



**ESG RATINGS AND STOCK PERFORMANCE DURING  
THE COVID-19 CRISIS: EVIDENCE FROM  
ASIAN MARKETS**

**BY**

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ENTITLED

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CRISIS: EVIDENCE FROM ASIAN MARKETS

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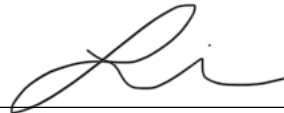
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## ABSTRACT

Since the COVID-19 pandemic caused a worldwide stock market catastrophe, the trend of ESG investing has increased in recent years, specifically for Asian markets. However, there has been relatively little study conducted on the Asian market, thus we would like to conduct more. Moreover, in Asia, political instability could have an impact on the significance of ESG, like the protest that occurred in Hong Kong prior to COVID. It also impacts the economy's functioning. To determine whether ESG score is more important to stock performance during a crisis, we additionally consider country characteristics.

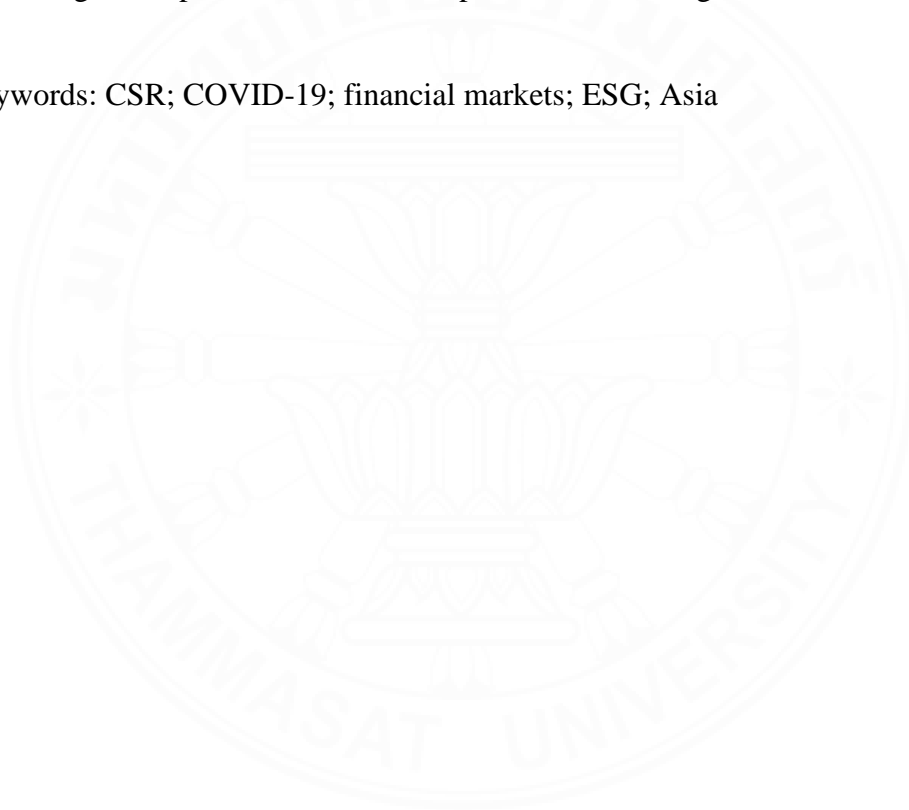
Our study found that overall ESG scores protect stocks from idiosyncratic volatility in the 11 Asian markets, particularly in Korea and Malaysia. However, when examining individual ESG factors, we found that environmental (E) factors protect stocks from idiosyncratic volatility in Hong Kong and Korea. We also found that increasing ESG scores led to higher CARs in China but lower CARs in Japan, with governance (G) playing a significant role in increasing CARs in both countries.

Furthermore, high ESG score companies performed well in countries with low human development, transparency, and democracy, particularly in terms of social (S) factors in low transparency countries. Conversely, high ESG score companies

performed better with higher governance (G) performance in countries with high human development and transparency. Lastly, our analysis showed that the combination of E and S factors had a significantly negative impact on both CARs and idiosyncratic volatility during the crisis.

Overall, our study supports the idea that a focus on ESG factors can lead to more stable outcomes in the face of uncertainty, particularly in Asian markets where political instability can impact the economy's functioning. Our findings also highlight the importance of considering individual ESG factors and country characteristics when evaluating the impact of ESG on stock performance during a crisis.

Keywords: CSR; COVID-19; financial markets; ESG; Asia



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Chingju Chang

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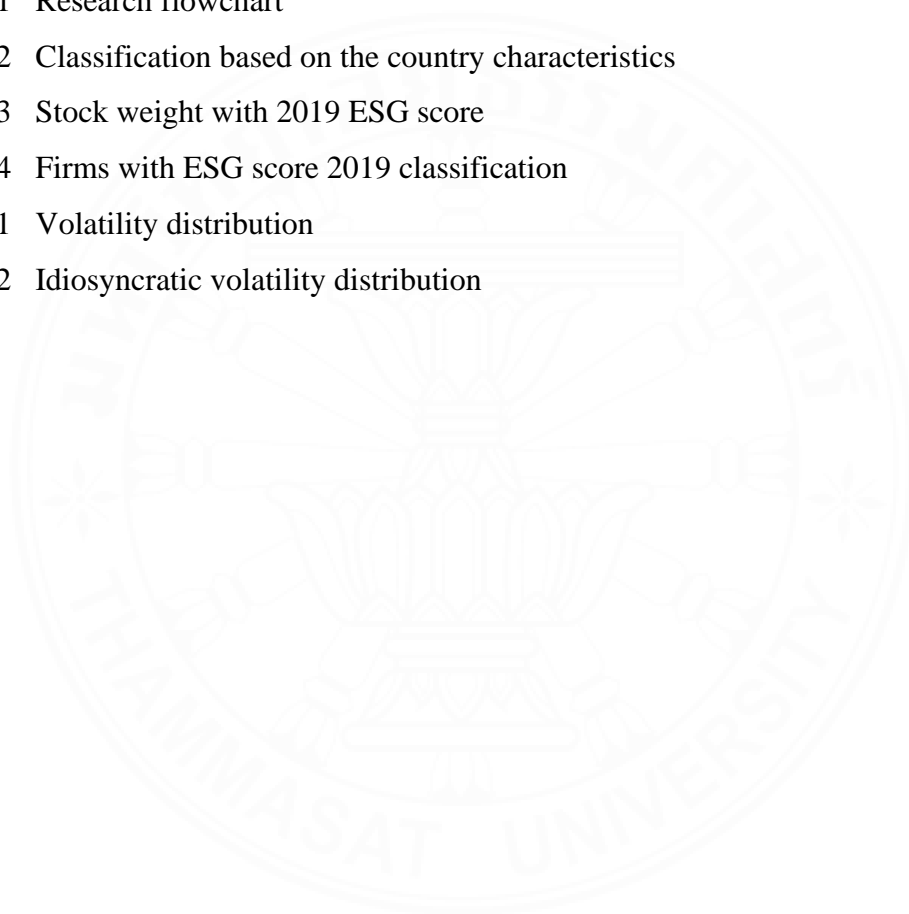


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## LIST OF ABBREVIATIONS

<b>Symbols/Abbreviations</b>	<b>Terms</b>
ASEAN	Association of Southeast Asian Nations
ASEAN-5	Indonesia, Malaysia, the Philippines, Singapore, and Thailand
ASEAN Plus Three (APT)	China, Japan, and Republic of Korea
BRICS	Brazil, Russia, India, China, and South Africa
ESG	Environmental, Social, and Governance
CSR	Corporate Social Responsibility
SRI	Socially Responsible Investing
GSS	Green, Social, Sustainability
Democracy; Democracy Index	Democracy Civil Liberties Index 2019
Corruption; Corruption Index	Corruption Perception Index 2018
Human Development	Human Development Index 2015
CAPM	Capital Asset Pricing Model
CAR	Cumulative Abnormal Return

# CHAPTER 1

## INTRODUCTION

### 1.1 Background of study

#### 1.1.1 The rise of ESG

Currently, the idea of corporate social responsibility (CSR) is once again in the forefront. One of the significant non-financial aspects for fundamental analysis in investment is socially responsible investing (SRI). The awareness of climate change, social inequality, and particularly the economic depression brought on by the COVID-19 epidemic has made environmental, social, and governance (ESG) the trendiest topic in terms of responsible investing. The corporation has dramatically increased the frequency with which "ESG" is mentioned during earning calls (Eckerle et al., 2020; Harriet Agnew, 2022). Additionally, by conducting survey research, Van Duuren et al. (2016) investigated how conventional asset managers account for ESG in their investment processes. It was discovered that many conventional managers incorporate SRI into their investment strategy, particularly for red flagging and risk management. Especially, governance of the company, which has a close relationship with managerial quality, receives the most attention from the research (Van Duuren et al., 2016). As a result, businesses must publish more than just their financial performance in order to fulfill sustainable management and ESG objectives. ESG is now undoubtedly one of the most important non-financial elements for both individual and institutional investors with high expectations.

Will ESG only be one of the businesses' marketing plans? Green investing is still popular, and "green reports" are becoming required in some EU nations (Euronext, 2022) despite ESG controversies like "greenwashing," "uncertainty in ESG ratings," and "underperformance," which were mentioned by de Silva Lokuwaduge and De Silva (2022), Halbritter and Dorfleitner (2015), as well as financial columns (Atkins, 2022) (Curtis, 2022).

### 1.1.2 ESG ratings and stock performance during crisis

Does the ESG index have an impact on stock return? Few academics have examined this topic and reached the ambiguous conclusion. Friede et al. (2015) discovered a positive association between ESG and company performance especially in North America and emerging markets. La Torre et al. (2020) concluded that the performance of the Eurostoxx50 companies did not appear to be affected by their efforts in terms of ESG commitments, according to research based on the European market. Garcia et al. (2017) found that the profitability of the firm's assets was correlated with only one of the ESG performance proxies, environmental performance, and that companies with the best ESG performance were typically less profitable based on emerging markets BRICS (Brazil, Russia, India, China, and South Africa). Additionally, according to research in specific sectors, Cayón and Gutierrez (2021) discovered that sin companies had a positive correlation with ESG performance, whereas non-sin companies that were listed in the top 25% and worst 25% of ESG performers had a negative correlation with ESG performance in the following year. In general, it's still unclear whether ESG ratings and stock performance are related.

The COVID-19 outbreak caused an economic disaster on a global scale. During the COVID period, the majority of businesses' financial situations drastically worsened. According to J.P. Morgan report (Wu & Juvyns, 2020), COVID-19 demonstrates that ESG is more important than ever. In the meantime, much of the media promotes ESG investment as being extremely stable and durable (Hale, 2020), and that its rate of return is more resistant to changes in the financial markets. However, can investors gain from ESG ratings, particularly in times of crisis?

There are numerous perspectives and findings about the relationship between ESG or CSR and crisis-related corporate performance. From the positive relationship perspective, Engelhardt et al. (2021), and R. Albuquerque et al. (2020) indicated that, based on data from European and US markets, ESG equities outperformed non-ESG companies during the COVID-19 pandemic, according to the results of positively and highly statistically coefficients with abnormal return. In addition, Lins et al. (2017) found that during the 2008 financial crisis, enterprises with high CSR earned higher returns than those with low CSR. Also, Mousa et al. (2021)'s findings suggested that ESG investment played a significant role as a less risky

investment channel on Arab capital markets during times of crisis. From the negative relationship perspective, however, Bae et al.'s research demonstrated that pre-crisis CSR was ineffective at protecting shareholder capital during the crisis (Bae et al., 2021).

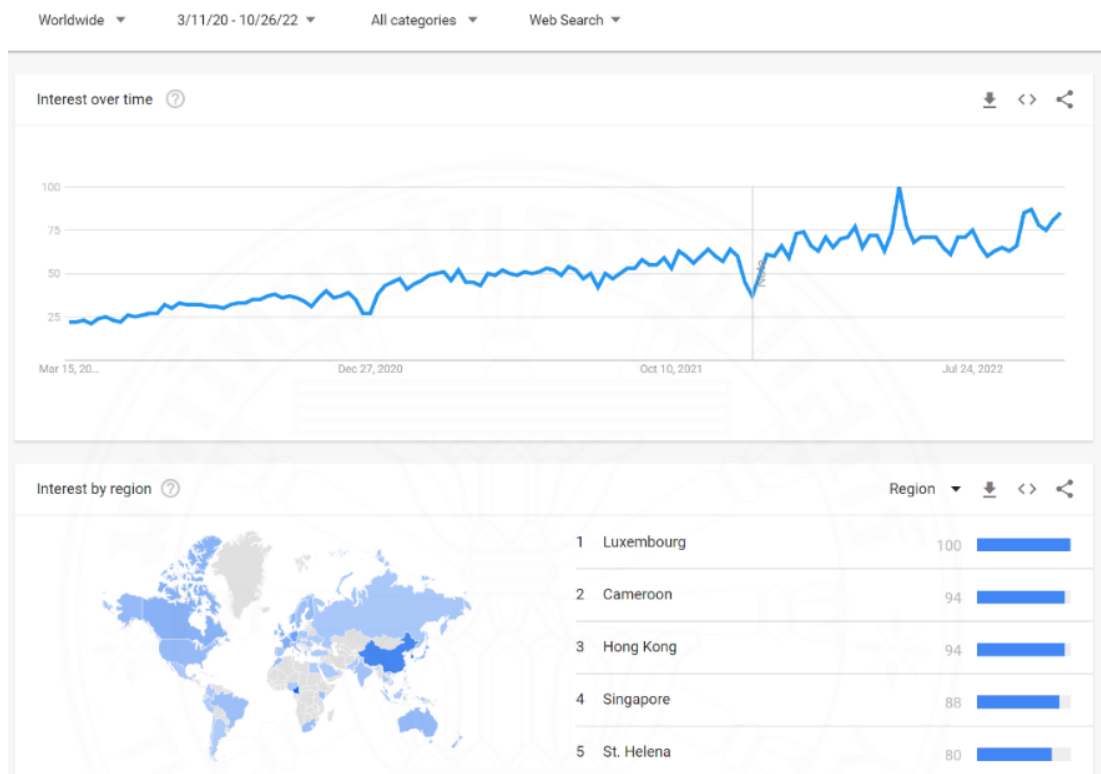
### **1.1.3 ESG poised to take off in Asia**

According to a report by Morningstar (Baselli, 2021) based on the Morningstar Sustainability Atlas in 2021, European countries such as France, Spain, the Netherlands, and others in northern Europe achieved relative dominance in ESG investment prospects. Hong Kong and Taiwan were surprisingly in the top five non-European markets.

Even though ESG advancements in Asia have lagged Europe, sustainable investment is increasingly becoming a focus in Asia and is viewed as an opportunity by the majority of investors. From March 11, 2020, the date The World Health Organization (WHO, 2020) declared the COVID-19 outbreak a global pandemic, through October 2022, Google trends *Figure 1.1* indicates that "ESG" is a prominent search word in Hong Kong, Luxembourg, Singapore, St. Helena, and Cameroon. Asia plays host to two of the five regions with the highest proportion of total queries. Also, *Figure 1.1* shows that the interest in searching the word "ESG" has been increasing. Additionally, HSBC (2021)'s ASEAN Sustainable Finance 2021 report demonstrated that ESG-related investment instruments have exploded in recent years. Overall, ESG or CSR-related financial instruments have grown significantly in recent years.

Figure 1.1

*Interest over time: frequency of “ESG” interest as a search keyword with time*  
*Interest by region: locations have a high level of interest in the word “ESG.”*



*Source: Google Trends*

Even though the relationship between ESG score and stock performance over the long term is still unclear, positive correlation has been discovered between high ESG/ CSR and stock returns during crisis in specific markets (R. Albuquerque et al., 2020; Engelhardt et al., 2021; Hwang et al., 2021; Lins et al., 2017; Mousa et al., 2021). In order to gain a broader perspective in Asian areas, this paper extends previous research to examine the relationship between ESG score and market performance during the most recent financial crisis caused by the COVID-19 epidemic, in terms of stock returns and volatility.

#### **1.1.4 High ESG and Country characteristics: democracy, corruption, and human development**

Notably, in 2019-2020, before to the COVID outbreak, the Hong Kong Protests (Cheung & Hughes, 2020), also known as the Anti-Extradition Law Amendment Bill Movement (Alex et al., 2019), one of the greatest rallies in Hong Kong's history, occurred. Bhambhwani (2022) discovered that the more the protest intensity, the greater the volatility and the increased likelihood of negative abnormal returns. As Hong Kong is one of the largest financial markets and the pioneer in ESG development in Asia, the extra test assessing whether ESG is even more essential in certain nations based on the democracy index (Herre & Roser, 2021) and corruption index will be conducted (Ortiz-Ospina & Roser, 2019). A few scholars have conducted similar estimations. Engelhardt et al. (2021) stated that ESG was considerably important in nations with low-trust or poor security regulations, but Lins et al. (2017) demonstrated that CSR was more relevant in high-trust US regions during the global financial crisis.

Lastly, the more a country's level of development, the greater its concern about sustainability (Debrah et al., 2021). In this study, we employ the human development index (Roser, 2019) as a third dependent variable grouping metric as a proxy for ESG awareness in order to determine if ESG performance is more crucial in some countries than others.

## **1.2 Research Objective**

The study investigates:

### **1.2.1 ESG score and stock returns**

Whether firms in Asia with higher ESG ratings have higher returns during crisis.

### **1.2.2 ESG score and volatility**

Whether firms in Asia with higher ESG ratings have lower volatility during crisis.



### **1.2.3 High ESG score, and stock returns associated with country characteristics**

Whether High ESG performance is even more critical in relation to human development, democracy, and corruption.

## **1.3 Scope of Research**

The research design is based on Engelhardt et al.'s study. For our purpose, we select a sample of listed firms from eleven Asian indices, which include both developed and emerging markets. The study will focus on the period from 5 Mar 2020 to 28 Apr 2020, which is one month later than the "collapse period" from 3 Feb 2020 to 23 Mar 2020 proposed by Fahlenbrach et al. (2021) due to the late arrival of the COVID-19 pandemic to the Asian financial markets.

### **1.3.1 Cross-sectional analysis and Ordinary Least Square (OLS)**

Our analysis is based on a two-step methodology: a cross-sectional analysis and multiple linear regression extended from ordinary least square (OLS).

### **1.3.2 Dependent variables: stock performance**

The dependent variables are cumulative log return, cumulative abnormal return, volatility calculated from daily log returns, idiosyncratic volatility calculated from daily abnormal returns, and cumulative abnormal return of high ESG firms from countries with respect to six groups of country characteristics, calculated from daily stock closing price.

### **1.3.3 Independent variables: ESG score and the others**

2019 yearly ESG score is the main variable, along with other factors such as firm controls, industry fixed effects, and country fixed effects. Nowadays, ESG suppliers such as MSCI, Refinitiv, Sustainalytics, ISS Global, and Bloomberg have developed ESG ratings in recent years. We obtain Refinitiv's ESG ratings from Thomson Reuters Eikon as they are primarily used in the previous literature (R. Albuquerque et al., 2020; Bae et al., 2021; Engelhardt et al., 2021; Lins et al., 2017).

#### **1.4 Expected Benefit of Research**

Allow investors who want to invest in the Asian market to decide whether the ESG score should be considered an indicator. And if the stock with a higher ESG score can be viewed as a hedging opportunity during the crisis based on differing country characteristic.



## CHAPTER 2

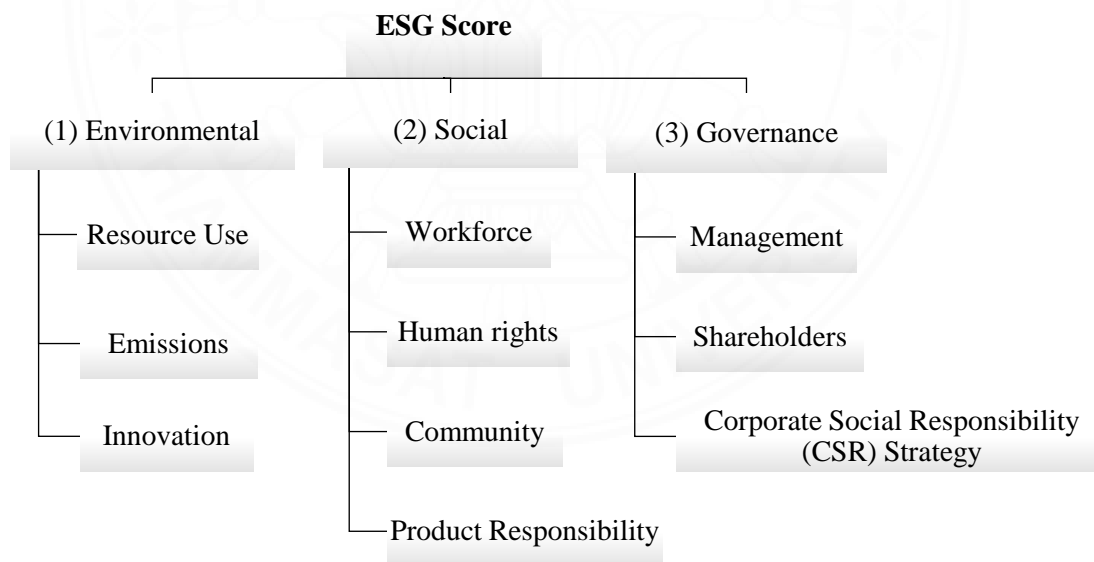
### REVIEW OF LITERATURE

#### 2.1 Environmental, Social, and Governance (ESG)

In accordance with the Refinitiv ESG methodology (Refinitiv, 2022), the ESG score is comprised of three pillars and ten categories: (1) Environmental, including resource use, emissions, and innovation. (2) Social, including workforce, human rights, community, and product responsibility. (3) Governance, including management, shareholders, and a strategy for corporate social responsibility. *Figure 2.1* shows the components of the ESG rating, and *Figure 2.2* displays the weight of each category.

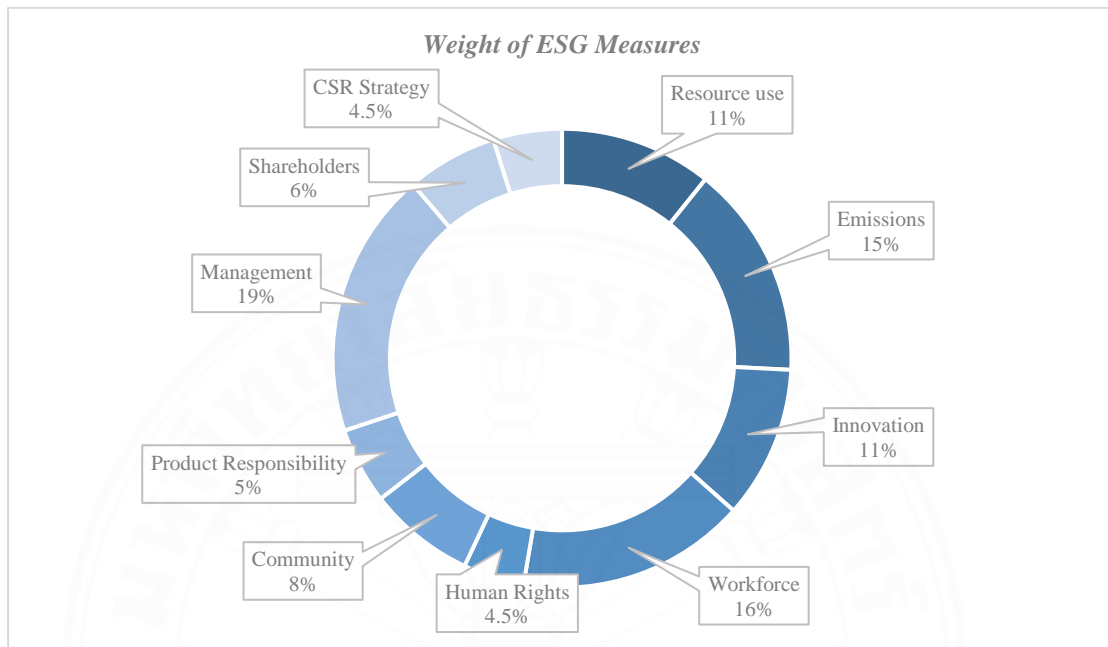
Figure 2.1

*The ESG rating components of Refinitiv*



*Source: Environmental, Social, and Governance Scores from Refinitiv*

Figure 2.2

*Weight of ESG measures*

Source: <https://www.refinitiv.com/en>

The ESG pillar score is the sum of the industry-dependent category weights. The weights are standardized to a percentage range between 0 and 100. The score range will be rated based on a percentage of 12 possible points. From the highest grade/highest percentage (ESG leaders) to the lowest grade/lowest percentage (ESG laggards), the grades are as follows: A+, A, A-, B,...D+, D, and D-.

In the research, we get ESG ratings from Thomson Reuters Eikon. Those companies without ESG scores will be excluded from the subsequent investigation.

## 2.2 Debate of whether engaging in ESG is beneficial

As stated in the introduction 1.1.2, the correlation between ESG score and the financial performance of a company is still a matter of discussion. As ESG rating is a non-financial statistic, results may vary based on data period, regions, special events, investment behavior, and various ESG rating standards. Comparing a few study

publications, mostly the research focus on European countries, the United States, or a specific nation. In addition to the positive and negative perspectives indicated in section 1.1.2, there is a discussion as to whether socially responsible governance will boost the value of a company. Some argue that socially responsible companies confront a competitive disadvantage and should have lower valuations as a result of their increased costs and lower profit margins (Aupperle et al., 1985; Brammer & Millington, 2008). Moreover, according to some study, it is unrelated to the firm's value, and due to the expense and high agency charges, may even harm the firm's valuation (Bae et al., 2021; Cheng et al., 2014; Di Giuli & Kostovetsky, 2014). In contrast, some perspectives hold that socially responsible governance is a value-enhancing activity (Falck & Heblich, 2007; McWilliams & Siegel, 2001; Servaes & Tamayo, 2013).

Despite the fact that Asian markets have been understudied, there are a few studies based on Asian markets that investigate the relationship between CSR or ESG and firm performance. Regarding corporate governance and transparency, Husnaini and Basuki (2020) discovered that the ASEAN Corporate Governance Scorecard (ACGS) had no impact on sustainability reporting and a considerable negative impact on firm value based on data from 2014 to 2017. The ACGS is a corporate governance measurement introduced for ASEAN countries with the purpose of improving the standards and practices of corporate governance of the firms going public and creating greater international visibility, as well as a competitive tool to attract investors (ASEAN, 2019). Mutuc and Lee (2019) indicated that ESG participation had a favorable impact on market-adjusted stock returns in 11 Asia Indices over the long term, although the short-term consequences varied by nation and industry. Budsaratagoon and Jitmaneroj (2021) discovered that when economic performance in Asian-Pacific Markets was weak, investors placed a greater emphasis on business sustainability. Auer and Schuhmacher (2016) analyzed cross-region data and discovered that ESG scores and investment success were not significantly correlated in Asia Pacific and the United States, although investors in Europe preferred to pay a premium for socially responsible behavior in particular industries. Based on ASEAN-5 data, Rahma and Rokhim's research revealed that the ESG score significantly affected stock market volatility, but not market beta. In other words, ESG scores impacted total risk but had no effect on systematic risk. According to Rahman and Al Mamun (2021)'s research, corporations'

stock price responses to the financial crisis were independent of their CSR activity. Based on research from Korea, Hwang et al. (2021) demonstrated that the performance of ESG activities protected enterprises against a significant fall in financial performance.

### **2.3 Variables and methodologies used from existing literature**

In terms of the methodology, some similar procedures have been proposed by scholars. La Torre et al. (2020), which analyzed Eurostoxx50, Cayón and Gutierrez (2021), which studied sin stocks, and the research I primarily cite to in this study, Engelhardt et al. (2021), revealed that they all used panel analysis and cross-sectional analysis. Notably, in addition to the ESG rating and stock return, three research examined accounting or macro variables as well, such as: ROE, Market-to-Book ratio, market capitalization, idiosyncratic risk, and liquidity, etc. However, the application of the variables differed slightly. Cayón and Gutierrez (2021) used ESG ratings as the dependent variable, whereas La Torre et al. (2020) and Engelhardt et al. (2021) used stock returns as the dependent variable and ESG index as the independent variable.

The study will be conducted according to Engelhardt et al. (2021)'s procedures, which were developed based on R. Albuquerque et al. (2020), Bae et al. (2021), and Lins et al. (2017), as the concept is more similar to the topic at hand: determining the relationship between region stock returns and ESG score during crisis.

Referring to Engelhardt et al. (2021)'s research which examined 1452 publicly traded companies from 16 countries, the author acquired ESG scores from Thomson Reuters Eikon Refinitiv, accounting data from Compustat/ Capital IQ, and country characteristics regarding social trust, rule of law index, disclosure index, and Anti-Self-Dealing index from the World Values Survey's. In addition, the stock prices were gathered between 3 February 2020 and 23 March 2020, the so-called "collapse period" proposed by Fahlenbrach et al. (2021).

ESG score was the primary independent variable in the study by Engelhardt et al. (2021). The authors also created the dummy variable High ESG, which was greater than the median score and 0 otherwise. In addition to the primary independent variable, which was the ESG score, the authors collected company controls (accounting data),

firm fixed effects, and country fixed effects as independent variables, and they extracted stock returns, market volatility, and nation characteristics to examine their relationships.

#### **2.4 Correlations between country characteristics and ESG scores**

The research by Engelhardt et al. (2021) also investigated if a company's strong ESG performance was significant based on the features of various countries, employing four primary factors: social trust, rule of law, disclosure index, and Anti-Self-Dealing index (ASDI). In addition, the data indicated that the firm's ESG performance had a favorable influence during crisis in countries with low levels of trust or lax security measures. In contrast, Lins et al. (2017) found that CSR was more relevant in regions of the United States with high levels of trust during the global financial crisis.

By dividing the findings of Engelhardt et al. (2021) into three parts: (1) ESG ratings and stock returns, (2) ESG ratings and stock volatility, and (3) ESG ratings with respect to country characteristics and stock returns, the author drew the following conclusions from 1452 European stocks: (1) During the COVID-19 crisis, companies with stronger ESG ratings performed better from both the firm and investor perspectives. (2) There was a considerable negative link between ESG score and idiosyncratic volatility. Also, firms with a greater debt-to-assets ratio and greater historical volatility had greater idiosyncratic volatility. (3) There was a positive and highly statistically significant correlation between strong ESG and countries with low levels of trust, poverty, or disclosure.

Expansion of the research to include data from Asian regions can offer further findings for the investigation.

## CHAPTER 3

### RESEARCH METHODOLOGY

#### 3.1 Stock composition

The study is comprised of 1118 stocks from 11 Asian indices, including ASEAN-5 and the other Asian nations: China CSI 300, Hong Kong Hang Seng 50, Korea KOSPI 200, Japan Nikkei 225, Singapore STI 30, Philippines PSEI 30, Malaysia KLCI 30, MSCI Taiwan 81, MSCI Thailand 42, MSCI India 105, and MSCI Indonesia 25. *Table 3.1* displays all equities split by market.

Table 3.1 Number of stocks from each market used for research

	<b>Market</b>	<b>Index</b>	<b>Number of Stocks</b>	<b>Number of stocks with 2019 ESG</b>
(1)	China	Shanghai Shenzhen CSI	300	250
(2)	Hong Kong	Hang Seng Index	50	46
(3)	Korea	KOSPI	200	126
(4)	Japan	Nikkei	225	218
(5)	Singapore	Straits Times Index	30	28
(6)	Philippines	PSEI	30	23
(7)	Malaysia	FTSE Bursa Malaysia KLCI	30	28
(8)	Taiwan	MSCI Taiwan	81	78
(9)	Thailand	MSCI Thailand	42	36
(10)	India	MSCI India	105	88
(11)	Indonesia	MSCI Indonesia	25	22
	<b>Total</b>		<b>1118</b>	<b>943</b>

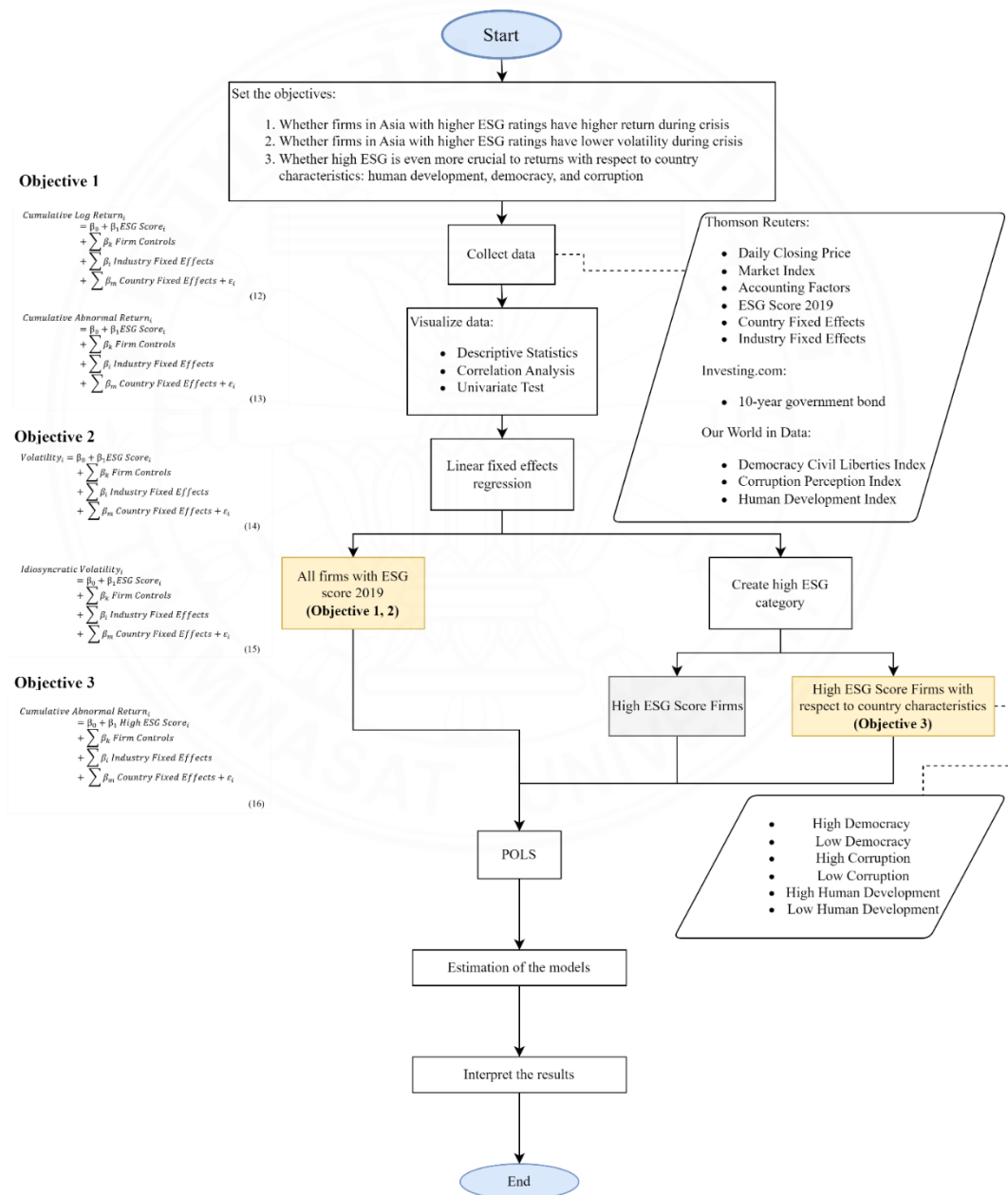


### 3.2 Flowchart of research

Figure 3.1 illustrates the procedure of the overview of the research.

Figure 3.1

Research flowchart



### 3.3 Data Collection

Thomson Reuters Eikon Refinitiv is used to retrieve the daily closing stock price, market index, ESG score 2019, accounting parameters, country, and industry factors. Investing.com provides the risk-free rates which are the country-specific 10-year bond yield rates. Our World in Data provides country characteristics.

#### 3.3.1 Data of Dependent Variables

As the study investigates three objectives, the main dependent variables can be divided into three sets accordingly: (a) Firms' cumulative raw stock return and cumulative abnormal stock return. (5 Mar 2020- 28 Apr 2020) (b) Volatility and idiosyncratic volatility. (5 Mar 2020- 28 Apr 2020) (c) Firms' stock returns grouped with Human development index (2015), Corruption index (2018) and Democracy Index- civil liberties (2019).

Data (a) and (b) are derived using the daily closing price from Refinitiv Eikon between 5 Mar 2020 and 28 Apr 2020, which is the extended version for Asian markets based on the "collapse period" specified and utilized by previous research (Engelhardt et al., 2021; Fahlenbrach et al., 2021).

We obtain index information for Data (c) from Our World in Data (Herre & Roser, 2021; Ortiz-Ospina & Roser, 2019; Roser, 2019). *Table 3.2* defines the country characteristics indices utilized.

Table 3.2 Definition of Country Characteristics Index

Country Characteristics Index	Definition
Democracy Civil Liberties (2019)	Assesses whether citizens have physical integrity rights, freedom of religion, freedom of travel, and freedom from forced labor, as well as access to justice, laws that are transparent, and impartial governmental administration, on a scale from 0 to 1, where 1 is extremely democratic.

Table 3.2 Definition of Country Characteristics Index (Cont.)

Country Characteristics Index	Definition
Corruption Perception (2018)	It ranks 180 nations and territories according to their estimated levels of public sector corruption, as evaluated by experts and businesses, on a scale from 0 to 100, where 100 is extremely clean.
Human Development (2015)	It assesses essential aspects of human progress based on life expectancy, education, and standard of living based on gross national income per capita adjusted for the country's price level, on a scale from 0 to 1, where 1 is extremely developed.

### 3.3.2 Methodology of Dependent Variables

The construction of the dependent variables is similar to previous estimation based on CAPM equation (R. Albuquerque et al., 2020; Engelhardt et al., 2021). *Table 3.3* provides the information necessary for calculation.

Table 3.3 Abbreviation used for calculation

Definition	
$S_0$	Stock price at period 0
$S_1$	Stock price at period 1
$r_m$	Market index return with respective countries
$r_f$	Risk-free rate; 10-year bond yield with respective markets
$r_i$	Daily logarithm return (raw return; log return)
$r_{\text{abnormal}}$	Daily abnormal return
CAPM beta	Estimated by using firm's stock daily returns and the respective markets since the year 2019.

### 3.3.2.1 Cumulative daily logarithm (raw) return

Cumulative daily logarithm return from 5 March 2020 to 28 April 2020 is the aggregate of daily logarithm return based on equation (1).

$$r_i = \ln\left(\frac{S_i}{S_0}\right) \quad (1)$$

### 3.3.2.2 Cumulative daily abnormal return

Cumulative daily abnormal return from 5 Mar 2020 to 28 Apr 2020 is the aggregate of daily abnormal return based on equation (2).

$$r_{abnormal} = r_i - \hat{r}_i \quad (2)$$

Specifically, a firm's abnormal stock return is the difference between the log and expected return calculated based on CAPM equation (3). The stock beta is calculated based on respective market return since year 2019.

$$E(r_i) = r_f + \beta_i (E(r_m) - r_f) \quad (3)$$

### 3.3.2.3 Volatility

Volatility is the standard deviation from daily logarithm return based on equation (5).

$$Var(r) = \frac{1}{T-1} \sum_{t=1}^T (R_t - \bar{R})^2 \quad (4)$$

$$SD(r) = \sqrt{Var(r)} \quad (5)$$

### 3.3.2.4 Idiosyncratic volatility

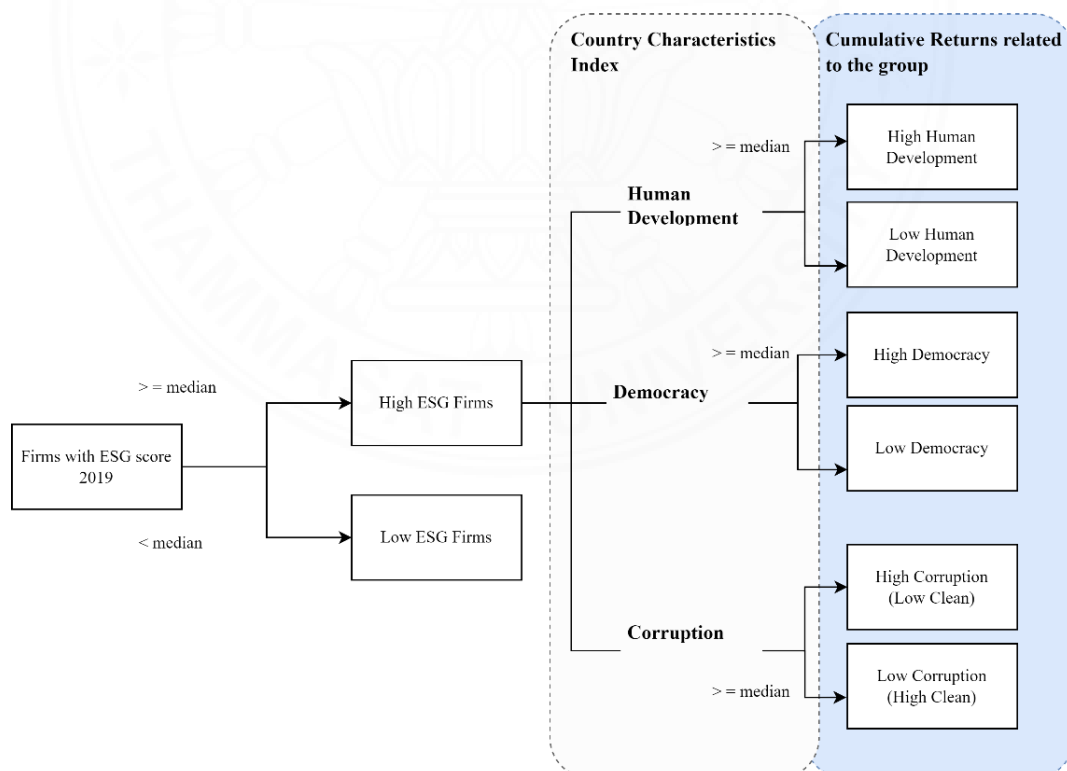
Idiosyncratic volatility is the standard deviation from daily abnormal return based on equation (5).

### 3.3.2.5 Cumulative abnormal return of high ESG firms with respective to country characteristics

To determine whether the high ESG performance of a company is more crucial in certain countries than others. Similar to the research conducted by Engelhardt et al., the nation characteristics will be divided into low and high groups based on their respective median scores (Engelhardt et al., 2021). The democracy index, the corruption index, and the human development index will be classified as low-high democracy, low-high corruption, and low-high human development, respectively, with reference to *Figure 3.2*. There are six factors that depend on the features of a nation. Moreover, the cumulative abnormal returns will serve as the dependent variables for estimation.

Figure 3.2

*Classification based on country characteristics*

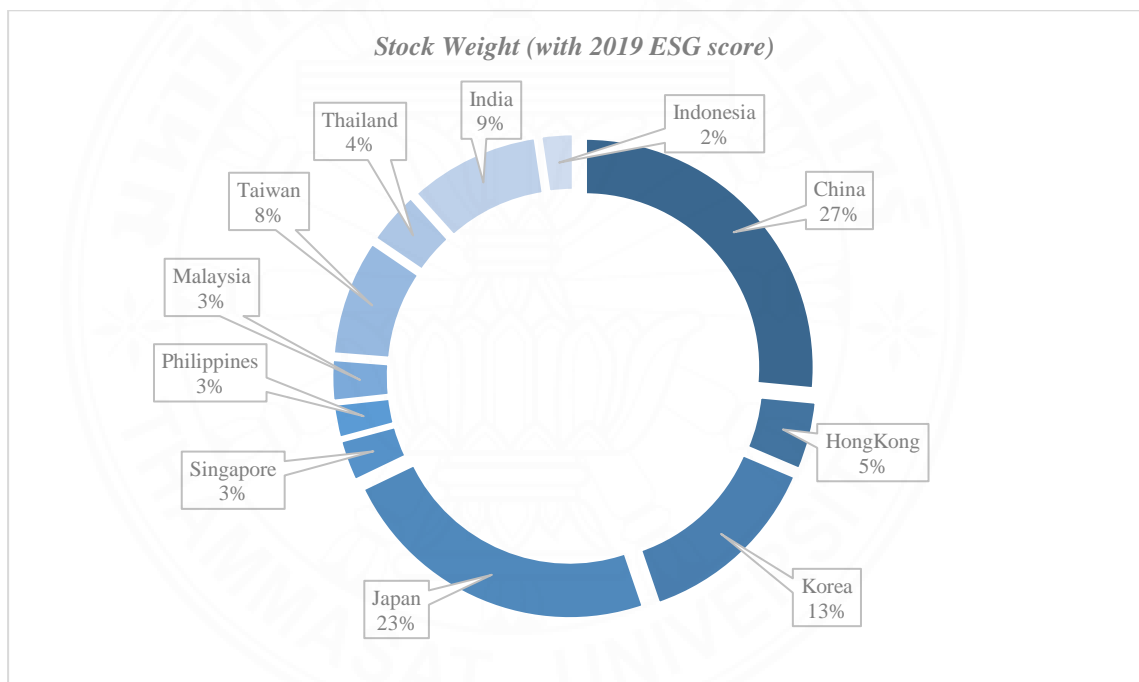


### 3.3.3 Data of Independent Variables

The main independent variable is the 2019 ESG total score, which can be retrieved from Refinitiv Eikon. Due to the lack of ESG score, 175 stocks are eliminated from the list in total. In conclusion, 943 stocks from eleven nations will be observed. *Figure 3.3* shows the weights of the stocks from 11 Asian indices that have ESG scores available for 2019.

Figure 3.3

*Stock weight (with 2019 ESG score)*

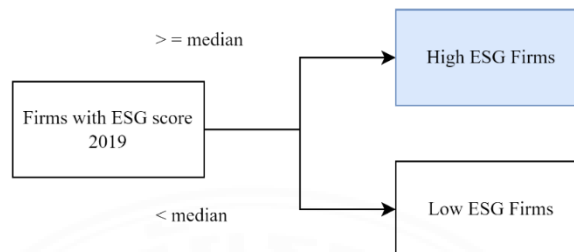


#### 3.3.3.1 ESG Scores

As ESG score is the primary independent variable, the firms will be divided into two groups: high ESG and low ESG, as proposed (Engelhardt et al., 2021), in order to examine further differences between firms with high ESG score and firms with low ESG score. First, the research needs to categorize companies with ESG scores equal to or above the median as High ESG firms. *Figure 3.4* shows the classification.

Figure 3.4

*Firms with ESG score 2019 classification*



### 3.3.3.2 Firm Controls (Accounting Data)

The study employs various accounting metrics that are commonly used by investors as independent variables. These metrics provide insights into the company's performance, including ROE, Cash and Cash Equivalents/Total Current Assets, Long Term Debt/Total Assets, Price/Book Value Per Share, and Historical Volatility. The data for these metrics will be obtained from Refinitiv Eikon and calculated manually, if necessary.

ROE is a measure of profitability. The ratio of Cash and Cash Equivalents to Total Current Asset represents liquidity. The ratio of long-term debt to total assets is a proxy for the firm's leverage. Price-to-book ratio is used to determine if a company is undervalued or overvalued. Additionally, historical volatility is utilized to predict stock price movements. *Table 3.4* provides a summary of the variables used for this study's three aims.

### 3.3.3.3 Industry Fixed Effects

There are total 38 sectors from the stock selection, such as beverage, banks, and others. *Table 3.4* displays the sectors of the selected stock.

### 3.3.3.4 Country Fixed Effects

In total, the stocks are retrieved from 11 markets, including China, ASEAN-5, and others. *Table 3.4* shows the countries of the selected firms located.

## 3.3.4 Methodology of Independent Variables

Although we will test the model just during the collapse period, we will utilize 2019's annual ESG score as another independent component; hence, it

makes more sense to use accounting data from 2019Q1 to 2020Q1 on average. The following factors contribute as firm controls:

$$\text{Dividend yield} = \frac{\text{Annual dividends per share}}{\text{Share price}} \quad (6)$$

$$\text{ROE} = \frac{\text{Net income}}{\text{Shareholder's Equity}} \quad (7)$$

$$\text{Cash to Current Assets} = \frac{\text{Cash \& cash equivalents}}{\text{Current assets}} \quad (8)$$

$$\text{TD} - \text{to} - \text{TA} = \frac{\text{Total liabilities}}{\text{Total assets}} \quad (9)$$

$$\text{Longterm debt to TA} = \frac{\text{Longterm debt}}{\text{Total Assets}} \quad (10)$$

$$\text{Price} - \text{to} - \text{book} = \frac{\text{Market price per share}}{\text{Book value per share}} \quad (11)$$

### 3.4 Summaries of the variables

*Table 3.4* aims to compare the variables used in this study for three different purposes. It presents the objectives for each target and the corresponding variables utilized. The table summarizes the variables for three objectives.



### 3.5 Estimations

Table 3.4 Variable summary

Objectives	Dependent Variables (5 Mar - 28 Apr 2020)	Independent Variable (Main)	Independent Variable (Others)
i. Whether firms in Asia with higher ESG ratings have higher <b>returns</b> during crisis	<ul style="list-style-type: none"> <li>- Cumulative log return</li> <li>- Cumulative abnormal return</li> </ul>	ESG Score 2019 (All firms)	<p><b>Firm Controls:</b></p> <ul style="list-style-type: none"> <li>- Avg Div. Yield (2019Q1-2020Q1)</li> <li>- Avg. ROE (2019Q1- 2020Q1)</li> <li>- Avg. Cash to CA (2019Q1- 2020Q1)</li> <li>- Avg. Historical Volatility (2019Q1-2020Q1)</li> <li>- Avg. TD to TA (2019Q1- 2020Q1)</li> <li>- Avg. Long term Debt to TA (2019Q1-2020Q1)</li> <li>- Avg. Price to Book (5 Mar~ 28 Apr)</li> </ul> <p><b>Industry Fixed Effects:</b></p> <ul style="list-style-type: none"> <li>- Beverage</li> <li>- Banks</li> <li>- Automobiles and Parts</li> <li>- Oil and Gas Producers</li> <li>- Life Insurance</li> <li>- Mining</li> <li>- Electricity</li> <li>- Technology Hardware and Equipment</li> <li>- General Retailers</li> <li>- Household Goods and Home Construction</li> <li>- Health Care Equipment and Services</li> <li>- Food Producers</li> <li>- Support Services</li> <li>- Electronic and Electrical Equipment</li> <li>- Chemicals</li> <li>- Financial Services (Sector)</li> <li>- Industrial Transportation</li> <li>- Pharmaceuticals and Biotechnology</li> <li>- Construction and Materials</li> <li>- General Industrials</li> <li>- Real Estate Investment and Services</li> <li>- Industrial Metals and Mining</li> <li>- Alternative Energy</li> <li>- Industrial Engineering</li> <li>- Nonlife Insurance</li> <li>- Aerospace and Defense</li> <li>- Fixed Line Telecommunications</li> <li>- Leisure Goods</li> <li>- Travel and Leisure</li> <li>- Software and Computer Services</li> <li>- Personal Goods</li> <li>- Media</li> <li>- Oil Equipment and Services</li> <li>- Food and Drug Retailers</li> <li>- Gas, Water and Multiutilities</li> <li>- Tobacco</li> <li>- Forestry and Paper</li> <li>- Real Estate Investment Trusts</li> </ul> <p><b>Country Fixed Effects:</b></p> <ul style="list-style-type: none"> <li>- China</li> <li>- Hong Kong</li> <li>- Japan</li> <li>- Singapore</li> <li>- South Korea</li> <li>- Philippines</li> <li>- Taiwan</li> <li>- Thailand</li> <li>- India</li> <li>- Indonesia</li> <li>- Malaysia</li> </ul>
ii. Whether firms in Asia with higher ESG ratings have lower stock <b>volatility</b> during crisis	<ul style="list-style-type: none"> <li>- Volatility</li> <li>- Idiosyncratic volatility</li> </ul>		
iii. Whether <b>high ESG</b> is even more crucial to returns with respect to country characteristics:  - human development - democracy - corruption	<p><b>Cumulative abnormal return of High ESG firms</b> with respect to country characteristics:</p> <ul style="list-style-type: none"> <li>- High human development</li> <li>- Low human development</li> <li>- High democracy</li> <li>- Low democracy</li> <li>- High corruption</li> <li>- Low corruption</li> </ul>	ESG Score 2019 (High ESG firms)	

### 3.5.1 Objective I: ESG Ratings and Stock Returns

$$\begin{aligned}
 & \text{Cumulative Log Return}_i \\
 &= \beta_0 + \beta_1 \text{ESG Score}_i \\
 &+ \sum \beta_k \text{Firm Controls} \\
 &+ \sum \beta_i \text{Industry Fixed Effects} \\
 &+ \sum \beta_m \text{Country Fixed Effects} + \varepsilon_i
 \end{aligned}
 \tag{12}$$

$$\begin{aligned}
 & \text{Cumulative Abnormal Return}_i \\
 &= \beta_0 + \beta_1 \text{ESG Score}_i \\
 &+ \sum \beta_k \text{Firm Controls} \\
 &+ \sum \beta_i \text{Industry Fixed Effects} \\
 &+ \sum \beta_m \text{Country Fixed Effects} + \varepsilon_i
 \end{aligned}
 \tag{13}$$

The dependent variable is stock performance from 5 March 2020 to 28 April 2020, measured by cumulative raw return or cumulative abnormal stock return. ESG score is the primary independent variable, accompanied by firm controls, industry fixed effects, and country fixed effects as additional independent variables.

First, the cumulative raw returns, cumulative abnormal returns, ESG ratings, and company controls are arranged in a multivariate format. We conduct the correlation analysis and statistical synthesis.

Second, we provide univariate tests to compare the business characteristics of High ESG and Low ESG firms, in order to determine the differences between High ESG and Low ESG enterprises in terms of accounting status.

Following this, the model will be estimated. To support the hypothesis that there is a positive correlation between the ESG score and stock return,

the coefficient of ESG score,  $\beta_1$ , should be significantly positive, meaning that the higher the ESG score, the higher the stock return during a crisis.

### 3.5.2 Objective II: ESG Ratings and Stock Volatility

$$\begin{aligned}
 Volatility_i &= \beta_0 + \beta_1 ESG Score_i \\
 &+ \sum \beta_k Firm Controls \\
 &+ \sum \beta_i Industry Fixed Effects \\
 &+ \sum \beta_m Country Fixed Effects + \varepsilon_i
 \end{aligned}
 \tag{14}$$

$$\begin{aligned}
 Idiosyncratic Volatility_i & \\
 &= \beta_0 + \beta_1 ESG Score_i \\
 &+ \sum \beta_k Firm Controls \\
 &+ \sum \beta_i Industry Fixed Effects \\
 &+ \sum \beta_m Country Fixed Effects + \varepsilon_i
 \end{aligned}
 \tag{15}$$

In order to evaluate the relationship between ESG ratings and stock volatility, the regression examines firm's stock volatility and idiosyncratic volatility between 5 March 2020 and 28 April 2020 as dependent variables. If the coefficient of ESG Score,  $\beta_1$ , is significantly negative, it indicates that there is a negative correlation between ESG score and volatility; in other words, a higher ESG score will result in less volatility during times of crisis.

### 3.5.3 Objective III: High ESG Rating companies with country-specific attributes

According to *Figure 3.2*, the third aim would categorize High ESG firms based on three country characteristics, using the relative cumulative abnormal returns as dependent variables and the ESG score as the main independent variable.

$$\begin{aligned}
& \text{Cumulative Abnormal Return}_i \\
&= \beta_0 + \beta_1 \text{ High ESG Score}_i \\
&+ \sum \beta_k \text{ Firm Controls} \\
&+ \sum \beta_i \text{ Industry Fixed Effects} \\
&+ \sum \beta_m \text{ Country Fixed Effects} + \varepsilon_i
\end{aligned}
\tag{16}$$

According to this model, coefficient of high ESG score,  $\beta_1$ , is still the most important factor we would like to study; nevertheless, the ESG score here is only evaluated for high ESG firms. If the  $\beta_1$  is highly positive, it indicates that a company with a high ESG score has a strong link with the stock return in a certain country. For instance, if the estimation is for a high ESG firm located in the country with a high level of democracy, the significantly positive coefficient will indicate that a high ESG score is specifically more critical and meaningful in terms of stock return during a crisis in a country with a high level of democracy.

## CHAPTER 4

### RESULTS AND DISCUSSION

#### 4.1 Statistics summary

At the beginning, we collected ESG scores and financial data for 943 stocks across 11 Asian countries for the year 2019. However, during the computation, we found that only 935 stocks had sufficient data for testing. Therefore, in the following tests, we used data of 935 stocks. *Table 4.1* below shows the number of stocks for each country.

Table 4.1 Weights of Stocks for Regression

	<b>Market</b>	<b>Index</b>	<b>Number</b>	<b>Percent</b>
(1)	China	Shanghai Shenzhen CSI	245	26.20%
(2)	Hong Kong	Hang Seng Index	43	4.6%
(3)	Korea	KOSPI	126	13.48%
(4)	Japan	Nikkei	218	23.32%
(5)	Singapore	Straits Times Index	28	2.99%
(6)	Philippines	PSEI	23	2.46%
(7)	Malaysia	FTSE Bursa Malaysia KLCI	28	2.99%
(8)	Taiwan	MSCI Taiwan	78	8.34%
(9)	Thailand	MSCI Thailand	36	3.85%
(10)	India	MSCI India	88	9.41%
(11)	Indonesia	MSCI Indonesia	22	2.35%
	<b>Total</b>		<b>935</b>	<b>100%</b>

*Note:* At the beginning of the analysis, there were 1,113 stocks from the major index of 11 Asian countries. Of these, only 943 had ESG scores for the year 2019. However, during the regression computation, only data for 935 individual stocks were found to be efficient. The composition of the 935 stocks used in the analysis is listed above.

In this study, we investigated the relationship between ESG scores and return and volatility during the COVID-19 period across 11 Asian countries using STATA. The following *table 4.2* presents the summary statistics for the variables used in our analysis without standardization, which allows us to display the actual minimum, maximum, and mean values of the variables.

Table 4.2 Statistics Summary (without standardization)

Variable	Observations	Mean	Standard Deviation	Min.	Max.
Cumulative log return	935	-0.0954	0.1501	-0.7176	0.7530
Cumulative abnormal return	935	-0.0182	0.1221	-0.5617	0.7029
Volatility	935	0.0385	0.0153	0.0081	0.1943
Idiosyncratic volatility	935	0.0261	0.0128	0.0049	0.1919
ESG overall score	935	50.9537	21.0378	1.9200	92.9000
E	935	49.1141	27.2100	0.0000	97.6700
S	935	50.5287	25.0504	0.5400	97.2000
G	935	51.5081	22.2551	0.8200	96.7100
Dividend yield	935	2.3209	1.7882	0.0000	11.8967
ROE	930	11.8651	13.9008	-68.4720	210.5580
Cash/ total assets	774	38.1899	20.9028	0.9500	98.5860
Historical volatility	934	0.3203	0.1296	0.0000	1.1278
Total debt/ total assets	931	24.8042	17.8627	0.0000	162.7720
Long-term debt/ total assets	932	25.9028	21.6807	-116.2500	126.6660
Price-to-Book	932	3.2013	17.3743	-0.7738	512.8403

*Note:* The table presents actual minimum, maximum, and mean values of the variables, providing an overview of the data distribution in our sample without standardization. Cumulative return and volatility are data from 5 Mar 2020 to 28 Apr 2020, while the ESG score is yearly data from 2019. The independent variables of firm controls are accounting data from 2019Q1 to 2020Q1, covering the period before and during the COVID-19 outbreak.

#### 4.1.1 Cumulative log return

The mean cumulative log return is negative, indicating an overall decrease in stock prices over the collapse period considered.

#### 4.1.2 Cumulative abnormal return

The mean cumulative abnormal return is also negative, indicating that the stocks underperformed relative to the market.

#### 4.1.3 Volatility

The mean volatility of returns is relatively low, suggesting that the stocks in the sample were not very volatile. However, the standard deviation is relatively high, indicating that there was still a wide range of volatility across stocks. *Figure 4.1* shows the distribution.

#### 4.1.4 Idiosyncratic volatility

The mean level of idiosyncratic risk is relatively low, suggesting that the stocks in the sample were relatively well-diversified. However, the standard deviation is relatively high, indicating that there was still a wide range of idiosyncratic risk across stocks. *Figure 4.2* shows the distribution.

Figure 4.1

*Volatility Distribution*

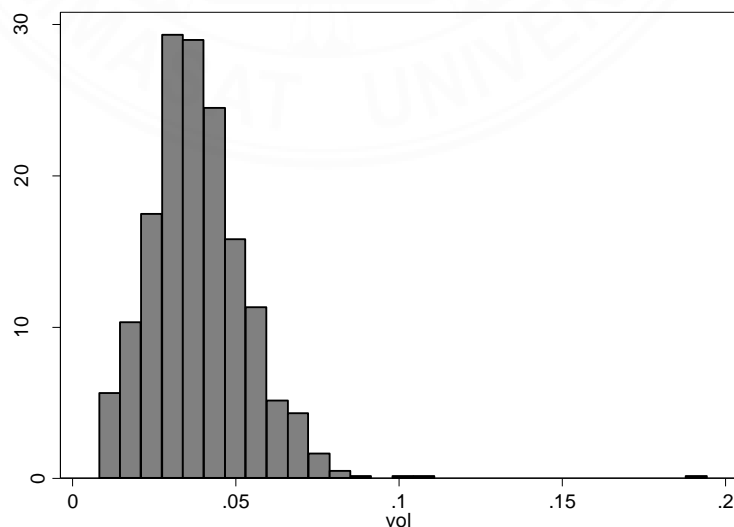
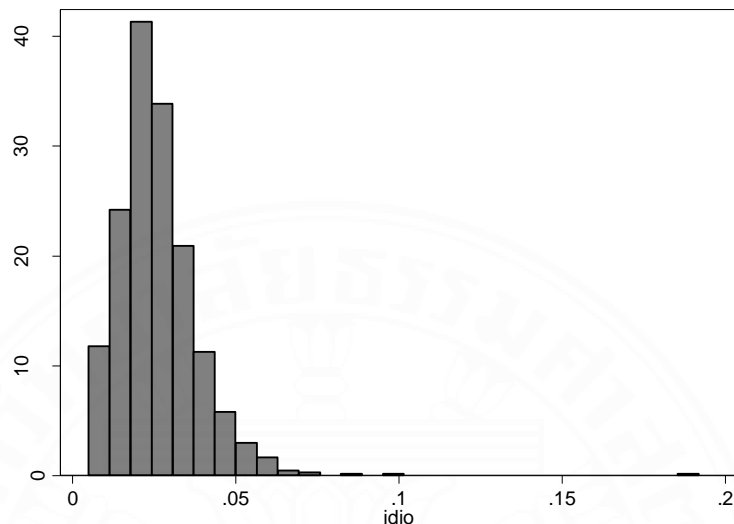


Figure 4.2

*Idiosyncratic volatility distribution*

*Note:* To create the figures for the volatility distribution, I used the Stata command "histogram" to plot the graph of the unstandardized data for volatility and idiosyncratic volatility during the period from 5 Mar 2020 to 28 Apr 2020. These figures offer a visual representation of the distribution of the data, providing insight into the risk and uncertainty associated with the sample firms during the period of analysis.

Prior to running regression models, we standardized the variables so that the findings could be interpreted more easily in later analysis. By correcting for differences in scale and enhancing the interpretability of the coefficients, standardizing the variables helped in ensuring the validity of our results and enhancing the readability of the coefficients. Besides, we observed that standardizing the variables had no impact on the interpretation of the results when compared to the results obtained with unstandardized variables. Thus, we would interpret the findings of our regression study using the variables that have been normalized.

## 4.2 Correlation analysis

*Table 4.3* shows the correlation coefficients between various financial ratios and market performance measures, such as cumulative abnormal returns and volatility.



#### **4.2.1 Return and volatility**

The results indicate that stocks with higher volatility tend to underperform the market, as evidenced by the negative correlation between  $z\_volatility$  and  $z\_cum\_abr$  &  $z\_cum\_logr$ .

#### **4.2.2 ESG and return**

There is a negative correlation between ESG scores and returns, it could suggest that companies with higher ESG scores may prioritize socially responsible activities over maximizing profits. This could potentially lead to lower returns for investors, as the company may be forgoing some profit-making opportunities in favor of more socially responsible activities. (Garcia et al., 2017)

#### **4.2.3 ESG and volatility**

Regarding the results of that ESG scores have positive correlation with volatility but negative one with idiosyncratic volatility during the COVID-19 period, it is difficult to provide a definitive explanation. However, one possible explanation is that during the COVID-19 period, companies with higher ESG scores may have been perceived as having better preparedness and resilience to handle the pandemic, leading to negative correlation with idiosyncratic volatility.

#### **4.2.4 ESG and other firm controls**

Companies with higher ESG scores may prioritize dividend payments over growth, suggested by positive correlation with  $z\_div\_yield$  but negative with  $z\_ROE$ . This factor possibly shows that companies with high ESG scores may be more likely to prioritize stable, reliable returns for shareholders through dividends.

On the other hand, companies with higher ROE and cash reserves relative to their assets tend to outperform the market, as suggested by the positive correlation between  $z\_cash/total\ assets$ ,  $z\_roe$  and  $z\_cum\_abr$  and  $z\_cum\_logr$ . In contrast, companies with higher levels of debt tend to underperform the market, as evidenced by the negative correlations between  $z\_TD/TA$  and  $z\_LTD/TA$  with  $z\_cum\_abr$  and  $z\_cum\_logr$ . Finally, the weak negative correlation between  $z\_PBV$  and  $z\_cum\_abr$  and  $z\_cum\_logr$  suggests that companies with higher PBV ratios may underperform the market, although the correlation is not strong. Overall, despite the COVID-19 crisis, the correlations are consistent with prior research regarding the accounting factors that drive stock performance and can guide investment decisions.

Table 4.3 Correlation analysis (variables used in the study)

Variable	z_cum. logr	z_cum. abr	z_volatility	z_idio. volatility	z_esg	z_e	z_s	z_g	z_div_yield	z_roe	z_cash/ total assets	z_historical volatility	z_TD/ TA	z_LTD/TA	z_PBV	
z_cum. logr	1.0000															
z_cum. abr	0.8844	1.0000														
z_volatility	-0.2150	-0.0376	1.0000													
z_idio. volatility	-0.0853	0.0215	0.7958	1.0000												
z_esg	-0.1700	-0.1104	0.1060	-0.0199	1.0000											
z_e	-0.2079	-0.1481	0.1098	-0.0509	0.8771	1.0000										
z_s	-0.1684	-0.0876	0.1501	0.0298	0.9163	0.7681	1.0000									
z_g	-0.0244	-0.0166	0.0254	-0.0242	0.6695	0.4041	0.4505	1.0000								
z_div_yield	-0.1233	-0.0134	-0.0933	-0.2140	0.2693	0.3001	0.2831	0.0824	1.0000							
z_roe	0.2598	0.1861	-0.2054	-0.0873	-0.1061	-0.1521	-0.0598	-0.0668	-0.0105	1.0000						
z_cash/ total assets	0.1730	0.0982	-0.0989	-0.0372	-0.1406	-0.2164	-0.0910	-0.0654	-0.1119	0.0898	1.0000					
z_historical volatility	-0.0365	-0.1404	0.0103	0.0633	-0.3386	-0.3072	-0.3603	-0.1785	-0.3068	-0.0048	0.0735	1.0000				
z_TD/TA	-0.2164	-0.1073	0.1176	0.0350	0.1281	0.1430	0.1020	0.0798	0.0699	-0.2193	-0.3088	-0.0880	1.0000			
z_LTD/TA	-0.2087	-0.1001	0.1311	0.0357	0.2169	0.2183	0.1951	0.1354	0.0908	-0.2159	-0.2639	-0.1650	0.8918	1.0000		
z_PBV	-0.0092	-0.0128	-0.0096	0.0543	-0.0153	-0.0560	-0.0005	0.0145	-0.0710	0.1481	0.1002	0.0220	0.0148	0.0438	1.0000	

*Note:* This table shows the correlation matrix between the variables used in our study, which includes cumulative log return, cumulative abnormal return, ESG scores, and other accounting factors. Each variable has been standardized using a z-score, denoted by the 'z\_' prefix in each variable name. The correlation matrix shows the pairwise correlations between the variables, providing insights into the relationships among the variables in our sample.

Table 4.4 Correlation analysis (e, s, g and its beta)

Variable	z_beta	z_e	z_s	z_g
z_beta	1.0000			
z_e	0.0629	1.0000		
z_s	-0.0610	0.7499	1.0000	
z_g	-0.0473	0.4071	0.4474	1.0000

*Note:* This table shows the correlation matrix between e, s, g and beta in this study. Each variable has been standardized using a z-score, denoted by the 'z\_' prefix in each variable name.

#### 4.2.5 E, S, G and its beta

Furthermore, to examine how ESG individual scores related to the stocks' systematic risk, we conducted the correlation analysis by showing the correlation matrix between systematic risk (beta) and the (E), (S), and (G). *Table 4.4* shows the relatively weak correlations between these variables during the Covid-19 collapse period. These findings suggest that there is limited direct correlation between systematic risk and the ESG factors. Specifically, (E) exhibits a positive correlation with beta, while (S) and (G) display negative correlations with beta.

### 4.3 Results of the main research objective

In this study, we aim to investigate the potential relationship between a firm's ESG performance and its stock returns and volatility during COVID-19. To achieve this objective, we employed Ordinary Least Squares (OLS) regression with the model previously mentioned in chapter 3. Our analysis aims to study whether ESG performance can influence stock returns and volatility while controlling for other relevant factors.

#### 4.3.1 Objective I: ESG ratings and stock returns

The dependent variable used in the model is stock returns, while ESG scores serve as the primary independent variable alongside other firm controls. Additionally, the model considers industry and country fixed effects to control for potential confounding factors.

*Table 4.5* reports the results from OLS regressions with standardized data, where the dependent variable is either the cumulative log return of a firm from 5 Mar 2020 to 28 Apr 2020 (in columns 1, 3, and 5), or the cumulative abnormal returns (in columns 2, 4, and 6). We report the regression results with robust standard errors clustered by country.

Overall, the results indicate a negative association between ESG performance and stock returns during the COVID-19 crisis in 11 Asian countries. Specifically, the ESG overall score is negatively related to both cumulative log returns and cumulative abnormal returns in all regression models (Columns 1-4). This suggests that firms with better ESG performance experience lower stock returns during the crisis period. While these findings align with prior research indicating a negative or ambiguous correlation between overall ESG scores and stock returns (Bae et al., 2021; Dhasmana et al., 2023), they also contradict other studies that suggest higher ESG or CSR performance leads to increased abnormal returns (Engelhardt et al., 2021; Lins et al., 2017). This discrepancy can be attributed to differences in the regions, timeframes, and industries examined.

Breaking down the ESG score into its three components (Columns 5-6), we find that environmental (E) and social (S) factors also have negative effects on cumulative log returns and cumulative abnormal returns, while governance (G) is positively associated with stock returns. This implies that firms with stronger environmental and social practices tend to have lower stock returns, while those with better governance practices have higher stock returns during crisis. This finding could be explained by the fact that firms with stronger environmental and social practices might have higher operating costs and face more regulatory pressure, which could negatively impact their financial performance. In contrast, firms with better governance practices tend to have a more effective management structure, which can lead to better decision-making and higher returns during a crisis. Therefore, it is important for firms to prioritize all three aspects of ESG practices to maintain sustainable financial performance in the long run.

In terms of other accounting factors, we find that firms with higher return on equity (ROE) tend to have higher stock returns in all regression models, which is consistent with previous research. On the other hand, higher historical volatility is

negatively related to stock returns, indicating that investors may prefer less volatile stocks during a crisis period.

The analysis suggests mixed results regarding the impact of dividend yield on stock returns, depending on the different regression models. However, cash/total assets show a positive relationship with stock returns, while the proportion of debt to assets exhibits a negative relationship with stock returns, although these relationships are not statistically significant.

Overall, these findings suggest that ESG factors had some impact on stock returns during the COVID-19 crisis. Firms with better ESG performance, especially in environmental and social practices, tend to have lower stock returns. However, those with better governance practices tend to have higher stock returns. The results also highlight the importance of considering other accounting factors, such as ROE and historical volatility, when analyzing stock returns during a crisis period.



Table 4.5 ESG Ratings and stock returns (with standardized data).

Dependent Variable	(1) Cumulative Log Returns	(2) Cumulative Abnormal Returns	(3) Cumulative Log Returns	(4) Cumulative Abnormal Returns	(5) Cumulative Log Returns	(6) Cumulative Abnormal Returns
ESG overall	<i>-0.1082***</i> (0.002)	<i>-0.0660*</i> (0.080)	<i>-0.1074***</i> (0.006)	<i>-0.0928**</i> (0.021)		
E					<i>-0.1004*</i> (0.055)	-0.0778 (0.154)
S					<i>-0.0907*</i> (0.090)	<i>-0.1004*</i> (0.071)
G					<i>0.0609*</i> (0.060)	<i>0.0651*</i> (0.063)
Dividend Yield			<i>-0.0709*</i>	0.0127	-0.0575	0.0265
ROE			<i>0.2011***</i>	<i>0.1401***</i>	<i>0.2023***</i>	<i>0.1420***</i>
Cash/ Total Assets			0.0601	0.0253	0.0565	0.0230
Historical Volatility			<i>-0.0866**</i>	<i>-0.0965**</i>	<i>-0.0839**</i>	<i>-0.0932**</i>
Total Debt/Total Assets			-0.0636	-0.0719	-0.0703	-0.0778
Long-term Debt/Total Assets			-0.0843	-0.0409	-0.0780	-0.0354
Price-to-Book			<i>-0.0207</i>	<i>-0.0320***</i>	<i>-0.0251*</i>	<i>-0.0363***</i>
Observations	935	935	771	771	771	771
Industry/ Country FE	yes	yes	yes	yes	yes	yes
Firm controls	no	no	yes	yes	yes	yes
Adjusted R-Squared	0.3332	0.2878	0.3808	0.3516	0.3894	0.3597

*Note:* The table presents the regression coefficients for standardized data across all stocks, using either cumulative log return or abnormal return as dependent variables. Statistical significance levels of 1%, 5%, and 10% are denoted by \*\*\*, \*\*, and \*, respectively. The coefficient is represented by the number displayed, while the number enclosed in parentheses indicates the p-value. In addition, any p-values that are significant at a level of less than 15% are highlighted in italic. Robust standard errors were used to estimate the standard errors of the regression coefficients.

### 4.3.2 Objective II: ESG ratings and stock volatility

For our second objective, we aim to investigate the correlation between a firm's ESG performance and its stock volatility. To achieve this, we adopt the same methodology as in our previous analysis, employing OLS regressions with ESG scores and other firm controls as independent variables, while also including industry and country fixed effects.

*Table 4.6* displays the results from the OLS regressions using standardized data, where the dependent variable is the realized volatility of a firm's stock returns.

The results indicate that there is a negative correlation between ESG performance and volatility in the 11 Asian countries during the COVID-19 crisis. Specifically, the overall ESG score has a statistically significant negative correlation with idiosyncratic volatility. This suggests that companies with higher ESG scores tend to have lower levels of volatility during times of crisis.

Looking at the individual components of ESG, it is interesting to note that the social (S) component has a negative correlation with both overall and idiosyncratic volatility, while the environmental (E) and governance (G) components do not have a statistically significant correlation with either type of volatility. This suggests that social factors may be particularly important in mitigating volatility during a crisis.

Other accounting factors such as dividend yield and ROE also have statistically significantly negative correlations with volatility. For example, higher dividend yields, and ROE are associated with lower idiosyncratic volatility, while higher historical volatility is associated with higher overall and idiosyncratic volatility. Another study by Sun et al. (2022) also explored the impact of stock characteristics and corporate governance variables on stock price overreaction and volatility during the COVID-19 pandemic. The study found that firm size, dividend, and trading volume are important determinants of stock price reactions during market chaos caused by the pandemic. This finding is consistent with our results.

In general, there is a negative correlation between ESG and volatility. The findings of this study are consistent with previous research based on EU, US markets (R. Albuquerque et al., 2020; Engelhardt et al., 2021; Lins et al., 2017), as well

as Asian or Arabian markets(Broadstock et al., 2021; Dhasmana et al., 2023; Li et al., 2022; Mousa et al., 2021; Rahma & Rokhim, 2022). As the majority of previous research indicates that ESG performance plays a significant role in mitigating risk across diverse countries and various time periods. This reinforces the idea that a focus on ESG factors can lead to more stable outcomes in the face of uncertainty.





Table 4.6 ESG Ratings and volatility (with standardized data).

Dependent Variable	(1) Volatility	(2) Idiosyncratic Volatility	(3) Volatility	(4) Idiosyncratic Volatility	(5) Volatility	(6) Idiosyncratic Volatility
ESG overall	<i>-0.0960***</i> (0.001)	<i>-0.1591***</i> (0.000)	<i>-0.0469</i> (0.126)	<i>-0.1041***</i> (0.002)		
E					<i>0.0835**</i> (0.030)	0.0136 (0.732)
S					<i>-0.1161***</i> (0.007)	<i>-0.1301***</i> (0.003)
G					-0.0062 (0.809)	0.0071 (0.7873)
Dividend Yield			<i>-0.0601**</i>	<i>-0.0867***</i>	<i>-0.0579*</i>	<i>-0.0806***</i>
ROE			<i>-0.0675**</i>	<i>-0.0464*</i>	<i>-0.0633**</i>	<i>-0.0430*</i>
Cash/Total Assets			0.0262	0.0378	0.0327	0.0411
Historical Volatility			<i>0.2584***</i>	<i>0.2170***</i>	<i>0.2648***</i>	<i>0.2229***</i>
Total Debt/Total Assets			<i>0.1610**</i>	<i>0.1361*</i>	<i>0.1656**</i>	<i>0.1369*</i>
Long-term Debt/Total Assets			-0.1003	-0.0806	<i>-0.1092*</i>	-0.0854
Price-to-Book			<i>-0.0353***</i>	<i>-0.0296***</i>	<i>-0.0347***</i>	<i>-0.0306***</i>
Observations	935	935	771	771	771	771
Industry/ Country FE	yes	yes	yes	yes	yes	yes
Firm controls	no	no	yes	yes	yes	yes
Adjusted R-Squared	0.5093	0.4523	0.5753	0.5013	0.5789	0.5032

*Note:* The table presents the regression coefficients for standardized data across all stocks, using either volatility or idiosyncratic volatility as dependent variables. Statistical significance levels of 1%, 5%, and 10% are denoted by \*\*\*, \*\*, and \*, respectively. The coefficient is represented by the number displayed, while the number enclosed in parentheses indicates the p-value. In addition, any p-values that are significant at a level of less than 15% are highlighted in italic. Robust standard errors were used to estimate the standard errors of the regression coefficients.

### **4.3.3 Objective III: High ESG companies with country characteristics**

Initially, there were 935 stocks used for regression analysis. To conduct a more detailed analysis, we focused on companies with high ESG scores which were equal to or greater than the median score 53.52. We then categorized this data based on the human development index, democracy index, and corruption index. To avoid confusion, we have decided to refer to the corruption index as transparency since a higher score in corruption index indicates greater transparency in the country. The data will be grouped according to the median as mentioned in *chapter 3 figure 3.2*.

From this further detailed analysis, we expect to explore more about that whether companies with high ESG scores are more crucial in specific countries with various country characteristics during COVID-19 crisis.

#### **4.3.3.1 Human Development (Human Development Index)**

According to *table 4.7*, high ESG companies with strong governance scores have a positive impact on stock returns in countries with higher human development indexes.

Conversely, in countries with lower human development indexes, high ESG overall score companies have a significantly positive correlation with cumulative abnormal returns at a significance level of 10%. Additionally, individual social (S) scores show a relatively significant positive correlation with cumulative abnormal returns in these countries at a significance level of 15%.

Overall, high ESG companies have a higher adjusted R-square value in countries with lower human development indexes compared to those with higher human development indexes, indicating that companies with high ESG scores are more likely to have a positive impact on their stock returns during the COVID-19 crisis in countries with lower human development.

#### **4.3.3.2 Transparency (Corruption Perception index)**

Based on *table 4.7*, as mentioned earlier, although the index is corruption index, the higher score of the index indicates higher transparency. In order to avoid the confusion, we would like to mark it as transparency for better interpretation.

High ESG companies show positive correlation with cumulative abnormal returns during COVID-19 collapse period, especially in the countries classified low transparency, it shows significantly positive at a confidence level of 10%. Moreover,

individual governance (G) score in the countries with higher transparency, show significantly positive correlation with the stock returns as well at a confidence level of 15%. It possibly indicates that the countries with higher transparency would make the investors to trust the governance of the companies with high ESG score during the market slump.

#### **4.3.3.3 Democracy (Democracy Civil Liberties Index)**

*Table 4.7* shows that in high democracy countries, there is no significant relationship between high ESG scores and cumulative abnormal returns. However, it reveals a positive correlation between high ESG scores, particularly the social (S) score, and cumulative abnormal returns at a significance level of 15% in countries with lower levels of democracy.

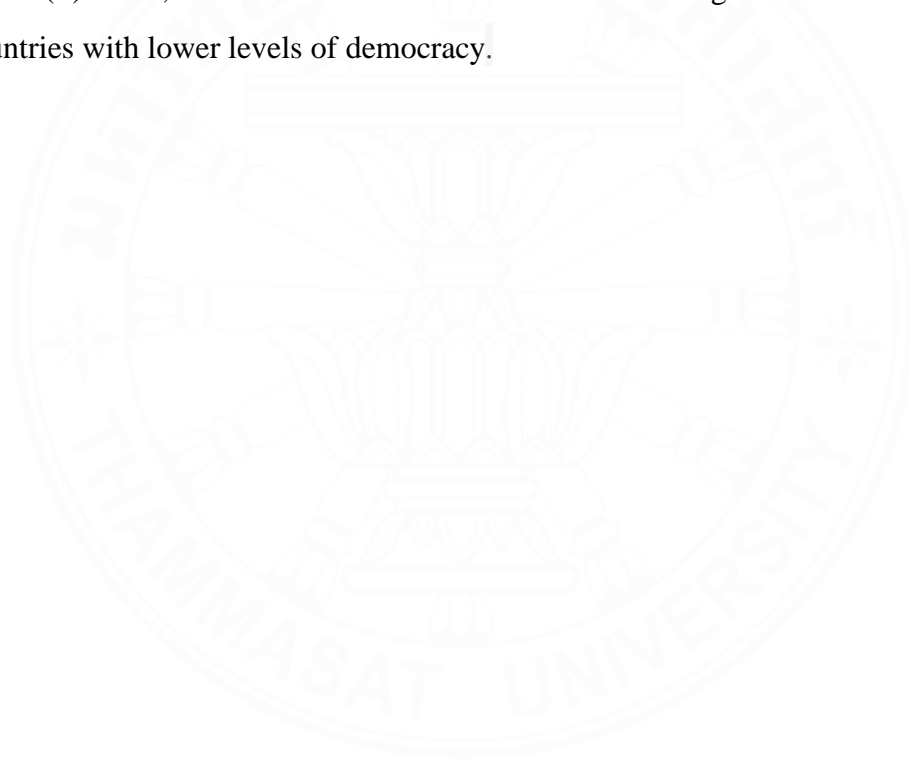


Table 4.7 High ESG companies and cumulative abnormal returns with respect to country characteristics (with standardized data).

Dependent Variable: Cumulative Abnormal Returns	Human Development Index Median= 0.54				Corruption Perception index Median= 47				Democracy Civil Liberties Index Median= 0.742			
	Human Development				Transparency				Democracy			
	(1) High		(2) Low		(3) High		(4) Low		(5) High		(6) Low	
ESG overall	0.0590 (0.345)		<u>0.2132*</u> (0.086)		0.0495 (0.426)		<u>0.200*</u> (0.083)		0.0559 (0.364)		<u>0.1585</u> (0.136)	
E		-0.0021 (0.974)		0.0150 (0.929)		0.0458 (0.516)		-0.0491 (0.724)		0.0269 (0.693)		-0.0171 (0.913)
S		-0.0628 (0.393)		<u>0.2694</u> (0.118)		-0.0800 (0.284)		<u>0.2661*</u> (0.067)		-0.0482 (0.519)		<u>0.2200</u> (0.132)
G		<u>0.1139**</u> (0.043)		0.0562 (0.617)		<u>0.0863</u> (0.150)		0.1269 (0.265)		0.0774 (0.195)		0.0848 (0.393)
Dividend Yield	-0.0229	-0.0291	0.1808	0.1145	0.0177	0.0229	0.1148	0.0981	0.0255	0.0317	0.1118	0.0967
ROE	0.0986	0.1162	0.2022	0.1756	<u>0.2362**</u>	<u>0.2412**</u>	0.2038	0.1856	0.0748	0.0837	<u>0.2472*</u>	<u>0.2423*</u>
Cash/ Total Assets	0.0731	0.0786	-0.0156	-0.0110	0.1127	0.1223	-0.0642	-0.0861	0.1135	0.1184	-0.0737	-0.0854
Historical Volatility	0.0459	0.0306	-0.0283	-0.0265	0.0591	0.0451	-0.1214	-0.1720	0.0428	0.0337	-0.1599	-0.1683
Total Debt/ Total Assets	-0.1952	-0.2393	-0.1456	-0.2253	-0.2557	-0.2878	0.1331	0.0539	-0.2567	-0.2845	0.0518	-0.0022
Long-term Debt/ Total Assets	-0.0200	0.0306	-0.1011	0.0693	0.0724	0.1093	-0.3664	-0.2497	0.0506	0.0835	-0.2881	-0.2109
Price-to-Book	-0.1254	<u>-0.1475*</u>	-0.1029	-0.0976	<u>-0.1873**</u>	<u>-0.1879**</u>	-0.0184	0.0034	0.0807	0.0792	-0.1968	-0.2115
Adjusted R- Squared	0.3530	0.3610	0.6077	0.6199	0.3659	0.3727	0.5975	0.6095	0.3911	0.3942	0.5561	0.5645

Table 4.7 High ESG companies and cumulative abnormal returns with respect to country characteristics (with standardized data). (Cont.)

Dependent Variable: Cumulative Abnormal Returns	Human Development Index Median= 0.54		Corruption Perception index Median= 47		Democracy Civil Liberties Index Median= 0.742	
	Human Development		Transparency		Democracy	
	(1) High	(2) Low	(3) High	(4) Low	(5) High	(6) Low
With respect to markets:	CH 12.60% HK 7.12% JP 43.84% SG 3.84% KR 17.26% TW 15.34%	India 47.62% Indo 8.57% ML 16.19% PI 6.67% TH 20.95%	HK 7.74% JP 47.62% ML 5.06% SG 4.17% KR 18.75% TW 16.67%	CH 34.33% India 37.31% Indo 6.72% PI 5.22% TH 16.42%	HK 7.93% Indo 2.74% JP 48.78% SG 4.27% KR 19.21% TW 17.07%	CH 32.39% India 35.21 % ML 11.97% PI 4.93% TH 15.49%
Observations (for regression)	292	84	274	102	267	109
Industry/ Country FE	yes	yes	yes	yes	yes	yes
Firm controls	yes	yes	yes	yes	yes	yes

Abbreviation:

CH= China; HK= Hongkong; Indo= Indonesia; ML= Malaysia; PI= Philippines; TH= Thailand

JP= Japan; SG= Singapore; KR= South Korea; TW= Taiwan

*Note:* The table displays regression coefficients for high ESG companies, categorized by country characteristics indexes (human development, democracy, and transparency). CARs are dependent variables categorized by high-low indices based on the median of country characteristics index. Statistical significance levels of 1%, 5%, and 10% are denoted by \*\*\*, \*\*, and \*, respectively. The coefficient is represented by the number displayed, while the number enclosed in parentheses indicates the p-value. In addition, any p-values that are significant at a level of less than 15% are highlighted in italic. All regression analysis in this research were conducted using z-score standardized data. Robust standard errors were used to estimate the standard errors of the regression coefficients.

#### 4.3.3.4 Summary for High ESG Firms in specific markets

High ESG scores have a significantly positive correlation with cumulative abnormal returns in countries with lower levels of human development, transparency, and democracy, according to *Table 4.7*. Environmental performance does not significantly impact stock returns during the COVID-19 crisis. In "low" index countries, social responsibility (S) is crucial for stock returns, while good governance (G) is prioritized for better stock performance in countries with higher human development and transparency.

According to prior research conducted by Engelhardt et al. (2021), which further examined high ESG firms in the context of social trust, rule of law, disclosure, and anti-self dealing, the research concluded that good quality CSR is particularly valuable in countries with low trust and those with weaker security regulations and lower disclosure standards, the results imply that the impact on stock returns tends to be more significant in countries with "low" characteristics, such as low human development, low transparency, and low democracy, trust and security regulations.

### 4.4 Robustness checks

#### 4.4.1 Grouped by Country: ESG and cumulative abnormal returns

To investigate the influence of the overall ESG score and individual scores on cumulative abnormal returns during the COVID-19 crisis, we conducted a country-specific regression analysis, as shown in *Table 4.8*. However, due to the cross-country data primarily sourced from country index compositions, the number of observations for some specific countries was insufficient to conduct the regression analysis.

For countries with a larger number of observations, such as China and Japan, governance (G) consistently showed a significantly positive correlation with cumulative abnormal returns during the crisis. Furthermore, we found a positive correlation between the overall ESG score and stock returns in China, whereas Japan showed a negative correlation.

Especially the significant findings for the Japanese market during COVID-19, showing a negative correlation for the environment (E) component and a positive correlation for governance (G), are consistent with previous research.

In the study by Takeda and Tomozawa (2006), they examined the connection between stock prices and the release of environmental (E) management rankings. The study analyzed the top 30 manufacturing companies in the rankings published by Nikkei newspaper from 1998 to 2005, and found that stock prices generally did not respond significantly to the release of the rankings within a three-day event window. Interestingly, stock prices increased significantly for companies with downgraded rankings, while those with upgraded rankings decreased significantly. This suggests that investors may not necessarily value environmental performance as highly as other factors, such as governance and financial performance, when making investment decisions.

In another study by Liu and Nemoto (2021), they investigated the relationship between a firm's ESG evaluations and its attractiveness to potential employees. Their results indicated that higher ESG evaluations enhanced a company's desirability as an employer, offering a competitive edge in recruiting top talent. The significant positive correlation between governance (G) and cumulative abnormal returns may underscore the importance of governance in the Japanese market context, suggesting that transparent and ethical management practices contribute to both stock performance and employee attraction.

Moreover, it is worth noting that China demonstrates a positive correlation between ESG and CARs during the crisis, which is nearing significance, with a significance level of 11.3%. This finding closely aligns with earlier research by Li et al. (2022), who also investigated ESG and stock performance during the COVID-19 outbreak, concluding that ESG performance positively relates to cumulative abnormal returns amid the crisis. Although Hong Kong also exhibits a positive correlation, its results are not significant.

Table 4.8 ESG Scores and CARs by Country

Dependent Variable: Cumulative Abnormal Returns (observations)	ESG overall score	E	S	G
China (198)	<i>0.1441 (0.113)</i>	-0.0127(0.916)	0.0665(0.614)	<i>0.1805**(0.024)</i>
Hong Kong (31)	0.0103(0.982)	0.1331(0.871)	-0.4846(0.523)	0.2954(0.335)
India (76)	-0.0729 (0.557)	<i>-0.1078(0.578)</i>	-0.1435(0.554)	0.1786(0.229)
Indonesia (18)	Insufficient observations for this regression			
Japan (196)	<i>-0.1152 (0.119)</i>	<i>-0.1550* (0.097)</i>	-0.1079 (0.255)	<i>0.1216* (0.082)</i>
Malaysia (22)	-0.1915(0.690)	Insufficient observations for this regression		
Philippines (16)	Insufficient observations for this regression			
Singapore (17)	Insufficient observations for this regression			
S. Korea (107)	-0.1473 (0.162)	0.0379 (0.870)	-0.2372(0.254)	-0.0086(0.931)
Taiwan (62)	-0.1600 (0.271)	-0.2732(0.231)	0.1342(0.391)	-0.1354(0.179)
Thailand (28)	-0.5185 (0.497)	-0.4440(0.516)	0.3782(0.800)	-0.4750(0.586)

*Note:* The table shows the impact of ESG overall and individual scores on cumulative abnormal returns during the COVID-19 crisis, categorized by country. However, some countries have insufficient observations for regression analysis.

The symbols \*\*\*, \*\*, and \* denote statistical significance at the 1%, 5%, and 10% levels, respectively. The coefficient is represented by the number displayed, while the number enclosed in parentheses indicates the p-value. In addition, any p-values that are significant at a level of less than 15% are highlighted in italic. All regression analysis in this research were conducted using z-score standardized data. Robust standard errors were used to estimate the standard errors of the regression coefficients.

#### 4.4.2 Grouped by Country: ESG and idiosyncratic volatility

*Table 4.9*, on the other hand, demonstrates the effect of ESG total score and individual scores on idiosyncratic volatility during the COVID-19 crisis. The ESG overall score reveals significantly positive and negative results for Malaysia and Korea, respectively, which is consistent with another research conducted by Hwang et al. (2021) based on the Korean market. The study found that the earnings volatility of most firms is higher during the COVID-19 pandemic, but firms with good ESG performance have achieved more stable business performance during the pandemic compared to firms with poor ESG performance. This suggests that good ESG performance may help firms achieve more stable financial performance during crises such as the COVID-19



pandemic. However, we currently do not have sufficient information to compare Malaysia's results with previous research.

In addition, environmental (E) has a negative correlation with idiosyncratic volatility in Korea and Hong Kong, implying that the higher environmental (E) will also reduce idiosyncratic risk during the collapse period. The social (S) score demonstrates a significantly negative correlation with the idiosyncratic volatility of Thai firms.

In the meantime, surprisingly, we can still observe that governance (G) has a positive impact on the idiosyncratic volatility in both China's and Thailand's markets during the COVID-19 crisis. It demonstrates that companies with a higher governance (G) score may also have greater idiosyncratic volatility during the COVID-19 crisis.

Table 4.9 ESG Scores and Idiosyncratic Volatility by Country

Dependent Variable: Idiosyncratic Volatility (observations)	ESG overall score	E	S	G
China (198)	<i>-0.0765(0.139)</i>	-0.0584 (0.446)	-0.0758 (0.348)	<i>0.0753* (0.061)</i>
Hong Kong (31)	-0.2097 (0.407)	<i>-0.7527* (0.061)</i>	-0.0010 (0.996)	0.2341 (0.166)
India (76)	-0.0673 (0.529)	-0.0537 (0.758)	-0.1150 (0.534)	0.0780 (0.585)
Indonesia (18)	Insufficient observations for this regression			
Japan (196)	-0.0177 (0.717)	0.0898 (0.205)	-0.0561 (0.473)	-0.0525 (0.321)
Malaysia (22)	<i>0.6224* (0.053)</i>	Insufficient observations for this regression		
Philippines (16)	Insufficient observations for this regression			
Singapore (17)	Insufficient observations for this regression			
S. Korea (107)	<i>-0.160* (0.094)</i>	<i>-0.3761* (0.054)</i>	0.1753(0.288)	-0.0023(0.979)
Taiwan (62)	-0.0509 (0.655)	-0.164 (0.259)	.0209 (0.851)	0.0581 (0.504)
Thailand (28)	-0.3934 (0.753)	0.266 (0.169)	<i>-2.2377* (0.051)</i>	<i>0.8916* (0.069)</i>

*Note:* The table shows the impact of ESG overall and individual scores on idiosyncratic volatility during the COVID-19 crisis, categorized by country. However, some countries have insufficient observations for regression analysis. The symbols \*\*\*, \*\*, and \* denote statistical significance at the 1%, 5%, and 10% levels, respectively. The coefficient is represented by the number displayed, while the number enclosed in parentheses indicates the p-value. In addition, any p-values that are significant at a level of less than 15% are highlighted in italic. All regression analysis in this research were conducted using z-score standardized data. Robust standard errors were used to estimate the standard errors of the regression coefficients.

#### 4.4.3 Data Grouped by Significance Based on Previous Analysis

According to previous results, some ESG individual scores shows significantly in some countries. Therefore, we divided the countries in two groups based on the significance for further discussion. The significant group included: China, Hong Kong, Malaysia, Korea, Thailand, and Japan. The insignificant group included: India, Indonesia, Singapore, Philippines, and Taiwan.

*Table 4.10* shows that the dataset was divided into two groups based on the significance of a prior analysis. In the significant group, the regression analysis indicates a significantly positive correlation between governance (G) and CARs, suggesting that companies with stronger governance structures tend to experience higher CARs during the collapse period, which is consistent with the majority of previous regression models in this research.

Conclusively, the results from the significant group demonstrate robustness in comparison to the initial regression model that included all stocks. The findings indicate a negative correlation between ESG overall score and individual social (S) score with idiosyncratic volatility, indicating that ESG and (S) can reduce unsystematic risk. Additionally, strong governance (G) structures lead to an increase in cumulative abnormal return, which is a robust result in comparison to the initial model without any grouping.

In contrast, for the insignificant group, only one significant correlation was observed: a significantly negative correlation between ESG overall score and Idiosyncratic volatility. This finding suggests that companies with better ESG ratings tend to experience lower levels of idiosyncratic volatility, regardless of their previous analysis group.

Table 4.10 ESG Scores and CARs, Idiosyncratic Volatility by Significance

Dependent Variable: CARs or Idiosyncratic Volatility	China, Hong Kong, Malaysia, Korea, Thailand, and Japan				India, Indonesia, Singapore, Philippines, and Taiwan			
	Significant Group				Insignificant Group			
	(1) CARs		(2) Idiosyncratic Volatility		(3) CARs		(4) Idiosyncratic Volatility	
ESG overall	-0.0773 (0.139)		-0.1096 ** (0.044)		-0.0842 (0.187)		-0.0766 ** (0.036)	
E		-0.0662 (0.324)		0.0436 (0.492)		-0.0262 (0.766)		-0.007 (0.899)
S		-0.0994 (0.139)		-0.2015 *** (0.003)		-0.0865 (0.371)		-0.0654 (0.291)
G		0.0719* (0.080)		0.0580 (0.122)		0.0049 (0.947)		-0.0117 (0.774)
Dividend Yield	-0.0423	-0.0341	-0.1439 ***	-0.1396 ***	0.0605	0.0753	-0.0396	-0.0333
ROE	0.2135 ***	0.2144 ***	-0.1122 *	-0.1080	0.1697 ***	0.1769 ***	0.0388	0.0435
Cash/ Total Assets	0.0262	0.0233	0.0272	0.0361	0.0296	0.0279	0.0269	0.0258
Historical Volatility	-0.1287 ***	-0.1264 ***	0.2348 ***	0.2409 ***	-0.0058	-0.0042	0.1883 ***	0.1922 ***
Total Debt/ Total Assets	-0.0941	-0.0887	0.2788 **	0.2879 **	-0.2270	-0.2387	-0.0176	-0.0184
Long-term Debt/ Total Assets	-0.0080	-0.0158	-0.2673 **	-0.2790 **	0.0960	0.1092	0.1086	0.1049
Price-to-Book	-0.1019	-0.1065 *	0.0299	0.0275	-0.0457 **	-0.0486 **	-0.0586 ***	-0.0583 ***
Adjusted R-Squared	0.3524	0.3603	0.3107	0.3197	0.5837	0.5859	0.7728	0.7725

Table 4.10 ESG Scores and CARs, Idiosyncratic Volatility by Significance (Cont.)

Dependent Variable: CARs or Idiosyncratic Volatility	China, Hong Kong, Malaysia, Korea, Thailand, and Japan		India, Indonesia, Singapore, Philippines, and Taiwan	
	Significant Group		Insignificant Group	
	(1) CARs	(2) Idiosyncratic Volatility	(3) CARs	(4) Idiosyncratic Volatility
With respect to markets:	China 35.2% Hong Kong 6.18% Japan 31.32% Malaysia 4.02% Korea 18.1% Thailand 5.17%		India 36.82% Indonesia 9.21% Philippines 9.62% Singapore 11.72% Taiwan 32.64%	
Observations (for regression)	582		189	
Industry/ Country FE	yes		yes	
Firm controls	yes		yes	

*Note:* The table shows the impact of ESG overall and individual scores on cumulative abnormal returns and idiosyncratic volatility during the COVID-19 crisis, categorized by groups of countries, based on prior analysis. The significant group includes China, Hong Kong, Malaysia, Korea, Thailand, and Japan. The insignificant group includes India, Indonesia, Singapore, Philippines, and Taiwan. The symbols \*\*\*, \*\*, and \* denote statistical significance at the 1%, 5%, and 10% levels, respectively. The coefficient is represented by the number displayed, while the number enclosed in parentheses indicates the p-value. In addition, any p-values that are significant at a level of less than 15% are highlighted in italic. All regression analysis in this research were conducted using z-score standardized data. Robust standard errors were used to estimate the standard errors of the regression coefficients.

#### 4.4.4 (E+S)/2

When studying the relationship between ESG and stock performance, it is commonly seen that environmental (E) and social (S) factors are grouped together as single category. This approach has been done in previous studies. (R. Albuquerque et al., 2020; R. A. Albuquerque et al., 2020) We expected that combining environmental (E) and social (S) factors into one category can simplify the analysis and have more significant results. Therefore, we conducted an additional regression test, where we merged environmental (E) and social (S) factors and divided them by two.

Remarkably, the results *Table 4.11* revealed that the environmental and social (ES) factors had a significant impact on both CARs and idiosyncratic volatility during the COVID-19 collapse period. The results remained stable, whether or not firm controls were taken into account. The analysis revealed a negative relationship between (ES) and CARs as well as idiosyncratic volatility, suggesting that firms with higher (ES) experience lower cumulative returns, but also reduced risk during the crisis.

It's worth noting that this study's results differ from those previous research (R. Albuquerque et al., 2020), which found a positive correlation between (ES) and stock returns in the US market during the COVID-19 period. Despite this difference, both studies agree on the negative correlation between (ES) and idiosyncratic volatility. However, the findings contrast with research based on the Indonesian market, which suggests that (ES) performance did not significantly influence economic performance. This difference may be due to the absence of meaningful sustainability efforts by companies and investors in that market. (Handayani, 2019).

Table 4.11 ES and G Scores and CARs, Idiosyncratic Volatility

Dependent Variable Independent Variable	Without Firm Controls		With Firm Controls	
	(1) CARs	(2) Idiosyncratic	(3) CARs	(4) Idiosyncratic
(E+S)/2	<i>-0.1103***</i> (0.006)	<i>-0.1923***</i> (0.000)	<i>-0.1658***</i> (0.000)	<i>-0.1041***</i> (0.001)
G	0.0418 (0.198)	0.0329 (0.222)	<i>0.0640*</i> (0.068)	0.0017 (0.949)
Dividend Yield			0.0259	<i>-0.0836***</i>
ROE			<i>0.1414***</i>	<i>-0.0464*</i>
Cash/ Total Assets			0.0221	0.0363
Historical Volatility			<i>-0.0939**</i>	<i>0.2196***</i>
Total Debt/ Total Assets			-0.0784	<i>0.1343*</i>
Long-term Debt/ Total Assets			-0.0347	-0.0819
Price-to-Book			<i>-0.0363***</i>	<i>-0.0308***</i>
Observations	935	935	771	771
Industry/ Country FE	yes	yes	yes	yes
Firm controls	no	no	yes	yes
Adjusted R-Squared	0.2917	0.4568	0.3596	0.5005

*Note:* The table presents the results of combining environmental and social factors into one category (ES) and its impact on cumulative abnormal returns and idiosyncratic volatility during the COVID-19 crisis. The symbols \*\*\*, \*\*, and \* denote statistical significance at the 1%, 5%, and 10% levels, respectively. The coefficient is represented by the number displayed, while the number enclosed in parentheses indicates the p-value. In addition, any p-values that are significant at a level of less than 15% are highlighted in italic. All regression analysis in this research were conducted using z-score standardized data. Robust standard errors were used to estimate the standard errors of the regression coefficients.

## CHAPTER 5

### CONCLUSION

This research focuses on studying the impact of ESG scores on stock return and volatility resilience during the COVID-19 period in 11 Asian countries, using accounting factors and other indices such as the Human Development Index, Corruption Index (Transparency), and Democracy Index as grouping metrics. The study examines the period between 5 March 2020 and 28 April 2020.

While there is ongoing debate on whether ESG is beneficial for stock prices, my event period cross-sectional analysis, in conjunction with the findings of other papers, suggests that ESG can increase the resilience and reduce volatility during crisis. Specifically, the results of my research indicate that high ESG firms have a positive correlation with cumulative abnormal returns (CARs), particularly in countries with low scores on the Human Development Index, Corruption Index (Transparency), and Democracy Index.

However, the relationship between ESG scores and cumulative abnormal returns is still a matter of discuss. Nonetheless, my research shows that social (S) factors are more significant in adding value to CARs in low-scoring countries, while governance (G) factors are more significant in high-scoring countries.

By breaking down the details further, we find that (E) factor plays an important role in reducing idiosyncratic volatility in Hong Kong and Korea, while (S) is significant in Thailand. (G) factors are key in creating positive CARs in China and Japan.

Overall, while the combination of (ES) factors can lead to more significant results, there is still a negative correlation between (ES) scores and CARs and idiosyncratic volatility during the COVID-19 period. In terms of generating positive CARs, (G) becomes the most important factor, while (S) and (E) factors increase the resilience to volatility.

The study highlights the importance of considering country-specific characteristics when incorporating ESG factors into investment strategies. Future research could explore how ESG factors impact financial performance in countries with higher scores on relevant indices, and investigate the specific governance factors that generate positive cumulative abnormal returns.

Table 5.1 Summary of significant results

Regression Models		Dependent Variables	ESG overall score	E	S	G	
Stocks from 11 indices	All Stocks	C. Log returns	<i>-0.1074***</i>	<i>-0.1004*</i>	<i>-0.0907*</i>	<i>0.0609*</i>	
		CARs	<i>-0.0928**</i>	-0.0778	<i>-0.1004*</i>	<i>0.0651*</i>	
		Volatility	-0.0469	<i>0.0835**</i>	<i>-0.1161***</i>	-0.0062	
		Idiosyncratic	<i>-0.1041***</i>	0.0136	<i>-0.1301***</i>	0.0071	
High ESG firms grouped in different index criteria	High	Human Development	CARs	0.0590	-0.0021	-0.0628	<i>0.1139**</i>
		Transparency	CARs	0.0495	0.0458	-0.0800	<i>0.0863</i>
		Democracy	CARs	0.0559	0.0269	-0.0482	0.0774
	Low	Human Development	CARs	<i>0.2132*</i>	0.0150	<i>0.2694</i>	0.0562
		Transparency	CARs	<i>0.200*</i>	-0.0491	<i>0.2661*</i>	0.1269
		Low Democracy	CARs	<i>0.1585</i>	-0.0171	<i>0.2200</i>	0.0848
By country with significant results	China	CARs	<i>0.1441</i>	-0.0127	0.0665	<i>0.1805**</i>	
		Idiosyncratic	<i>-0.0765</i>	-0.0584	-0.0758	<i>0.0753*</i>	
	Japan	CARs	<i>-0.1152</i>	<i>-0.1550*</i>	-0.1079	<i>0.1216*</i>	
	Hong Kong	Idiosyncratic	-0.2097	<i>-0.7527*</i>	-0.0010	0.2341	
	Korea	Idiosyncratic	<i>-0.160*</i>	<i>-0.3761*</i>	0.1753	-0.0023	
	Malaysia	Idiosyncratic	<i>0.6224*</i>				
Thailand	Idiosyncratic	-0.3934	0.266	<i>-2.2377*</i>	<i>0.8916*</i>		
By significance	Significant group	CARs	<i>-0.0773</i>	-0.0662	<i>-0.0994</i>	<i>0.0719*</i>	
		Idiosyncratic	<i>-0.1096**</i>	0.0436	<i>-0.2015***</i>	<i>0.0580</i>	
	Insignificant group	CARs	-0.0842	-0.0262	-0.0865	0.0049	
		Idiosyncratic	<i>-0.0766**</i>	-0.007	-0.0654	-0.0117	
(E+S)/2 for stocks from 11 indices	ES	CARs			<i>-0.1658***</i>	<i>0.0640*</i>	
		Idiosyncratic			<i>-0.1041***</i>	0.0017	

*Note:* The table summarizes results for all the regression models used in this research, including only those with significant results. The symbols \*\*\*, \*\*, and \* denote statistical significance at the 1%, 5%, and 10% levels, respectively. In addition, any p-values that are significant at a level of less than 15% are highlighted in italic. All regression analysis in this research were conducted using z-score standardized data. Robust standard errors were used to estimate the standard errors of the regression coefficients. Firm controls were included in all regression models to control for the effects of potential confounding variables.



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