

ESG Performance of Multinational Companies and Stock Price Crash: Evidence from Korea

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Abstract Our research focuses on the relationship between the ESG performance of South Korean multinational companies and stock price crash in next year. For our study, we divide samples into three different categories - namely, all companies, multinational companies (MNC) and non-multinational companies(non-MNC). Our major findings are as following. First, we find the negative relationship between the social (S) score of multinational companies and future price crash, indicating that their social performance prevents price crash risk. Second, when individual ESG performance is considered, there exists negative relationship between environmental (E) and social (S) score, and future price crash for multinational companies. Lastly, we find negative relationship between the ESG score and future price crash, which is due to the high environmental (E) and social (S) score of MNCs, which, in turn, raise each respective score for all companies, which has high correlation with their ESG scores. In this research, focusing on features of ESG on price crash in Korean MNCs, we identify the mitigating effect of social (S) factor for the MNC, which is in consistence with previous researches.

Keywords: ESG, Multinational Companies, Korea, Stock Price Crash

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I. Introduction

Multinational companies (MNCs) are firms that conduct business in more than two countries or engage in foreign direct investment. Over the last decade, there have been debates on a wide range of MNC topics, including financial performance (Cherkasova and Nenuzhenko, 2022; Wu and He, 2019; Click and Harrison, 2000), environmental policy (Christmann, 2004; Kolk and Tulder, 2010), risk management and ethics (Black et al., 2014; Boehme and May, 2016; Yin and Zhang, 2020), and tax avoidance (Clausing, 2009; Contractor, 2017; IMF, 2018). Recently, whether corporate social responsibility (CSR) activities of MNCs, as measured in

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environment, social, and government (ESG), affect their firm value has been a matter of debates, as CSR is believed to enhance the economic openness of MNCs in the eyes of investors and capital markets (Aguilera-Caracuel et al., 2017; Morck and Yeung, 1991). However, a relatively small number of studies have paid attention to developing countries with unique business environments and cultures, which could be risky to business expansion for the investors and capital markets. This study focuses on the ESG performance of MNCs and the stock price crash in Korea.

In Korea, thanks to the rapid economic development under the support of the government, many major companies have grown into MNCS, by expanding business operations into a new jurisdiction, whether organically or through an acquisition. As of 2021, four well-known Korean MNCs, namely, Samsung Electronics, Hyundai Motors, LG Electronics, and LG Chemicals, account for nearly 66% of their total profit. Remarkably, the percentage of their overseas profits earned outside of Korea for the top ten MNCs has increased by more than 700% in the last decade (2011-2021). Despite the expansion of overseas business, the transparency of Korean MNCs has been a source of concern. In the last half-century, critics' demand for the reformation of *chaebols*, a unique type of national conglomerate that comprises a significant portion of listed Korean MNCs, has grown because of their association with political scandals, causing owner risk (Lee et al., 2008; Lee et al., 2022; Yoon et al., 2019).

In our study, we observe the role of risk, more specifically, future crash risk, in driving the valuation of Korean MNCs is relatively understudied in recent literature. If the CSR activities of Korean MNCs alleviate or aggravate crash risk, they are expected to accordingly have a mitigating *or* causing effect on shareholder value, as measured in stock price crash. Specifically, we use "negative coefficient of skewness" for the proxy of a stock price crash, denoted as *NCCKEW*, which was first introduced by Chen et al. (2001).

Our research is theoretically based upon an agency-cost perspective, with a particular interest in the agent's managerial motivations in selectively disclosing CSR information to the public (Abeysekera et al., 2020; Beaudoin, 2008; Chih et al., 2008; Hemingway et al., 2004; Kothari et al., 2009). From the agency-cost perspective, information asymmetries could be prevented from optimally diversifying companies' international business portfolios (Morck and Yeung, 1991). In this context, the endeavor of firms in developing countries to become MNCs could be interpreted as economic openness in the eyes of global capital markets, so that the value of their multi-nationality to shareholders could eventually be enhanced. Previous research pointed out that firms' CSR performance, as measured in ESG, mitigates stock price crash as it reduces information asymmetry, thereby resolving agency problems (Chen et al., 2001; Kothari et al., 2009; Kim et al., 2014)

Previous studies on the CSR of MNCs and stock price crash yield quite contrasting results (Boehme and May, 2016; Wu and He, 2019), whereas we focus on how the CSR activities

of Korean MNCs, as measured in ESG, could improve economic openness in markets, which leads to the prevention of a stock price crash in the stock market the following year.

Our major findings are as follows. First, we find that the social (S) factor for all companies and MNCs has a negative correlation with stock price crash, consistent with previous research at the international level. Specifically, we argue that the negative impact of the social (S) factor on all companies is affected by MNCs. Second, we present the evidence on the heterogeneity effect for individual ESG factors between MNCs and non-MNCs. Specifically, the environment (E) and social (S) factors for MNCs have a statistically significant negative relationship with stock price crash, implying that the improvement of these scores prevents the future price crash. However, the scores for the non-MNCs are statistically insignificant. Finally, we find that the ESG factor of all firms has a negative impact on stock price crashes, which could be due to its high correlation with environmental (E) and social (S) factors. Such impacts are affected by the same factors of MNCs, which account for a significant portion of all firms.

In proposing a couple of explanations from both agency-cost and investor perspectives, our analysis employs firm-level data for 2013-2020. There are 749 firms in the sample, with 196 MNCs and 508 non-MNCs. The total number of observations is 7,490, 1,960, and 5,080, accordingly. Our study makes several contributions. First, we add to the growing body of literature on CSR and its impact on the stock price crash for MNCs in emerging markets. Although much work in this area has focused on the developed markets, we depart from these studies and shed light upon the unique features and forces of ESG on stock price crash in Korean MNCs. Second, we identify the mitigating effect of the social (S) factor for the MNC on stock price crash, which agrees with the previous research on the mitigating effect of the social (S) factor at the international level (Bae et al., 2021; Dumitrescu and Zakriya, 2021; Edmans, 2011). Lastly, we find the negative impact of the ESG factor of all firms on stock price crash, which could be due to its high correlation with environment (E) and social (S) factors, which are affected by the same factors of MNCs, which comprise a significant proportion of all firms.

The remainder of this paper is organized as follows. Section 2 discusses previous research and theoretical motivation for hypothesizing a link between each ESG factor and the stock price crash for Korean MNCs. Section 3 presents data and methodology. Section 4 presents the results of our analysis along with a robustness check. Finally, Section 5 concludes the paper.

II. Literature Review

A. CSR and MNCs

In the last decades, there has been a wide array of definitions of CSR have been proposed by academics. For instance, Carroll (1979) defined CSR as "social responsibility of business that encompasses the economic, legal, ethical, and discretionary expectations that society has of organizations at a given point in a time." In more practical terms, Kotler and Lee (2005) noted that when developing marketing policies, marketers should balance three factors: company profits, consumer desires, and societal interests. CSR is becoming increasingly popular as it becomes more closely linked to business.

Previous research found that geographic, international diversification and social performance of MNCs. For example, after analyzing US MNCs from chemical, energy and industrial machinery sectors over six years (2005-2010), Aguilera-Caracuel et al. (2017) concludes that MNCs with a high level of social performance fulfill the expectations of stakeholders in both local and global markets, so that they obtain better reputation as a result. Pederson and Neergaard (2009) emphasized the importance of MNCs' social commitment to the demands of local stakeholders, as meeting those needs under different circumstances in which they operate could benefit society. These CSR initiatives, both local and global, would allow stakeholders to protect and even improve MNCs' reputations (Kolk and van Tulder, 2010).

B. The ESG and the stock price crash

A stock price crash is defined as the conditional skewness of return distribution, an essential characteristic of return distribution (Chen et al., 2001). In other words, the price crash captures risk asymmetry, whereas stock performance and firm risk are concerned with the mean and variance of the return distribution. Another branch of research points out the negative relationship between ESG performance and stock price crashes from the perspective of agency-cost theory. For example, Kim et al. (2014) found that if CSR firms commit to a high standard of transparency and engage in less bad news hoarding, they would have a low risk of a stock price crash. In particular, this argument is consistent with the notion that the magnitude of the negative stock price reaction to bad news disclosures is greater than that of the positive stock price reaction to good news disclosure (Kothari et al., 2009). Meanwhile, Dumitrescu et al. (2021) noted that social subcategories aimed at specific stakeholder groups, such as the community, employees, or customers, tend to mitigate future crashes, whereas environmental and governance characteristics have limited effects on price crashes.

Previous research on MNCs suggests quite contrasting results for the relationship between

companies' multi-nationality and stock price crash. For example, after examining large samples of US-based firms between 1987 and 2011, Boehme and May (2016) argued that crash risk is higher for MNCs than for domestic companies, all else being equal. However, although some specified "unclear motivations" on the business strategy of MNCs in developing countries (Accenture, 2007), the role of the ESG performance in the relationship between MNCs in developing countries and stock price crash is quite unclear. Rather, Black et al. (2014) noted that MNCs' complexity and information asymmetry promote self-serving resource diversion by managers, such as perquisite consumption or empire building. To put it differently, managers' incentives to conceal their actions in pursuit of their own benefits could lead to negative consequences in the form of bad news hoarding (Boehme and May, 2016; Kothari et al., 2009).

C. Korean MNCs and the stock price crash

There has been a debate on how the ESG performance of Korean companies affects the stock price crash (Bae et al., 2021; Lee et al., 2022). Although many studies have pointed out that the complexity and information asymmetry of MNCs cause the fall in firm value (Boehme and May, 2016), another branch of research suggests that firms' ESG performance resolves these concerns. This is because ESG information providers are advantaged by measures to overcome information asymmetries, thereby mitigating stock price crash. For example, Lee et al. (2022) noted that the ESG factor reduces information asymmetry between firm managers and investors in the Korean market. Simply speaking, improving ESG performance for Korean MNCs could be a sign of conforming to a global standard in the eyes of investors and the capital market.

Particularly, previous research suggests that the social (S) factor drives the value of international firms (Bae et al., 2021; Dumitrescu and Zakriya, 2021; Edmans, 2011). For example, observing 35,800 firm-year observations on US companies from 1991 to 2015, Dumitrescu and Zakriya (2021) argued that social CSR dimensions mainly determine managerial bad news hoarding and the resultant stock price crashes. Furthermore, specific social categories such as community, employees, or customers, which are aimed at specific stakeholder groups, tend to mitigate future crashes. Moreover, analyzing a value-weighted portfolio of the "100 Best Companies to Work For in America" from 1984 to 2009, Edmans (2011) concluded that specific social factors, such as employee satisfaction, are positively correlated with shareholder returns. Although these studies overestimate the relative importance of other ESG factors, it is worth noting that promoting social (S) factors is supported by an agency-cost perspective: the firm's objective function is maximized by holding the workers to their reservation wage, because it would ultimately benefit shareholders (Taylor, 1911).

In this sense, if MNCs in Korea are oriented toward satisfying shareholders' needs, they

would distinguish appropriately from non-MNCs to develop socially responsible initiatives. For example, Auguilera-Caracuel et al. (2017) observed that increased visibility and exposure to pressures from interest groups would make MNCs' socially responsible behavior a priority. In turn, this visibility would motivate MNCs to be more proactive in various social issues, including gender equality, corruption, or workers' rights, to inform shareholders of adequate social responsibility initiatives. In this context, if Korean MNCs endeavor to improve specific ESG factors, such as social (S), this would be interpreted as conforming to social norms and standards in their countries. In turn, this would increase the firm value of Korean MNCs, which reduces stock price crash. Our first hypothesis is summarized as follows:

H-1. The social (S) factor for all firms and MNCs is negatively related to the stock price crash the next year.

Now we discuss how individual ESG factors could affect stock price crash differently for MNCs and non-MNCs. As aforementioned, the improvement of ESG performance for Korean MNCs could be interpreted as a sign of conforming to global standards from the perspectives of investors and the capital market. However, if companies have not built overseas branches and instead focus on domestic business operation, they would have fewer incentives to conform to global norms. As a result, their ESG factor would play less role in reducing information asymmetries to outside investors. Thus, our second hypothesis is summarized as the following.

H-2. Individual ESG score for MNCs and non-MNCs has a heterogeneity effect on the stock price crash for the following year.

Lastly, the role of the ESG factor in mitigating the price crash the following year must be defined. As shown in our correlation analysis in Table 2, notably, environment (E) and social (S) scores for all companies have a high correlation with the ESG factor. If these scores for MNCs, which form a significant proportion of all companies, affect the same score for all companies, they would affect the ESG factor for all companies. The effect of the correlation of individual ESG factor to the ESG factor is not unusual in the analysis of firms' stock price crash in Korea. For example, Lee et al. (2022) noted that *chaebols*, a unique type of a Korean conglomerate forming most MNCs, has systematic environmental strategies and organizations. Meanwhile, non-chaebols that form most non-MNCs have a low level of environmental (E) performance due to relatively weak environmental organization and strategies. Their study further notes that the environment's performance (E) leads to a high ESG score that would eventually reduce asymmetric volatility, another form of stock price crash.

Thus, it appears reasonable to argue that MNCs' environment (E) and social (S) scores would

lead to high ESG factor performance, which would then lead to high ESG factor scores for all companies. As a result, the ESG factor for all companies would prevent the following year's price crash. Accordingly, we present the third hypothesis as follows.

H-3. The ESG factor for all companies is negatively related to the stock price crash in the following year.

III. Data and Methodology

As aforementioned, we divide the samples into all companies, MNCs, and non-MNCs. The number of each sample is 708, 341, and 367, and the observation number is 4,296, 2,194, and 2,102, respectively. Notably, although the entire sample for MNCs is smaller than that of non-MNCs, the observation number is greater for MNCs, implying their influence on all companies. Our data source is threefold. First, we download company and financial data from FNguide. The sample period of our data is 2013-2020. Second, we obtained ESG data from Sustinvest, an ESG-evaluating institution in Korea. Then, we divide firm samples into three categories, namely, all companies, MNCs, and non-MNCs, by referring to the overseas firm database of the Korea Trade Investment Promotion Agency, which is a national agency that supports companies' exports and overseas investment.

Following Chen et al.'s (2001) methodology, we employ a measure of firm-specific crash risk. This metric is based on firm-specific weekly returns estimated as market model residuals. Using firm-specific returns ensures that our crash risk measures reflect firm-specific factors rather than broad market movements. We estimate the following expanded market model regression:

$$r_{j,t} = \beta_m + \beta_{1,ym,t-2} + \beta_{2,ym,t-1} + \beta_{3,ym,t+1} + \beta_{4,ym,t+2} + \beta_{5,ym,t+3} + \varepsilon_{m,t} \dots \quad (1)$$

where j,t is the return on stock j in week t , and m,t is the return on the market index in week t . The lead and lag terms for the market index return allow non-synchronous trading (Dimson, 1979). Moreover, the firm-specific weekly return for firm j in week t ($W_{j,t}$) is calculated as the natural logarithm of 1 plus the residual return from equation (1). Following Chen et al. (2001), we calculate our baseline measure of skewness, denoted by $NCSKEW$, by taking the negative of the third moment of firm-specific weekly returns for each year and normalizing it by the standard deviation of firm-specific weekly returns raised to the third power. $NCSKEW$ is calculated as follows for each firm j in year t :

$$NCSKEW_{j,t} = \log \frac{(n_u - 1) \sum_{DOWN} W_{j,t}^2}{(n_d - 1) \sum_{UP} W_{j,t}^2} \dots \quad (2)$$

where $W_{j,t}$ is firm-specific weekly return as defined earlier, and n_u and n_d are the number of up and down days, respectively. Here, the convention is that a higher value of this measure corresponds to a more left-skewed distribution (Chen et al., 2001). A negative sign is put in front of the third moment, such that a higher value of $NCSKEW$ indicates a higher crash risk.

Next, we present our regression model. The dependent variable, $NCSKEW$, represents price crash the following year ($NCSKEWI$). For $NCSKEWI$, we multiplied 100 for calculation convenience. The individual ESG data refer to the firm's performance of environmental (E), social (S), and governance (G).¹⁾ Subsequently, following Chen et al. (2001), our independent variables include $DTURN$, $RETURN$, $SIGMA$, ROA , $LogTA$, LEV , BTD . $DTURN$ and $RETURN$ refer to changes in yearly trading volume and yearly return. $SIGMA$ means stock volatility, calculated as the standard deviation of firm-specific weekly returns over the fiscal year. ROA and $LogTA$ mean return on total assets and firm size. Lastly, LEV and BTD mean firm leverage and book-to-income difference, respectively. Furthermore, to account for all time unit-specific effects, we include a year-fixed effect in all equations.. Each ESG data group is analyzed separately with the main variables for all companies, MNCs, and non-MNCs. Eqs. (3) and (4) refer to the equation that includes individual ESG and ESG variables, respectively, along with other financial variables.

$$\begin{aligned} NCSKEW_{j,t+1} = & \alpha_0 + \beta_1 E_{j,t} + \beta_2 S_{j,t} + \beta_3 G_{j,t} + \beta_4 DTURN_{j,t} + \beta_5 RETURN_{j,t} + \beta_6 SIGMA_{j,t} + \beta_7 ROA_{j,t} \\ & + \beta_8 LogTA_{j,t} + \beta_9 LEV_{j,t} + \beta_{10} BTD_{j,t} + Year_{j,t} + \varepsilon_{j,t} \dots \end{aligned} \quad (3)$$

$$\begin{aligned} NCSKEW_{j,t+1} = & \alpha_0 + \beta_1 ESG_{j,t} + \beta_2 DTURN_{j,t} + \beta_3 RETURN_{j,t} + \beta_4 SIGMA_{j,t} + \beta_5 ROA_{j,t} + \beta_6 LogTA_{j,t} \\ & + \beta_7 LEV_{j,t} + \beta_8 BTD_{j,t} + Year_{j,t} + \varepsilon_{j,t} \dots \end{aligned} \quad (4)$$

Table 1 shows the summary statistics for financial data, as well as our proxy, E , S , G , and ESG data. The values in the table include the mean, minimum, first quartile, median, third quartile, and maximum. The average value of $RETURN$ is 0.17, implying that all companies' returns are positive. Meanwhile, the median value of debt-to-equity level, as denoted by LEV , is around 90%. Subsequently, Table 2 presents the correlation for the main variables. This shows that

1) Sustainvest ESG data are evaluated under various categories, each with their own sub-category, namely, KPI and data point. Environmental performance (E) is evaluated using the categories of innovation activity, production process, supply chain management, and customer management. Meanwhile, the categories of human resource management, production process, supply chain management, social contribution activity, and relationship with local community are used to evaluate social performance (S). Finally, the evaluation of governance performance (G) is based on the categories of stockholder rights, information transparency, board composition and activity, board member compensation, affiliate risk, and infrastructure for sustainable management. For further details of each category, refer to Sustainvest (2011).

our dependent variable, *NCSKEW1*, is negatively correlated with *SIGMA* and *LEV*. However, each ESG variable is positively correlated with NCSKEW1. Lastly, we found a high correlation between each ESG variable and ESG variable. The correlation coefficients of environment (E) and social (S) variables with ESG variables are 0.65 and 0.75, respectively. In particular, the high correlation of environment (E) with ESG factor could be attributed to the fact that large Korean conglomerates, which account for a significant portion of MNCs, have more systematic environmental organization and strategy (Lee et al., 2022; Oh, 2012). Thus, environment (E) score may have a high correlation with the ESG factor.

Table 1. Descriptive Statistics

VARIABLES	Mean	Sd	Min	1 st Q	Med	3 rd Q	Max
E	21.13	20.624	0.56	5.30	15.24	29.28	83.91
S	33.56	15.650	9.58	21.86	30.11	42.44	76.97
G	52.13	7.353	35.31	47.01	51.95	57.25	70.54
ESG	55.25	21.453	12.73	38.56	53.78	71.29	97.92
NCSKEW1	-1,299.02	6125.432	-48,736.83	-191.01	-12.81	16.84	4739.35
DTURN	2.13	14.078	-20.53	-1.69	-0.83	1.00	105.65
RETURN	0.17	0.742	-1.44	-0.30	0.06	0.52	2.71
SIGMA	5.61	2.712	1.69	3.71	4.97	6.77	15.77
ROA	2.19	6.677	-26.32	0.22	2.49	5.39	20.04
LogTA	20.50	1.575	17.52	19.38	20.29	21.44	25.08
LEV	129.26	145.744	7.30	43.08	89.59	156.15	960.18
BTD	-0.02	0.062	-0.31	-0.04	-0.01	0.00	0.14

Source: Authors' calculations

Table 2. Correlation

VARIABLES	NCSKEW1	DTURN	RETURN	Sigma	ROA	LogTA	LEV	BTD	E	S	G	ESG
NCSKEW1	1											
DTURN	-0.00	1										
RETURN	0.04	0.22	1									
SIGMA	-0.05	0.28	0.48	1								
ROA	0.10	-0.03	0.13	-0.21	1							
LogTA	0.15	-0.02	-0.08	-0.26	0.14	1						
LEV	-0.04	0.02	-0.06	0.18	-0.28	0.20	1					
BTD	0.03	-0.02	0.08	-0.18	0.56	0.12	-0.18	1				
E	0.08	-0.00	-0.02	-0.10	0.07	0.65	0.10	0.06	1			
S	0.08	0.01	-0.02	-0.15	0.13	0.62	0.10	0.07	0.66	1		
G	0.00	-0.00	-0.03	-0.01	0.09	-0.00	-0.11	0.03	0.03	0.09	1	
ESG	0.05	0.01	-0.03	-0.1	0.12	0.50	0.02	0.08	0.65	0.75	0.59	1

Source: the authors' calculations

IV. Empirical Results

A. E/S/G and ESG analysis

We now conduct a regression analysis of the relationship between individual ESG performance and future firm-specific crash risk, measured in NCSKEW, after controlling for other potential determinants of stock price crash. Table 3 presents the regression analysis for individual ESG data for all companies, MNCs, and non-MNCs.

Table 3. Individual ESG Analysis for all Companies, MNCs, and Non-MNCs

VARIABLES	All Companies	MNCs	Non-MNCs
E	-7.292	-3.9376	1.090
S	-14.09*	-17.2175*	-9.162
G	-5.720	12.2385	-18.539
DTURN	-0.6713	-11.3096*	8.127
RETURN	415.9***	445.3329***	322.343
SIGMA	-168.2**	-132.1098**	-147.478**
ROA	60.43***	40.9061**	76.864***
LogTA	673.6***	471.8121***	1,055.317***
LEV	-1.670	-0.7052	-3.529***
BTD	-4,066	-649.0075	-7,455.613**
Intercept	-12,740***	-9503.3498***	-20,091.781***
Year control	Yes	Yes	Yes
Observations	4,296	2,194	2,102
R-Squared	0.0660	0.0651	0.0731
Adjusted R-Squared	0.0623	0.0578	0.0656

*** p < 0.01, ** p < 0.05, * p < 0.1.

Source: Authors' calculations

The results in Table 3 suggest that only the social (S) score for all companies and MNCs is negatively associated with one-year-ahead crash risk proxied by *NCSKEW1*, implying that the improvement of the score mitigates the stock price crash in the future. However, social (S) score for non-MNCs is found to be statistically insignificant. The coefficients on the control variables have the following signs. Companies with a higher return (*RETURN*), return on total assets (*ROA*), and firm size (*LogTA*) have a higher crash risk, whereas companies with high changes in yearly trading volume (*DTURN*), higher volatility (*SIGMA*), leverage (*LEV*), and book-to-income difference (*BTD*) are related to lower chances of crash risk. Overall, evidence in Table 3 suggests that from the perspectives of agency-cost theory, all companies and MNCs with social (S) scores are less likely to hoard bad news and exhibit a higher level of transparency, leading to lower price risk in the future. In particular, the mitigating effect of all companies

could be affected by MNCs as they form a significant proportion of all companies. To summarize, the results in Table 3 support H-1. We now focus on the ESG analysis for all companies, MNCs, and non-MNCs in Table 4.

Table 4. ESG Analysis for all Companies, MNC, and Non-MNCs

VARIABLES	All Companies	MNC	Non-MNC
ESG	-11.40**	-8.3208	-10.520
DTURN	-0.7179	-11.2363	8.005
RETURN	411.0***	428.3943***	325.826
SIGMA	-170.7***	-135.5973**	-146.926**
ROA	61.34***	42.2625**	76.019***
LogTA	606.6***	392.0906***	1,079.824***
LEV	-1.662**	-0.7402	-3.519***
BTD	-4,019**	-588.2850	-7,351.243**
Intercept	-11,810***	-7,551.6443***	-21,355.110***
Year control	Yes	Yes	Yes
Observations	4,296	2,194	2,102
R-Squared	0.0654	0.0629	0.0732
Adjusted R-Squared	0.0621	0.0565	0.0665

*** p < 0.01, ** p < 0.05, * p < 0.1,

Source: *the authors' calculations*

As shown in Table 4, the ESG factor for all companies is only negative at a statistically significant level. We argue that this could be due to its high correlation with the environment (E) and social (S) factors, previously observed in our correlation test. Furthermore, we believe this results from a high correlation between environment (E) and social (S) factors with the ESG factor for MNCs as they form a significant proportion of all companies. However, the negative relationship between MNCs' ESG factor and the price crash is not statistically significant. We speculate that this is due to the effect of MNCs' governance (G) factor insignificance, which renders the entire ESG factor insignificant. Thus, it is reasonable to state that the results in Table 3 support H-3(all companies).

B. Robustness check

We conduct additional analysis to check the robustness of the relationship between ESG and future price crash. The potential endogenous relation for all companies, MNCs, and non-MNCs is still a concern, as endogeneities may arise due to unobservable heterogeneity when some company-specific factors influence both ESG and crash risk. To resolve, we analyze ESG factors individually and then conduct the same regression analysis for all companies, MNCs, and non-MNCs. The results for environment (E), social (S), and governance (G) are presented in

Tables 5, 6, and 7.

As shown in the tables, the social (S) score for MNCs is negative at a statistically significant level, which is consistent with the analysis in Table 3. Interestingly, the same score for all companies became statistically significant, which could be due to the effect of the MNCs. Thus, it appears plausible to argue that our analysis supports H-1. Furthermore, the environment (E) score for all companies and MNCs is found to be negative at a statistically significant level, indicating that, when considered separately, environment performance for all companies and MNCs, which forms a high proportion of the former, could prevent future price crashes. Meanwhile, non-MNCs have a statistically insignificant score when compared to MNCs and all companies. However, for the governance (G) factor for all companies, the coefficients for MNCs and non-MNCs are inconsistent and statistically insignificant; hence, it is difficult to conclude that the improvement of governance (G) reduces future price crash. We speculate that unlike other ESG factors, the governance (G) factor for MNCs is not a relevant concern in the eyes of investors and capital markets.

Theoretically, following previous findings on the importance of environment (E) and social (S) factors known to reduce the risk of stock price crash (Bouslah et al., 2013; Edmans, 2011), we can conclude that, in our research, these factors improve economic openness of MNCs. To put it differently, environment (E) and social (S) factors help dissolve information asymmetry for Korean MCNs during globalization (Bae et al., 2021; Dumitrescu and Zakriya, 2021; Edmans, 2011; Lee et al., 2022), in contrast to non-MNCs, which may or may not adhere to global standards. Thus, it is reasonable to conclude that the results in Tables 5, 6, and 7 support H-2.

Table 5. Environment (E) Analysis for all Companies, MNCs, and Non-MNCs

VARIABLES	All Companies	MNC	Non-MNC
E	-12.530***	-10.4223*	-1.355
DTURN	-1.070	-11.5014	7.880
RETURN	415.5***	430.6854***	328.193
SIGMA	-165.9***	-129.7455**	-146.920**
ROA	58.20***	40.3101**	74.089**
LogTA	631.2***	429.2709***	1,021.648***
LEV	-1.647**	-0.7818	-3.398***
BTD	-3,943**	-541.7439	-7,395.534**
Intercept	-12,530***	-8,446.1060***	-20,581.597***
Year control	Yes	Yes	Yes
Observations	4,296	2,194	2,102
R-Squared	0.0653	0.0633	0.0726
Adjusted R-Squared	0.0620	0.0569	0.0659

*** p < 0.01, ** p < 0.05, * p < 0.1, Source: the authors' calculations

Table 6. Social (S) Analysis for all Companies, MNCs, and Non-MNCs

VARIABLES	All Companies	MNC	Non-MNC
S	-18.62**	-19.0180**	-10.166
DTURN	-0.3843	-11.1773	8.285
RETURN	418.8***	439.8530***	328.463
SIGMA	-172.3***	-134.5086**	-148.893**
ROA	60.76***	42.5483**	74.971**
LogTA	634.1***	449.5315***	1,061.621***
LEV	-1.595**	-0.7150	-3.415***
BTD	-4,079**	-706.4401	-7,404.696**
Intercept	-12,220***	-8,444.4884***	-21,086.488***
Year control	Yes	Yes	Yes
Observations	4,296	2,194	2,102
R-Squared	0.0657	0.0646	0.0728
Adjusted R-Squared	0.0624	0.0582	0.0661

*** p < 0.01, ** p < 0.05, * p < 0.1, Source: *the authors' calculations*

Table 7. Governance (G) Analysis for all Companies, MNC and Non-MNCs

VARIABLES	All Companies	MNC	Non-MNC
G	-9.374	7.3469	-20.297
DTURN	-0.8043	-11.2312	7.752
RETURN	410.2***	433.3489***	321.516
SIGMA	-171.6***	-136.5557**	-145.586**
ROA	60.03***	39.4708**	76.260***
LogTA	522.3***	321.6375***	1,018.987***
LEV	-1.596**	-0.6452	-3.525***
BTD	-3,975**	-352.0306	-7,452.541***
Intercept	-10,090***	-6,826.4775***	-19,545.852***
Year control	Yes	Yes	Yes
Observations	4,296	2,194	2,102
R-Squared	0.06441	0.0621	0.0729
Adjusted R-Squared	0.06113	0.0556	0.0663

*** p < 0.01, ** p < 0.05, * p < 0.1, Source: *the authors' calculations*

V. Conclusion

Our study developed three empirical hypotheses and tested them using a sample of Korean companies. We hypothesized (1) a negative relationship between social (S) scores and price

crash risk, (2) a heterogeneity effect between MNCs and non-MNCs, and (3) a negative relationship between ESG score and future price crash. The high correlation to the independent environment (E) and social (S) scores is heavily influenced by MNCs, which account for a significant portion of the total observations.

Our major findings are as follows. First, we found that the social (S) factor for all firms and MNCs has a negative relation with stock price crash, consistent with previous research (Bae et al., 2021; Dumitrescu and Zakriya, 2021; Edmans, 2011). In particular, we note that the negative impact of the social (S) factor for all companies is affected by the same factor for MNCs, which form a high proportion of all companies. Second, we present the evidence on the heterogeneity of the impact of individual ESG factors between MNCs and non-MNCs. Specifically, the environment (E) and social (S) factors for MNCs have a statistically significant negative relationship with stock price crash, implying that the improvement of these scores prevents the future price crash. However, the scores for the non-MNCs are statistically insignificant. Finally, we find that the ESG factor of all firms has a negative impact on stock price crashes, which could be due to its high correlation with environmental (E) and social (S) factors. These are affected by the same factors as MNCs, which account for a significant portion of all firms.

Several contributions are made by our research. First, we add to the growing body of literature on CSR and its impact on the stock price of MNCs in emerging markets. Although much of the research in this area has focused on developed markets, we depart from these studies and shed light upon the unique features and forces of ESG on stock price crashes in Korean MNCs. Second, we identify the mitigating effect of the social (S) factor for the MNCs on the stock price crash, which agrees with the previous research on the mitigating effect of the social (S) factor at the international level. Lastly, we find the negative impact of the ESG factor of all firms on the stock price crash that could be due to its high correlation with the environment (E) and social (S) factors, which are affected by the same factors as MNCs

In this study, we addressed the lack of research on the impact of ESG performance in Korean MNCs. However, although the relationship between some ESG factors and future price crash risk is confirmed in our study, it has not been thoroughly investigated. This relationship implies that non-MNCs would have to put in even more effort to pursue ESG values when expanding their business overseas. These concerns must be addressed in future research.

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