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Do High ESG Moderate Companies Perform Better in the Pandemic Period?

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ABSTRACT

ESG has gradually become an issue that companies can't ignore. The purpose of this study was to examine how high ESG companies achieve better performance and risk aversion during the crisis and answer whether ESG has a positive impact on corporate performance and risk aversion. Six hypotheses were developed and tested with the help of OLS on a sample of 719 listed companies in Taiwan's electronics industry.

The results show that ESG enhances firm performance. In addition, this study suggests that the interference effect of ESG on performance is due to the difference between ESG and corporate capabilities and that the interaction between ESG and different corporate capabilities may have different positive or negative enhancing effects on corporate performance.

Keywords: ESG, corporate capabilities, corporate efficiency, event study method, cumulative abnormal return (CAR)

JEL Classification: M31

INTRODUCTION

Most companies currently face various exogenous shocks, such as Sino-US trade, the new coronavirus epidemic, the Russia-Ukraine war, etc., which puts pressure on firms to increase their efforts and focus on adapting to different conditions in a fast-changing environment to stay highly competitive.

Between shifting governance and regulation, ongoing health crises, and political conflict, ESG challenges will soon take center stage. ESG serves as a guide for corporate risk management and operations; owing to its comprehensive effects in alignment with the current international focus on environment, social, governance, and sustainable development, ESG has become a research

hotspot in the global economy and management field (Paradis & Schiehll, 2021; Finger & Rosenboim, 2022; China National Technical Society, 2022).

The impact of ESG on firm performance has been a topic of discussion in academia and business research for several years. In recent years, many researchers have found positive results; several papers with negative results support the relationship between ESG and firm performance. Our understanding, however, remains fragmented with alternative accounts that seek to explain the relationship between ESG and firm performance. Few writers have discussed identifying and understanding the motivators for ESG activity. In addition, more conceptual works are required to understand the process of ESG within the firm's broader strategy.

According to the resource-based theory (RBV), ESG has the characteristics of VRIN (valuable, scarce, inimitable, and non-substitutable) (Chen, Kuo, & Chen, 2022), which motivates firms to make strategic, operational changes such as sustainable corporate performance, supply chain management, and customer satisfaction that lead to significant environmental, social, and economic impacts (Le, Vo, & Venkatesh, 2022).

To sum up, this study believes that ESG can not only be used as a strategic resource (Chen et al., 2022) but also as a long-term strategic development direction. Therefore, the samples were divided into high/low ESG groups as interference variables, and the study explored how ESG influences firm performance using the event study method.

Given that a growing number of studies are available to shed some light on the influence of EGS on firms, there is still no consistent view of ESG's impact on corporate performance. Several factors, including environmental, social, and corporate governance, influence a firm's ESG performance. The thesis discusses the impact of the degree of ESG on the performance of Taiwanese electronics firms. In addition, this thesis investigates the relationship between corporate capabilities and performance in Taiwan's electronics-listed firms, and the moderating effect of ESG on that association is also verified.

LITERATURE REVIEW

Corporate capabilities and corporate performance

Many past studies have shown that operations functions impact firm capabilities under different economic conditions. Ouyang (2009) has shown that in addition to eliminating inefficient firms, recessions also eliminate superior firms or firms with great future potential if these firms lack the resources and skills necessary to survive adverse economic conditions. According to the resource-based theory (RBT), enterprises need resources with VRIO (valuable, scarce, inimitable, and non-substitutable) characteristics that could potentially become the source of sustained competitive advantage (Barney, 1991). Therefore, compared with tangible resources, intangible resources are more likely to bring competitive advantages to enterprises. Thus, this study explores what enterprise capabilities perform better during the epidemic.

（1） Operational capabilities and corporate performance

For high-tech industries, operational capabilities are particularly important because firms adjust operational capabilities and strategies to the dynamic external environment to remain competitive (Setia & Patel, 2013). Dutta, Narasimhan, and Rajiv (1999) define operational capabilities as increasing output through the effective use of its production capabilities, technology, and flow of materials. From the previous discussion, operation capabilities can be seen as an indicator of performance and efficiency in utilizing corporate assets and resources (Lam, Yeung, & Cheng, 2016). Ahmed, Kristal, and Pagell (2014) discovered that operations ability improved firm performance during two economic recessions (between 1992 and 2010). The thesis results have key implications for operations strategy, capability development, and resilience in economic downturns. Moreover, the research results of Meng, Shen, and Xiong (2023) show that firms with stronger (weaker) total fundamental strength, higher (lower) profitability, and higher (lower) operating efficiency have lower (higher) stock price crash risk. Therefore, this study proposes H1: A positive relationship exists between operating capabilities and corporate performance in Taiwanese-listed electronics firms.

（2） Innovation capability and corporate performance

Innovation capabilities improve product quality, increase product diversification, and expand company size and market share (Hult, Hurley, & Knight, 2004). Innovation capability is regarded as a pinnacle success factor in the highly competitive global economy. An innovation perspective draws a clear picture of future opportunities that lie ahead. Therefore, effective management of innovation capability helps to gain more effective innovation outcomes to generate better firm performance and establish competitive advantages that are difficult to imitate (Cohen & Levinthal, 1990; Cao Shoumin & Chen Guangzheng, 2010; Huang Zhengren and Lin Bingxiao, 2016).

In addition, the electronics industry in Taiwan is very innovative. The electronics industry's product life cycle is shortened, so maintaining competitiveness through innovation capabilities is an important key to improving the sustainability performance and sustainable competitive advantage of organizations (Cai Yi-hsien and Huang Zheng-ren, 2022).

According to the research results of Adcock, Hua, Mazouz, and Yin (2014), innovations promote economic stability and enhance investors' confidence in a country's ability to cope during difficult times.

The research results of Tseng (2022) have shown empirical evidence for the role of technology spillover, an important innovation externality. It finds that the return effect is strengthened when there is a plausibly exogenous increase in the flow of technological information across firms. Specifically, spillover enables learning about new technology to facilitate timely and large-scale adoption. These findings highlight the influence of innovation externality on stock returns. As discussed above, we suggest that innovation and operations capabilities, along with interactions among these capabilities, are important determinants of performance within the industry. It is proposed H2: There is a positive relationship between innovation capability and corporate performance.

（3） Marketing capabilities and corporate performance

Marketing capabilities are the integration process of applying an enterprise's collective knowledge and resources in the organization (Day, 1994). Marketing capabilities and brand value are effective measures of corporate performance that integrate customer demand, brand strength (loyalty, reputation, market position), and economic earnings. A similar assumption was made by Lin et al. (2021), who stated that the corporate brand is an important corporate performance metric. According to the research results of Ahmed et al. (2014), marketing and operational capabilities both improve firm performance, though operational capability is more important during economic downturns. Angulo-Ruiz, Donthu, Prior, and Rialp (2018) showed that marketing capabilities in general and marketing capabilities of retail firms specifically directly affect abnormal stock returns. The growth potential that marketing capabilities exhibit helps explain higher stock returns. Therefore, we would like to hypothesize as follows: H3: There is a positive relationship between marketing capabilities and corporate performance.

Environmental, Social, Governance (ESG) and Corporate Capabilities

Existing literature suggests that corporate social responsibility performance (CSP) facilitates the development of new resources and capabilities (Barney, 1991; Russo & Fouts, 1997), thus enhancing the organization's capabilities for changes, turbulence, and crises in the external environment (Russo & Fouts, 1997). These capabilities also improve the efficiency of enterprise resource utilization by implementing corporate social responsibility (CSR) processes (Majumdar & Marcus, 2001). From the perspective of stakeholders, ESG helps companies establish close relationships with stakeholders, thereby improving their ability to implement innovative technologies, produce new products, and enter the market, thereby improving the company's ability to utilize resources (Hasan, Kobeissi, Liu, & Wang, 2018). Therefore this study believes that ESG can have a positive enhancing effect on corporate capabilities.

（1） ESG and operational capabilities

More and more companies regard CSR as a business strategy to enhance competitiveness and achieve sustainable operations (Bai & Chang, 2015). CSR initiatives directly impact individual

employee outcomes that favor the organization; Hansen, Dunford, Boss, Boss, & Angermeier, 2011 suggests that employees, when perceiving that their organizations are socially responsible, develop trust in their organizations (Mayer et al. 1995), and subsequently, these employees adopt attitudes and engage in behavior that serve to improve their organizations' overall performance. Another evidence suggests that the trust between a firm and both its stakeholders and investors, built through investments in social capital, pays off when the overall level of trust in corporations and markets suffers a negative shock. (Lins, Servaes, & Tamayo, 2017). In addition, process improvement in order to achieve sustainability goals, such as energy conservation, pollution and emission reduction, etc., let companies to improve efficiency and save costs (King & Lenox, 2002), thereby achieving higher operational efficiency.

（2） ESG and innovation capabilities

According to resource-based theory, innovation not only decreases the negative effect on the environment and resources but also provides a competitive advantage through lowering cost (Gürlek & Tuna,2018; Kramer & Porter, 2006; Porter & Kramer, 2011), For example, a firm can be in a superior position to its competitors by operating a cost lower than its competitors do. On the other hand, by following innovative approaches in product and production processes, it can differentiate itself from its competitors (Zhou, Brown, & Dev, 2009).CSR can not only be a beneficial source of innovation and competitive advantage (Kramer & Porter, 2006; Porter & Kramer, 2011), but also help companies to build new knowledge bases by cultivating good relationships with internal and external stakeholders (Hart , 1995), optimizing information exchange within the enterprise is conducive to the development of innovative capabilities.

（3） ESG and marketing capabilities

CSR, a source of competitive advantage, positively impacting customer satisfaction and brand equity (Lev, Petrovits, & Radhakrishnan, 2010). Moreover, CSR helps firms to enhance market and product diversification (Lichtenstein, Drumwright, & Braig, 2004; Lai, Chiu, Yang, & Pai, 2010). Bai and Chang (2015) showed that as market turbulence intensifies, the impact of CSR on marketing capabilities is enhanced, and they showed that in highly uncertain markets,

communication and market response capabilities improved by CSR are more important. Therefore, this study believes that the implementation of ESG will have a positive impact on marketing capabilities.

The interference effect of ESG on the relationship between corporate capabilities and corporate performance

In the wake of the COVID-19 health crisis, there is a growing view that the coronavirus pandemic may be a turning point for responsible business. As corporate social responsibility activities help to build social capital and trust, those corporations that look after all their stakeholders and strive to serve a purpose bigger than profits may be better placed to weather the immediate health crisis and economic downturn ahead. Several contemporaneous studies focusing on COVID-19 also find supportive evidence of ESG as a resilience factor amid uncertainty (Broadstock et al., 2021; Diaz et al., 2021). As explained earlier, we would like to hypothesize as follows:

H4: ESG could moderate the relationship between operational capabilities and corporate performance.

H5: ESG could moderate the relationship between innovative capabilities and corporate performance.

H6: ESG could moderate the relationship between marketing capabilities and corporate performance.

METHODS

Sample and data collection

The data is obtained from the TEJ database operated by Taiwan Economic Journal Co, Ltd. (http://www.finasia.biz/ensite/). This study uses the year of the outbreak (2020) as the research period. The electronics industry is the primary competitive industry in Taiwan. This sample includes eight different electronic segments and excludes the firms without enough and unsuitable information or other disqualified data.

Data analysis methods

（1） DEA and OLS

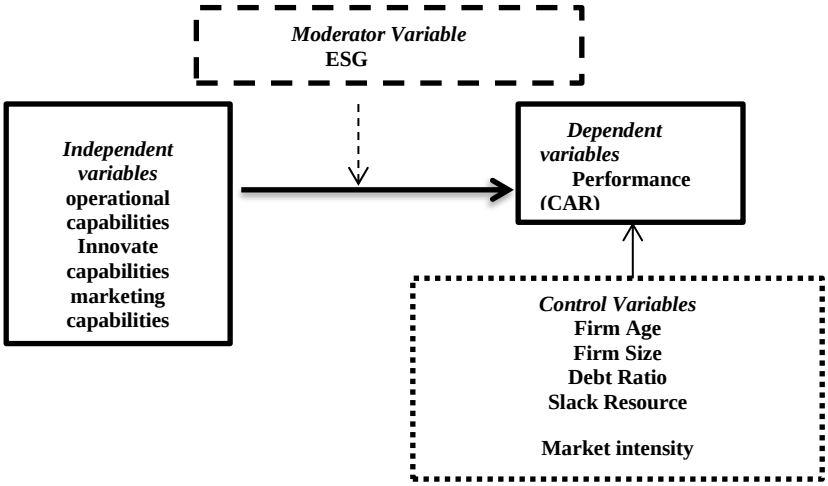
In statistics, DEA is a methodology for measuring the relative efficiencies of a set of decision-making units. This method allowed us to export the relationship between ESG and performance. Ordinary least squares (OLS) is a type of linear least squares that estimates the unknown parameters in a linear regression model. This method minimizes the sum of squares of errors and allows us to find the truth value of our model.

（2） Event Study

The event study method examines whether a specific event causes abnormal or excess returns toward stock price. The main themes, therefore, could be to explain the causation of abnormal returns, investigate whether the stock market can respond quickly and precisely to new information or events, or simulate the methodology studies. In this study, the event date is March 6, 2020.

Conceptual Framework and Variable Measurement

As explained earlier, we would like to show the conceptual Framework and variable measurements as follows:



VARIABLES	INDICATORS	MEASUREMENTS
Dependent variables	Performance	CAR
Independent variables	Operational capabilities	Two evaluation indices are selected as inputs (operating costs, operating expenses) and outputs (Total sales), and then annual data of companies are obtained. The DEA is utilized for the efficiency computation.
	Innovate capabilities	Three evaluation indices are selected as inputs (total assets, staff numbers, and R&D expenditure) and outputs (Total sales). Then the annual data of the electronics industry companies in Taiwan are obtained.
	Marketing capabilities	The ratio of Chinese assets divided by total assets
Moderator Variables	ESG	The degree of ESG Calculated by cluster analysis of STATA
Control Variables	Firm age	Year 2020 subtracts the established year of a firm
	Firm size	Nature logarithm of total asset
	Debt Ratio	Total debts/Total assets
	Slack Resource	Current assets/ Total assets
	Marketing Intensity	Advertising expenses/Total sales
	R&D intensity	The ratio of R&D expenditure to total sales

Data analysis and research results

In the following section, this study will introduce the calculation and statistical method by using STATA v.15 software.

1、 Data Description

The descriptive statistics and correlation matrices are shown as follows:

Table 1 Narrative statistics table

Variable	Mean	Std. Dev.	Min	Max
CAR010	-8.409	13.723	-54.435	47.625
CAR030	-1.188	11.859	-59.125	54.502
CAR045	3.199	13.575	-66.814	68.105
opt	.929	.026	.74	1
innate	.885	.038	.658	1
mktte	.814	.064	.586	1
hiesg	.389	.488	0	1

Note: n=719

Table 2 Correlation coefficient table

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) CAR010	1.000						
(2) CAR030	0.593*	1.000					
(3) CAR045	0.311*	0.739*	1.000				
(4) opt	0.065	0.213*	0.201*	1.000			
(5) innote	0.019	0.157*	0.143*	0.795*	1.000		
(6) mktte	0.133*	0.206*	0.148*	0.606*	0.598*	1.000	
(7) hiesg	0.032	0.076*	0.075*	0.252*	0.312*	0.333*	1.000

* $p<0.05$

2、 Abnormal return analysis during the event

According to Figure 5 and table 3, the COVID-19 event has negative impact on electronics industries. The red line represents cumulated abnormal return, it shows that CAR starts to decrease from +4, reaches the lowest point of -8% at +10. Then, CAR return to the starting point at +27. This study includes the period, which fully cover the response effect of this event to abnormal returns.

Figure 5 Average abnormal return and cumulative abnormal returns on March 6, 2020

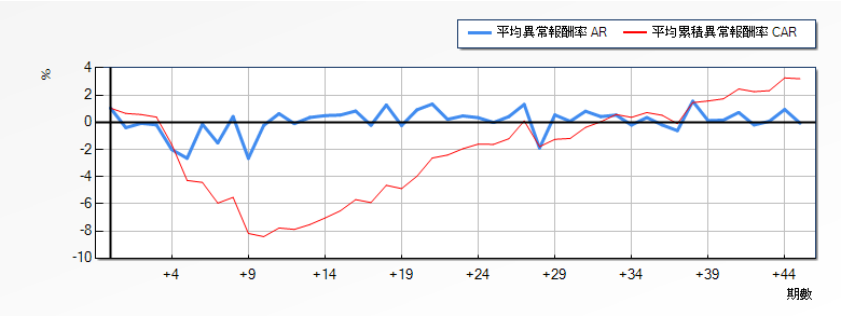


Table 3 Partial test results of sample abnormal returns and cumulative abnormal returns

incident date	WITH	p-value	CAR	p-value2
0	*1.042*	*0***	*1.042*	*0***
4	*-2.0088*	*0***	*-1.6298*	*0.3001*
5	*-2.6485*	*0***	*-4.2784*	*0***
10	*-0.2325*	*0.0037***	*-8.4092*	*0***
15	*0.5294*	*0***	*-6.5111*	*0***
20	*0.9123*	*0***	*-3.9655*	*0***
25	*-0.0198*	*0.3911*	*-1.6267*	*0.2963*
27	*1.3108*	*0***	*0.102*	*0***
30	*0.0685*	*0.992*	*-1.1884*	*0.0284***
35	*0.3479*	*0.0075***	*0.7118*	*0***
40	*0.1595*	*0.3878*	*1.726*	*0***
45	-0.0634	0.2019	3.1986	0**

3、 hypothesis test

In this section, the regression is conducted by the OLS method, firm size, firm age, debt ratio, current ratio ,R&D intensity and Marketing intensity are taken as control variables, and operational capabilities , innovate capabilities , and marketing capabilities as independent variables, for the moderators, this study uses ESG, the results of regression are demonstrated in table 4 and table5, while this study intends to see the relationship toward firms during the pandemic and under the yearly based period, the regression is conducted with different dependent variables.

Table 4 Multiple regression analysis results of this study

	(1) CAR010	(2) CAR010	(3) CAR010	(4) CAR010	(5) CAR030	(6) CAR030	(7) CAR030	(8) CAR030	(9) CAR045	(10) CAR045	(11) CAR045	(12) CAR045
I was born	-.209	-1.222***	-1.568***	-2.677***	.272	-1.055***	-1.324***	-1.751***	.273	-.591	-.882*	-1.106**
Ages	.148***	.166***	.168***	.18***	.077*	.099**	.101**	.111**	.038	.052	.055	.063
Debt Ratio	-.077**	-.082**	-.078**	-.093***	-.065**	-.061**	-.058*	-.061**	-.098***	-.095***	-.093***	-.093***
CurrentRatio	.002	.002	.002	.001	-.001	-.001	-.001	-.001	-.004*	-.004**	-.004*	-.004*
RDIntensity	-27.252***	-17.783*	-19.292*	-19.664**	-16.072**	7.915	6.739	7.048	-8.711	15.532	14.258	13.279
MktIntensity	10.872	9.017	6.763	2.431	-14.744	-2.004	-3.76	-8.137	-42.381***	-34.993***	-36.896***	-42.354***
opt		6.269	5.147	-24.591		109.004***	108.129***	142.16***		131.555***	130.608***	146.25***
innote		-11.077	-12.111	-12.309		-18.442	-19.247	-23.459		-50.577**	-51.45**	-38.5
mktte		49.35***	48.533***	25.379**		36.042***	35.406***	14.75		25.369**	24.679**	6.571
hiesg			2.044*	-155.337***			1.592	33.191			1.725	52.531
hiesgxopte				117.351*				-79.993				-55.257
hiesgxinnote				-20.065				-19.824				-63.062
hadgxmktte				81.736***				74.246***				69.388***
_cons	-5.629	-27.052	-19.936	43.451	-2.755	-99.579***	-94.034***	-98.896***	5.839	-81.276***	-75.268***	-83.149***
Observations	719	719	719	719	719	719	719	719	719	719	719	719
R-squared	.042	.074	.078	.124	.026	.081	.084	.102	.044	.072	.074	.087

Standard errors are in parentheses
**** p<.01, ** p<.05, * p<.1*

Table 5 Summary of Hypothesis Testing

Hypothesis	Content of Posited Relationship	Result
H1	There is a positive relationship between operating capabilities and corporate performance in Taiwanese listed electronics firms.	In table 4, it shows that the there is no significant relationship between operating capabilities and performance in the beginning. Then, operating capabilities has a positive relationship with the statistically significant value ($p < 0.01$) to firm performance, this partially supports the hypothesis 1.
H2	There is a positive relationship between innovation capability and corporate performance.	For the model 10 and model 11 in the table 4, innovation capability has a negative relationship with the statistically significant value ($p < 0.05$) to firm performance. Other model shows there is no significant relationship between innovation capabilities and performance. Hence, the hypothesis 2 is non-Supported
H3	There is a positive relationship between marketing capabilities and corporate performance.	For the model 8 and model 12 in the table 4, interaction terms of performance and marketing capabilities are not significant in the end of the event study. However, the interacting effect of marketing capabilities and performance presents significantly positive in another period. As explained earlier, the hypothesis 3 is partially Supported.
H4	ESG could be the moderator between the relationship of operational capabilities and corporate performance.	For the figure 6 and model 4 in the table 4, the intercept of high degree of ESG is significantly higher compared with low degree of ESG, both high and low degrees of ESG moderate the relationship between operational capabilities and corporate performance. Therefore, hypothesis 4 is partially Supported.

H5	ESG could be the moderator between the relationship of Innovate capabilities and corporate performance.	Interaction terms of ESG and Innovate capabilities has no relationship. Therefore, hypothesis 5 is non-Supported.
H6	ESG could be the moderator between the relationship of marketing capabilities and corporate performance.	For the figure 7, figure 8 and figure9, interaction terms of ESG and marketing capabilities has a positive relationship with the statistically significant value. Therefore, hypothesis 6 is Supported.

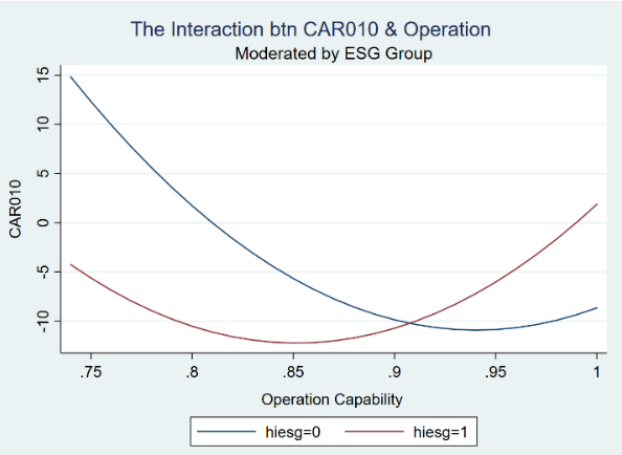


Figure 6 The interference effect of ESG on the relationship between operational capabilities and CAR010

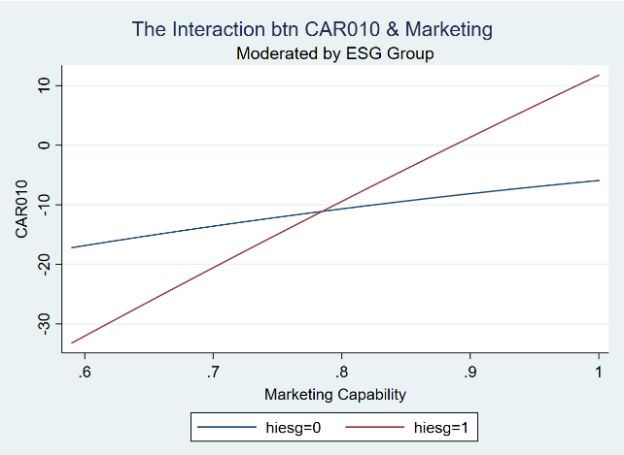


Figure 7 The interference effect of ESG on the relationship between marketing capabilities and CAR010

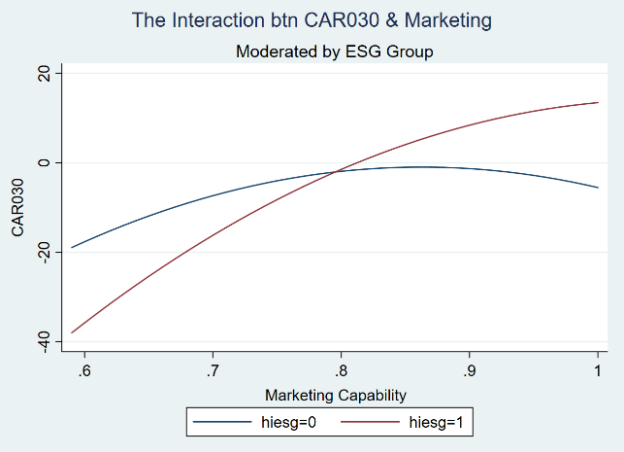


Figure 8 The interference effect of ESG on the relationship between marketing capabilities and CAR030

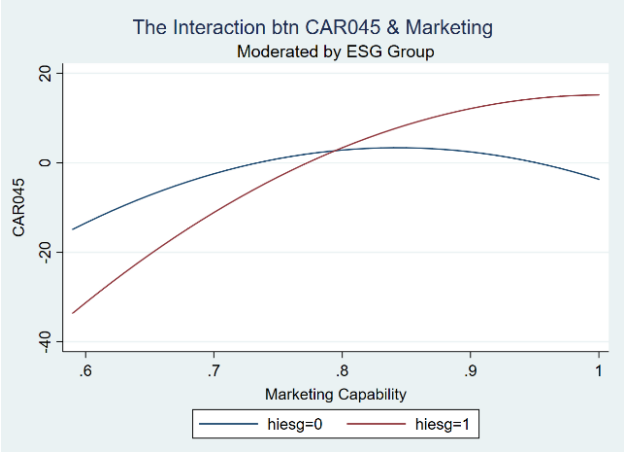


Figure 9 The interference effect of ESG on the relationship between marketing capabilities and CAR045

RESULTS

The evidence for the relationship between ESG and performance is inconclusive from the previous literature. The main objective of this study is to examine the relationship between corporate capabilities and corporate performance under serious external impacts such as COVID-19. More importantly, this study also shows how the extent of the ESG moderates performance. We used a sample of 719 listed companies in Taiwan's electronics industry to test the hypotheses proposed in our research. In this chapter, we will discuss the results of the hypothesis, analyze its managerial implications, and provide future research suggestions.

The results revealed that marketing capabilities impact abnormal returns most when external impact occurs initially. As time passes, the influence of marketing capabilities gradually decreases, and the influence of operational and innovative capabilities has increased. This also accords with our earlier observations, which showed that firms with higher marketing capabilities gain the trust of investors or consumers and assist firms to outperform in the beginning of external impact. At the end of the external crisis, the increase in operational and innovative capabilities allow Taiwan's electronics industry companies to enhance their performance and stock prices.

Based on Figure 6 - 9, ESG has a positive influence on marketing capabilities, operational capabilities, and performance. Under the condition of a high degree of ESG, the performance starts to increase with the increases in the degree of marketing capabilities and operational capabilities. However, interaction terms of ESG and innovative capabilities have no relationship.

DISCUSSION

Theoretical and management implications

ESG has gradually become an issue that can’t be ignored by government, management, academic, and companies because of carbon credit, carbon rights, the pressure from stakeholders, and the impact of external emergencies. Previous literature indicated that When investors and stakeholders focus on ESG, they will give better evaluations to corporates that are capable of implementing ESG. This study has demonstrated that the higher degree of ESG companies, the

better risk resistance and performance during the crisis. (Albuquerque et al., 2020; Broadstock et al., 2021; Lins et al., 2017).

According to (Table 4), as Meng et al., (2023) and Angulo-Ruiz et al. (2018) have demonstrated, firms with higher marketing and operating efficiency have lower stock price crash risk. Firms also improve customer loyalty to maintain existing customer relationship gaining better performance by higher marketing capabilities. The next finding confirms ESG plays an important role in the relationship between marketing capabilities and performance. As discussed above, it can be proved that Broadstock et al. (2021) argue that high ESG portfolios and marketing capabilities generally perform better and that ESG performance can mitigate risks during crises. The moderator like ESG, is proved to be benefit during the period of COVID-19 outbreak, consistent with the view that investors in may interpret ESG performance as a signal of future stock performance and/or risk mitigation in times of crisis. Taiwanese electronics firms thus have to pay a big ESG spending to maintain competitiveness and sustainability advantages.

CONCLUSION

The study confirms that while the relationship between ESG and corporate performance remains inconclusive in prior literature, ESG plays a crucial moderating role in performance during external crises like COVID-19. Analyzing 719 Taiwanese electronics firms, the findings reveal that marketing capabilities significantly drive abnormal returns at the onset of a crisis, but their impact diminishes over time as operational and innovative capabilities become more influential. Moreover, ESG positively influences marketing and operational capabilities, leading to enhanced performance, though its interaction with innovative capabilities remains insignificant. These findings highlight both theoretical and managerial implications, reinforcing that firms with strong ESG practices exhibit better risk resilience and investor confidence, ultimately improving performance during crises. Taiwanese electronics companies, therefore, must strategically invest in ESG initiatives to maintain long-term competitiveness and sustainability.

LIMITATION

This study aims to explore the impact of ESG and corporate capabilities on performance and risk avoidance when emergencies occur, it just focuses on whether it is possible that ESG performance acts as a valuable indicator to systematically navigate away from negative risk during times of crisis. However, both ESG and corporate capabilities require long-term investment and cultivation. The future research could use long-term samples (Panel Data) to export the relationship among ESG, corporate capabilities and performance. Furthermore, this study only chooses a single industry and event for the sample, another direction of future research is to test more industries by Multilevel models or test other event..

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