 Effect of firm reputation on ESG performance and ESG-related misconduct

Table 5 reports the results for the test of H3a which predicts that firms (listed at corporate governance index) with better reputation and better environmental and social performance are less likely to be associated with ESG-related misconducts. Panel A of Table 5 shows that the coefficient of ES index\*reputation is significantly negative associated with ESG-related misconducts for top 25% of the aggregate of environmental and social performance firms, while the coefficient of ES index\*reputation for bottom 25% of environmental and social performance firms is not significant. Panel B of Table 5 also shows that the environmental index\*reputation and social index\*reputation is negative and significant associated with ESG-related misconducts. These findings are consistent with the findings of panel A of Table 5, as well as, confirm our prediction. Furthermore, panel C of Table 5 reports that the coefficient of Water-Usage\*reputation and Employee-Turnover\*reputation both are negative and significant at one percent level. This suggests that firms with better reputation and engage in the lower level of water usage and employee turnover are less likely to engage in ESG-related misconducts.



**Table 5: Effect of firm reputation on ESG performance and ESG-related misconduct for social responsible and irresponsible firm (Test H 3a)**

Panel A: Interaction term of environmental, social index\*reputation and misconduct

Variable	Responsible firms misconduct Top 25% ES performance firm		Irresponsible firms misconduct Lower 25% ES performance firm	
	Coef	z-Stat	Coef	z-Stat
Intercept	-28.38	-4.77 ***	-19.52	-4.35 ***
ES index	4.14	2.59 ***	1.51	2.10 **
ES index*reputation	-6.01	-3.10 ***	-1.16	-1.04
Female	-2.15	-3.40 ***	-1.20	-2.37 ***
Governance	-2.67	-2.15 **	-1.57	-1.26
Reputation	2.43	2.01 **	-0.08	-0.11
Assurance	5.73	2.98 ***	2.29	1.32
Blockholder	0.35	0.23	0.93	0.81
ROA	43.32	2.19 **	29.22	1.74 *
SIZE	3.13	4.61 ***	2.20	3.61 ***
Growth	-0.17	-0.43	0.17	0.56
R&D intensity	-2.55	-2.20 **	-0.58	-0.55
Competition	-7.41	-2.77 ***	-5.71	-3.20 ***
Institution	-9.25	-2.63 ***	-5.47	-1.55
INDUSTRY	Included		Included	
YEAR	Included		Included	
Obs	226		226	
McFadden Adj <sup>2</sup>	0.53		0.50	

Panel B: Interaction term of environmental index\*reputation, social index\*reputation and misconduct

Variable	Responsible firms misconduct Top 25% E and S performance firm		Irresponsible firms misconduct Lower 25% E and S performance firm	
	Coef	z-Stat	Coef	z-Stat
Intercept	-18.73	-3.47 ***	-16.46	-3.91 ***
E index	1.29	1.89 *	0.49	1.37
E index*reputation	-1.75	-1.96 **	-0.87	-1.28
S index	1.40	1.54	1.70	1.86 *
S index*reputation	-3.79	-3.16 ***	1.24	1.21
Female	-1.74	-2.70 ***	-1.45	-2.90 ***
Governance	-2.03	-1.92 **	-1.25	-1.17
Reputation	1.74	1.55	-0.21	-0.28
Assurance	4.55	3.03 ***	2.64	1.60
Blockholder	1.37	1.10	0.95	0.86
ROA	31.69	2.17 **	22.88	1.89 *
SIZE	2.08	3.42 ***	1.98	3.91 ***
Growth	-0.13	-0.38	0.21	0.66
R&D intensity	-2.03	-1.46	-0.54	-0.50
Competition	-5.57	-2.66 ***	-5.83	-3.43 ***
Institution	-9.35	-2.31 **	-6.10	-1.85 *
INDUSTRY	Included		Included	
YEAR	Included		Included	
Obs	226		226	
McFadden Adj <sup>2</sup>	0.49		0.49	

Panel C: Interaction term of environmental dimension\*reputation, social dimension\*reputation and misconduct

Variable	Responsible firms Top 25% E&S performance firm		Misconduct Irresponsible firms Lower 25% E&S performance firm	
	Coef	z-Stat	Coef	z-Stat
Intercept	-22.88	-3.09 ***	-10.70	-2.38 **
Carbon-Emission	0.38	0.25	-0.67	-0.65
Energy-Consumption	3.09	2.31 **	-2.36	-1.35
Water-Usage	1.12	0.67	2.52	1.78 *
Employee-Turnover	2.35	1.96 **	1.62	1.62
Salary	-1.39	-1.14	4.16	2.41 **
Carbon-Emission*reputation			0.91	0.51
Energy-Consumption*reputation	-0.61	-0.35	-2.72	-1.18
Water-Usage*reputation	-5.37	-2.46 ***	-1.29	-0.79
Employee-Turnover*reputation	-8.56	-4.61 ***	1.14	1.02
Salary*reputation	-0.51	-0.33		
Female	-1.88	-2.64 ***	-2.07	-3.20 ***
Governance	-2.26	-1.64 *	-1.51	-1.06
Reputation	2.33	1.69 *	-0.71	-0.79
Assurance	6.12	2.94 ***	3.05	1.54
Blockholder	1.49	0.78	1.23	0.83
ROA	43.63	2.57 ***	33.42	1.77 *
SIZE	2.50	3.03 ***	1.39	2.59 ***
Growth	-0.53	-1.20	0.00	0.00
R&D intensity	-2.65	-1.50	-1.39	-1.04
Competition	-7.33	-2.20 ***	-7.83	-2.88 ***
Institution	-9.47	-2.10 ***	-5.19	-1.31
INDUSTRY	Included		Included	
YEAR	Included		Included	
Obs	226		226	
Adj <sup>2</sup>	0.49		0.49	

#### 4.3.4 Effect of firm reputation on ESG performance and abnormal return after the revelation of ESG-related misconducts

Table 6 reports the results for the test of H3b which predicts that firms with better reputation and are associated with better environmental and social performance experiences a less negative market reaction when the ESG-related misconducts were revealed. The result shows that firms with good reputation and lower level of energy consumption experiences a positive stock return after the revelation of ESG-related misconducts. Generally, there is no significant difference in market reaction following the revelation of ESG-related misconducts for that firms with good reputation or not or whether firms with better environmental performance or lower index of environmental performance.

**Table 6: Effect of firm reputation on ESG performance and abnormal return after the revelation of ESG-related misconducts for social responsible and irresponsible firm (Test H 3b)**

Panel A: Interaction term of the aggregate of environmental and social index\*reputation and abnormal return

Variable	Responsible firms CAR		Irresponsible firms CAR	
	Top 25% ES performance firm	Lower 25% ES performance firm	Coef	t-Stat
Intercept	0.52	0.17	0.83	0.28
ES index	1.28	2.16 **	0.75	1.62
ES index*reputation	-1.35	-1.38	-0.55	-0.68
Female	-0.72	-1.83	-0.61	-1.39
Governance	-0.69	-1.33	-0.57	-1.14
Reputation	0.89	1.15	0.36	0.56
Assurance	1.05	1.56	0.49	0.76
Blockholder	-0.41	-0.64	-0.09	-0.15
ROA	-7.67	-0.79	-3.11	-0.34
SIZE	-0.25	-0.64	-0.35	-0.95
Growth	0.42	2.34 **	0.49	2.40 **
R&D intensity	-0.05	-0.07	0.27	0.35
Competition	0.04	0.03	0.20	0.15
Institution	0.72	0.40	0.43	0.22
INDUSTRY	Included		Included	
YEAR	Included		Included	
Obs	226		226	
Adj <sup>2</sup>	0.13		0.12	

Panel B: Interaction term of environmental index\*reputation, social index\*reputation, and abnormal

Variable	Responsible firms CAR		Irresponsible firms CAR	
	Top 25% E and S performance firm	Lower 25% E and S performance firm	Coef	t-Stat
Intercept	-0.06	-0.02	1.02	0.41
E index	-0.04	-0.15	0.30	1.24
E index*reputation	0.00	0.01	-0.20	-0.49
S index	1.68	3.08 **	-0.32	-0.64
S index*reputation	-1.79	-2.28 **	1.30	1.35
Female	-0.58	-1.39	-0.56	-1.27
Governance	-0.90	-1.84 *	-0.61	-1.25
Reputation	1.29	1.70 *	0.33	0.51
Assurance	0.79	1.27	0.26	0.40
Blockholder	-0.49	-0.73	-0.08	-0.14
ROA	-9.97	-1.22	-7.90	-0.90
SIZE	-0.05	-0.18	-0.09	-0.32
Growth	0.36	1.97 *	0.35	1.80 *
R&D intensity	-0.76	-1.31	-0.97	-1.59
Competition	1.14	0.97	0.68	0.55
Institution	0.15	0.08	-0.14	-0.07
INDUSTRY	Included		Included	
YEAR	Included		Included	
Obs	226		226	
Adj <sup>2</sup>	0.08		0.02	

Panel C: Interaction term of environmental dimension\*reputation, social dimension\*reputation and abnormal return

Variable	Responsible firms CAR		Irresponsible firms CAR	
	Top 25% E&S performance firm		Lower 25% E&S performance firm	
	Coef	t-Stat	Coef	t-Stat
Intercept	-1.45	-0.50	0.25	0.09
Carbon-Emission	0.18	0.32	0.51	0.84
Energy-Consumption	-0.94	-1.55	0.26	0.38
Water-Usage	0.48	0.96	0.08	0.14
Employee-Turnover	1.92	3.33 ***	-0.07	-0.11
Salary	-0.12	-0.12	-0.83	-0.81
Carbon-Emission*reputation	-2.35	-2.36 **	0.16	0.18
Energy-Consumption*reputation	1.63	1.93 *	-1.05	-1.09
Water-Usage*reputation	-0.98	-1.10	-0.19	-0.20
Employee-Turnover*reputation	-1.61	-1.54	1.22	1.07
Salary*reputation	-0.71	-0.67		
Female	-0.57	-1.32	-0.49	-1.11
Governance	-0.78	-1.64	-0.65	-1.32
Reputation	1.08	1.39	0.31	0.49
Assurance	0.88	1.41	0.21	0.31
Blockholder	-0.50	-0.71	-0.10	-0.18
ROA	-10.02	-1.20	-6.46	-0.71
SIZE	0.03	0.10	0.01	0.02
Growth	0.47	2.63 ***	0.31	1.63
R&D intensity	-0.63	-1.13	-0.95	-1.49
Competition	2.00	1.59	0.72	0.58
Institution	0.94	0.47	-0.51	-0.27
INDUSTRY	Included		Included	
YEAR	Included		Included	
Obs	226		226	
Adj <sup>2</sup>	0.09		0.01	

## 5. Conclusion

This study examines whether firms with better environmental and social performance can help protect value of shareholders. Using a sample of firms that listed at Taiwan Stock Exchange, this study firstly finds that firms with lower indices of environmental and social performance relative to higher indices of environmental and social performance are more likely to associate with ESG misconduct. Specially, firms with the lower indices of environmental and social performance that with the higher level of water consumption and employee turnover rate, and the lower level of salary are more likely to associate with misconducts. In particular, this study finds that firms with higher indices of social performance (such as, firms with lower level of employee turnover rate) experiences an abnormal accumulated stock return following the revelation of ESG-related misconducts. Finally, the results also reveals that higher indices of environmental and social performance firms with good reputation are less likely to engage in ESG-related misconducts. Specially, firms with high reputation and lower level of energy consumption experience a positive stock return after the revelation of ESG-related misconducts. This study provides evidences that firms' reputation impacts on their environmental and social performance, and help firms to prevent from the occurrence of ESG-related misconducts and protect firm value.

The finding of this study will contribute the literature in several ways. First, different

from prior studies that using sample firms with voluntarily adoption of CSR report, and examine whether issuing CSR report helps to prevent from the occurrence of ESG misconducts (Christensen, 2016; Du and Wu, 2019), this study uses the sample firms that are mandatory to issue ESG report, and investigate whether firms with better social performance and environmental performance are less likely to engage in ESG-related misconduct. Second, this study explores what type of environmental performance (e.g., firms' carbon emissions, the level of energy consumption and water usage) and social performance (e.g., employee turnover rate, the level of salary) as a reputation-insurance to protect firm value after the occurrence of misconduct. Finally, this study provides evidences on what type of environmental and social performance associates with firms' valuation. Most importantly, this study provides evidences on the effect of firm reputation on ESG performance and the occurrence of ESG-related misconducts, as well as, accumulated abnormal return after the revelation of ESG-related misconducts

The study findings prove that firms with better environmental and social performance relative to a firm with lower indices of environmental and social performance are less likely to involve in ESG-related misconducts in the following year. In addition, firms with the higher level of water consumption, employee turnover rate, and the lower level of salary are more likely to associate with misconducts. Furthermore, firms with better social performance relative the lower indices of social performance experiences an abnormal accumulated stock return following the revelation of ESG-related misconducts. Additionally, firms with lower level of employee turnover rate experiences a positive stock market reaction following the revelation of firms' ESG-related misconducts. And firms with more female directors and firms that in the high competition position are less likely to engage in ESG misconducts

In this study, firms' reputation significantly impact on their environmental and social performance and the occurrence of misconducts. The result shows that firms with better reputation and engagement in better environmental and social performance previously relative to firms with lower indices of environmental and social performance are less likely to associate with ESG-related misconducts. Firms with better reputation and engagement in the lower level of water usage and employee turnover are also less likely to engage in ESG-related misconducts. And a firm with good reputation and a lower level of energy consumption experiences a positive stock return after the revelation of ESG-related misconducts.

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## APPENDIX

### Variable definition description

#### Dependent variables

Misconduct<sub>t+1</sub>: an indicator variable that equals 1 if a firm engages in misconduct in year t, and 0 otherwise.

Frequent: an indicator that equals one if a firm make misconduct more than one time, and zero otherwise.

CAR: the cumulative abnormal return over the three-trading-day window of (-1, +1) around the date of the misconduct event.

RET: share return.

#### Independent variables

E index: a firm's environment performance. E is calculated as the quartile of Environment performance in the same industry, the bottom (top) quartile of the level of carbon emission divided by sales, the level of water usage divided by sales and the level of energy consumption divided by sales in the same industry equal one, respectively, and then add the three amounts divided by 3 to proxy for responsible (irresponsible) firms for environmental performance.

S index: a firm's social performance. S is calculated as the quartile of social performance in the same industry, the bottom (top) quartile of employee turnover rate in the same industry equal one to proxy for a responsible (irresponsible) firm, the top (bottom) quartile of the level of salary in the same industry equal one to proxy for a responsible (irresponsible) firm, and then add the two amounts divided by 2 to proxy for social performance.

ES index: which is add the dummy variables of bottom (top) quartile of the level of carbon emission, water usage and energy consumption, employee turnover rate, and the top (bottom) quartile of the level of salary divided by 5 as responsible (irresponsible) firms.

Carbon-Emission is the level of Carbon-Emission divided by sales.

Energy-Consumption is the level of Energy-Consumption divided by sales.

Water-Usage is the level of Water-Usage divided by sales.

Employee-Turnover is the rate of Employee-Turnover

Salary is the level of salary

Female: a dummy variable that equals one if the ratio of female director more than the median equal one.

Governance: a dummy variable that equals one if a firm got A based on the corporate governance evaluation system and zero otherwise.

Reputation: an indicator that equals one if a firm listed at the corporate governance index.

Assurance: a dummy variable equal one if a firms' CSR report is assured by the outside of party and zero otherwise.

Blockholder (blockholder ownership): an indicator that equals one if outside shareholders hold the firm's share more than ten percent of total share and zero otherwise.

ROA: return on asset, measured as net income divided by total assets.

SIZE: firm size, measured as the natural log of total assets.

Growth: measured as market value divided by book value.

R& D intensity: measured as research and development expense divided by sales.

Competition: Herfindahl-Hirschman Index, calculated as the sum of the squares of the market shares of firms in an industry.

Institution: the percentage of institutional ownership.