THE INFLUENCE OF SUSTAINABLE DEVELOPMENT ON STOCK RISK AND VOLATILITY IN THAILAND'S STOCK EXCHANGE DURING THE COVID-19 PANDEMIC

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ABSTRACT

The COVID-19 pandemic has severely impacted most businesses worldwide. Sustainability management by involving Environmental, Social, and Governance (ESG) criteria is increasingly a focus of business stakeholders. This study explores the return and risk performance of 98 companies listed in the Thailand Sustainability Investment (THSI) strategy that adopted ESG measures during the COVID-19 outbreak. The regression analysis is also applied to examine the impacts of ESG pillar scores on stock returns from 2015–2021. The empirical results support the positive impact of ESG adoption to stock performance, even during the risks brought by the pandemic. Environmental and governance pillars have a statistically positive affect on stock returns, while the social pillar scores have no impact on return generating. The findings confirm the importance of sustainable development as the center of business's strategies to cope with emerging risk and to generate better stock performance.

Contribution/Originality: The study explores the impact of sustainable development on stock returns and risk during the COVID-19 pandemic in Thailand. The Sharp ratio is applied to measure the stocks' volatility comparing to the benchmark industry. Additionally, the regression model is used to analyze the impact of each ESG pillar on stocks' returns. The inside analysis of the impact of environmental, social, and good governance on stocks' performance benefits the institutional and individual investors in term of portfolio management.

1. INTRODUCTION

Sustainable development has become more challenging, especially due to the emerging uncertainties and risk factors in the world market. From past financial crises and other unexpected situations, such as the recent pandemic, many blame the failure of companies on the lack of governance and sustainable strategic management. The key reason why companies must run their business sustainably is because businesses face many changes, such as the development of technology, that play an important role in daily life. As a result, businesses must speed up adaptation to prepare for changes in consumer behavior. Changing global economic powers creates new business competitors and introduces new regulations. Moreover, resource scarcity has become a challenge as to how we will have enough resources and energy to meet demand. Global warming and climate change will be more severe in the future, and these are factors that will affect the economy, society, and environments around the world. Therefore, it is imperative that organizations have risk management strategies to reduce the likelihood of damage to their resources and the impact on stakeholders, including responding to changes in the business environment effectively.

The COVID-19 pandemic was unexpected, and it affected unprepared businesses with different degrees of severity. Thailand faced the first wave of COVID-19 infections from January 2020, resulting a nationwide lockdown and travel restrictions from March to June 2020. National income from tourists was frozen, and the international trade volume and value declined. The majority of businesses were dramatically impacted from the outbreak, lockdown, and travel restrictions. Their revenues and profits dropped significantly, and some business ceased trading. The relaxation of the lockdown policy and travel restrictions was introduced in July 2020, but at the beginning of 2021, Thailand faced a new wave of COVID-19 infections, and in January 2021, the government announced travel restrictions across five provinces that had a high number of cases. The lockdown and restriction policies were not enforced nationwide but rather in specific areas with a high number of infections.

COVID-19 may seem unconquerable for many businesses, but operational sustainability and survival are still observed and possible. Sustainable development involving environmental, social, and governance (ESG) criteria is gaining more interest as the center of company strategies to minimize the impact of threats and identify the area of improvement, which is the new normal in business environments. Business leaders focus on ESG aspects in their long-term strategies, and the transparency of working process is enforced by stakeholders. Environmental issues are still an ongoing concern of companies. The corporate social impact and societal roles are even more involved as the pandemic has changed the ways of working and living.

The Stock Exchange of Thailand (SET) is the main equity market of Thailand. The SET has continuously supported businesses to be able to maintain financial stability while operating in a socially and environmentally responsible manner under corporate good governance. The SET initiated the development of corporate governance (CG) for listed companies in 1994, focusing on the development of good CG policies and company practices. Until now, CG has been upgraded to be equivalent to widely accepted international standards. Importantly, the quality development processes of listed companies have been expanded to become a sustainable business organization, which is an important tool in managing the expectations of stakeholders. It also encourages listed companies to voluntarily participate in sustainability assessments in order to become one of the lists of sustainable stocks or Thailand Sustainability Investment (THSI). The Thailand Sustainability Investment (THSI) list has been in place since 2015 and comprises the listed companies that conduct sustainable business operations. The listed companies in the THSI were defined by the SET as the companies adopting ESG perspective in their innovation, supply chain management, and risk management. In 2018, the SET THSI Index was launched in Thailand's equity market. The reporting of ESG aspects benefits companies as they gain confidence from stakeholders and investors as well as the ability to identify opportunities for growth and improvement. There were 98 constituents in 2019 (Thailand Sustainability Investment (THSI), 2019). This study aims to demonstrate the return, volatility, and risk-adjusted return of ESG companies' stocks listed in the SET THSI during the COVID-19 pandemic in Thailand. The comparison of stock performance of companies adopting ESG within their industry in eight industry classifications was carried out. It is hypothesized that they can manage and respond to risk more efficiently than companies that have not adopted ESG measures in the industry with continuous involving economic, environmental, and social sustainability in their operations. The investigation of the relationship between ESG scores and stock returns is also analyzed using a regression model. The composite ESG scores, and each pillar scores are explored if any of the ESG pillars has a greater impact on return. The integration of time series and panel data analysis is applied to understand the dimension of the relationship between ESG composition and stock performance.

2. LITERATURE REVIEW

2.1. Related Theory

2.1.1. Portfolio Management and Asset Pricing Theory

Markowitz (1952) established the model of portfolio management with the principle of efficient diversification. His model is the master of the portfolio selection comprising risky assets to form the efficient frontier. The efficient

frontier shows the set of portfolios with variance minimization at any level of expected return. Markowitz's model is used to calculate mean-variance of portfolios.

From the mean-variance model theory, the capital asset pricing model (CAPM) was introduced by Sharpe (1964); Lintner (1969); and Mossin (1966). The risk-free asset was included in the portfolio. The model is used to calculate the systematic risk and return trade-off. Sharpe (1994) established the method to evaluate portfolio performance, which is called "the reward to volatility trade-off" or risk per unit of return.

2.1.2. Efficiency Market Hypothesis

Fama (1970) introduced the efficient market theory, which states that securities prices always fully reflect available information, so the market is efficient. It is impossible for investors to use the information to beat the market or to earn abnormal returns. ESG companies listed in the THSI is publicly available information and involves in the investment practice, hence, there should be no advantage of investing in ESG companies based on the efficient market hypothesis.

There are different studies that have identified the inefficient market in the Stock Exchange of Thailand, such as Laokulrach and Trisupinyo (2017), who found that the announcement of the revision of stock constituents in the SET 100 Index is not fully reflected in stock prices. There is a chance for investors to benefit from the information to beat the market in the short-term.

3. EMPIRICAL RESEARCH

Recently, there have been various studies related to the impact of ESG on stock returns, company performance, and financial performance. Loof and Stephan (2019) revealed that companies with higher ESG scores generate higher profitability and value of stock and can also yield higher returns and lower risk from merger and acquisition transactions. The study by Friede, Busch, and Bassen (2015) indicates that companies incorporating ESG elements provide lower stock performance volatility than competitors in the same industry. Similarly, the study by Kumar et al. (2016) used a new quantitative model to measure returns and volatility of stocks in the Dow Jones Sustainability Index (DJSI). Their results show superior returns, lower volatility, and higher risk-adjusted returns of companies that have adopted ESG measures compared to those that have not.

The portfolio of companies adopting environmental and social policies shows a lower volatility than non-ESG companies' portfolio (Eccles, Ioannou, & Serafeim, 2012). The study by Przychodzen and Przychodzen (2013) examined 85 companies on the S&P 500 that have incorporated sustainability into their business strategies and can generate abnormal returns with lower volatility. Zhang, Djajadikerta, and Zhang (2018) concluded that companies in China that release news related to sustainability more frequently can generate higher stock returns. Sustainable companies on the Brazilian Stock Market generate greater returns than other companies (Azevedo, Santos, & Campos, 2016).

Conversely, the study of Indian companies by Meher, Hawaldar, Mohapatra, Spulbar, and Birau (2020) found a negative correlation between environmental and good governance and returns, and a negative correlation with volatility. The study by Brammer, Brooks, and Pavelin (2006) found that a set of social performance indicators, including environment, employment, and community activities, surprisingly have a negative relationship with returns. Bauer, Koedijk, and Otten (2005) used an international database containing 103 German, UK, and US ethical mutual funds, and they found that when examining the investment style, there was no evidence of significant differences in risk-adjusted returns between ethical and conventional funds from 1990–2001.

3.1. ESG Pillar Scoring by Refintiv

Refinitiv provides comprehensive ESG data for financial markets, covering over 9,000 companies which represents 70% of the global market capitalization. ESG scores from Refinitiv measure a company's relative ESG

performance, commitment, and effectiveness, based on company-reported data. Overall ESG combined (ESGC) scores, which are discounted for significant ESG controversies impacting the corporations, are assessed. Scores for environmental, social, and governance pillars are also provided. The environment pillar score reflects company activities in terms of resource use, emissions, and innovation; the social pillar includes the perspectives of the workforce, human rights, community, and product responsibility; and the governance pillar evaluates management, shareholders' rights, and corporate social responsibility. The details are presented in Figure 1. The environmental and social scores are based on the relative performance of ESG factors within the company's sector. Governance scores are relative to the country of incorporation. Refinitiv produces a score between 0–100, as well as easy-to-understand letter grades.
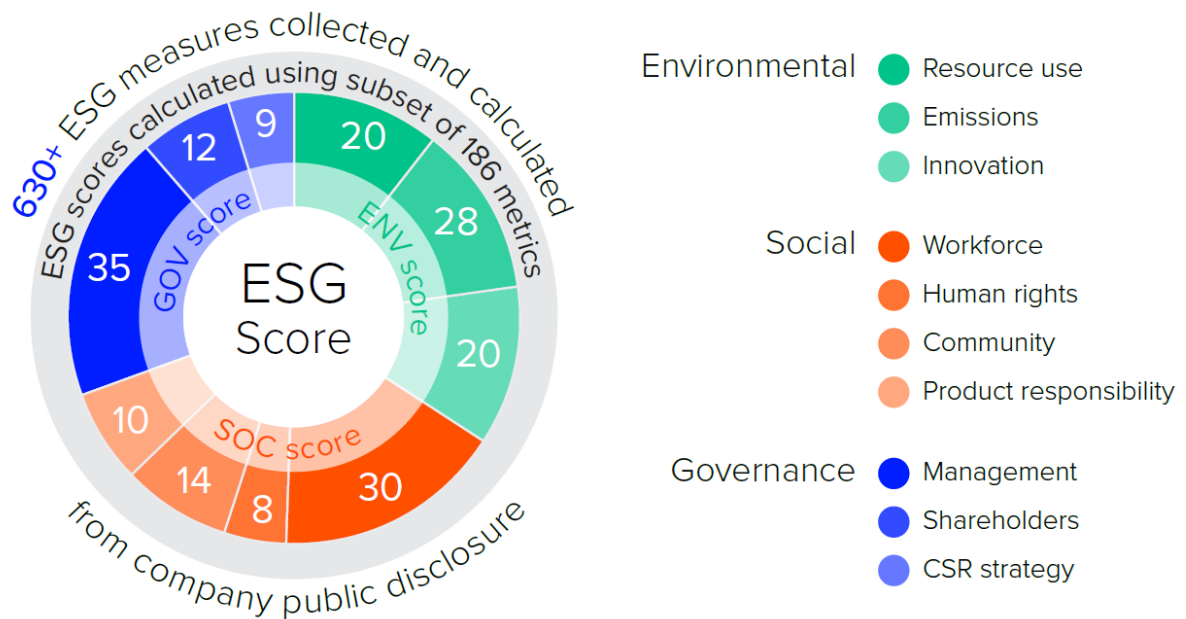

Figure 1. Refinitiv's ESG scoring.

4. METHODOLOGY

4.1. Performance During the COVID-19 Pandemic

This study explores the stock returns and volatility for 98 ESG-adopted companies in the THSI list at the year-end announcement in 2019. The period of return and performance of ESG stocks from 2020–2021, which is the period of the emerging risk from the COVID-19 pandemic until the recovery, is used in the analysis.

These ESG companies are classified into eight industry classifications by the SET – service, technology, financials, resources, consumer goods, industrials, agro & food, and property & construction. The equally weighted portfolios of ESG in each industry were built to avoid bias caused by any stocks with large market capitalization. Equally weighted industry benchmarking was also assumed in the study. As the situation of COVID-19 outbreak changed quite quickly in 2020–2021, the monthly return was used as the indicator of stock performance. The data was retrieved from Refinitiv data streaming and the SET SMART data streaming. The quantitative method of Kumar et al. (2016) is applied in this study. The steps of analysis are as follows:

A. Monthly return is calculated by:

$$R_{i(t)} = \frac{P_{i(t)} - P_{i(t-1)}}{P_{i(t-1)}}$$ (1)

where $R_{i(t)}$ is the return of stock i in month t;

$\quad$ $P_{i(t)}$ is the closing price of stock i in month t;

and $P_{i(t-1)}$ is the closing price of stock i in the prior month.

B. The annualized return is calculated as follows:

$$R_{i(Annual)} = (1 + R_{i(t)})^{12} - 1 \qquad (2)$$

where $R_{i(Annual)}$ is the annualized return of stock i;

$R_{i(t)}$ is the return of stock i in month t;

and 12 refers to the number of months in a year.

C. The monthly volatility of stock returns is calculated by:

$$\sigma_{i(monthly)} = \sqrt{\left.\sum_{i=1}^{t}(R_{i(t)} - R_{i(Avg)})^2)\right/ t - 1}$$
$$(3)$$

where $\sigma_{i(monthly)}$ is the monthly standard deviation of stock i's return;

$R_{i(t)}$ is the return of month t;

and $R_{i(Avg)}$ is the average monthly return; and t is the number of months in a year.

D. The annualized volatility of monthly returns is calculated by:

$$\sigma_{i(Annual)} = \sigma_{i(monthly)} * \sqrt{12} \qquad (4)$$

where $\sigma_{i(Annual)}$ is the annualized standard deviation of stock i's return;

$\sigma_{i(monthly)}$ is the monthly standard deviation of stock i's return;

and 12 is the number of months in a year.

E. The Sharpe ratio is applied to measure the reward to volatility or return per unit of risk as follows:

$$Sharpe\ ratio = \frac{R_{i(Annual)} - R_f}{\sigma_{i(Annual)}} \qquad (5)$$

where $R_{i(Annual)}$ is the annualized return of stock i;

R_f is the risk-free rate;

and $\sigma_{i(Annual)}$ is the annualized standard deviation of stock i's return.

4.2. Exploring the Impact of ESG Scoring

The study aims to explore the impacts of ESG ratings on stock returns; therefore, the company selection is based on the availability of ESG scores. Out of 98 ESG companies listed in the THSI, 41 had complete data for ESG scores in the Refinitiv data streaming and are included in the study. They are distributed among seven out of eight industries in the SET – services, technology, financials, resources, industrials, agro & food, and property & construction industries.

Monthly stock return data was collected for the 2015–2021 period with the purpose of having a time span long enough to investigate the impact of ESG composite scores, and each environmental, social, and governance pillar scores on stock returns. The control variables include a one-month lagged period return (Jegadeesh, 1990); size, value, book-to-market value ratio, profitability, and investment, referring to the studies by Fama and French (1992); Fama and French (2006); Fama and French (2015) and Hou, Xue, and Zhang (2015); and shareholder turnover (Khan, 2019) are included. The definitions of the variables are presented in Table 1. The pooled ordinary least squares regression approach from Khan (2019) is applied in this study. The ESG scores and control variables are included in Equation 6. Equations 7 to 9 present the impact of each environmental pillar score, social pillar score, and goverance pillar score together with the control variables.

$$R_{i(t)} = \alpha + \beta_1 Lagged\ return - \beta_2 Size + \beta_3 Value + \beta_4 B/M + \beta_5 Profit + \beta_6 Invest + \beta_7 Share\ Turn + \beta_8 ESG\ score \tag{6}$$

$$R_{i(t)} = \alpha + \beta_1 Lagged\ return - \beta_2 Size + \beta_3 Value + \beta_4 B/M + \beta_5 Profit + \beta_6 Invest + \beta_7 Share\ Turn + \beta_8 E\_score \tag{7}$$

$$R_{i(t)} = \alpha + \beta_1 Lagged\ return - \beta_2 Size + \beta_3 Value + \beta_4 B/M + \beta_5 Profit + \beta_6 Invest + \beta_7 Share\ Turn + \beta_8 S\_score \tag{8}$$

$$R_{i(t)} = \alpha + \beta_1 Lagged\ return - \beta_2 Size + \beta_3 Value + \beta_4 B/M + \beta_5 Profit + \beta_6 Invest + \beta_7 Share\ Turn + \beta_8 G\_score \tag{9}$$

Table 1. Variable Measurements.

Variables	Definition
Ri(t)	Monthly return
Lagged return	One-month lagged return
Size	Natural logarithm of market capitalization
Value	Operating cash flow divided by closing market value of equity
B/M	Book value of common equity divided by the closing market value of equity
Profit	Operating income divided by sales
Invest	Percentage growth in total assets compared to the previous year
Share Turn	Monthly trading volume divided by outstanding share
ESG Score	Composite ESG score
E_Score	Environmental pillar score
S_Score	Social pillar score
G_Score	Governance pillar score

5. RESULTS AND DISCUSSION

The discussion of results is divided into two parts. The first explores the return, risk, and risk-adjusted return of ESG-adopted companies compared to the overall industry during the COVID-19 pandemic. The second discusses the time series and regression analysis on the impact of the ESG rating on stock performance.

5.1. ESG Stock Performance During the COVID-19 Pandemic
5.1.1. Return and Risk of ESG Stocks Compared to the Industry

The distribution of the ESG companies among the different industries in the SET is shown in Table 2. The highest proportion, 19 out of 96 companies, are in the resources industry. Fifteen ESG companies from the services, property & construction, and industrial industries are listed in the THSI. The agro & food and financial industries consist of 13 and 11 ESG companies, respectively. The technology industry has eight ESG companies, and two ESG companies are in the consumer products industry. The market value of these 98 companies is about 60% of the total

market value of the SET. These companies are the major constituents in the SET Index and influence the changes in the index.

Table 2. Distribution of ESG-adopted companies in THSI.

Industry	Number of Companies
Resources	19
Services	15
Technology	8
Property and Construction	15
Financials	11
Agro & Food Industry	13
Industrial	15
Consumer Products	2
Total	98

During the COVID-19 pandemic in 2020–2021, investment in ESG companies generated a higher annualized return than the industry average. Figure 1 and Table 3 show that the ESG companies in the service, agro & food, technology, resources, property & construction, industrial, and financial industries provided superior returns for investors, while the consumer products industry provided a negative return. There are only two ESG companies in the consumer products industry that are included in the THSI Index, which is the lowest number compared to the other seven industries. These two companies are in the fashion and personal products sectors, which were heavily affected by the lockdown and travel restriction policies during the COVID-19 outbreak.

Looking into the details of the return differences of ESG companies, the technology industry shows the highest positive impact of ESG on stock returns. Investors can receive a 74.24% return from ESG companies compared to a 22.81% return from the industry. Most ESG companies in the technology industry are in the information and communication technology sector. The consequences of the lockdown policy, working from home, and social distancing were that people tended to use more online services. This new normal behavior has increased the usage of the internet and technology. ESG companies in the service industry provided a 10.10% positive return, while the industry provided a negative return of -10.88% for investors. During the COVID-19 outbreak, the service industry was severely affected as tourism is one of the sectors in the service industry, and travel restrictions decreased the number of international tourists to zero. Considering the constituents of ESG companies in the service industry, it has been found that the commerce, health care, and professional service sectors generated positive returns. Businesses in the commerce sector could still operate during the pandemic to provide necessary goods to consumers together with the increasing volume from delivery services. The health care sector also needed to continue to provide services to people during the outbreak. ESG companies in the professional services sector provided consultancy services and products related to waste management and safety equipment, which were in higher demand during the outbreak. There is only one ESG tourism company in service industry. Agro and food ESG companies provided a positive return of 20.19%, which is higher than the industry. They are under the agribusiness and food & beverage sectors, which were less impacted by pandemic. The lowest return difference occurred in the industrials industry, with only 2.68%. ESG companies in resources, property & construction, and financial industries provided positive returns of 3.29%, 2.58%, and 1.75%, respectively, while the other companies in the given industries provided negative returns. ESG companies have the ability to manage their businesses more effectively than others and maintain confidence from the market.
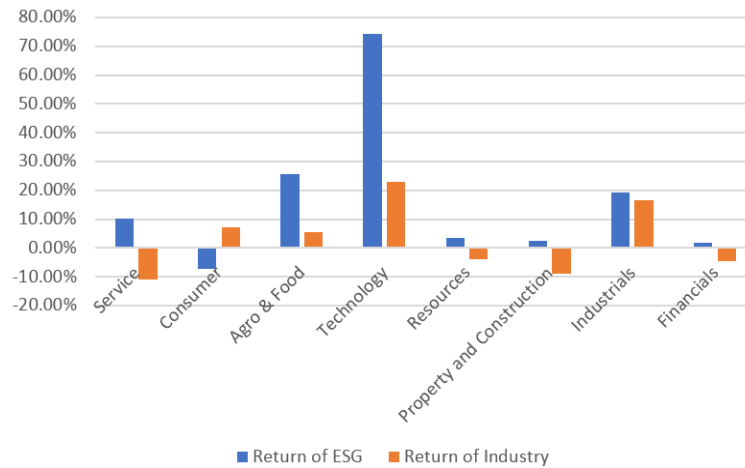
Figure 1. Comparison of annualized returns between ESG companies and the industry.

After considering the impact of ESG on returns, the next step is the volatility comparison. Figure 2 and Table 3 show that ESG companies in seven out of eight industries provided higher return with higher volatility to investors. The difference in volatility between ESG stocks and the industry is highest in the technology industry, with 27.22%, followed by the service industry, with a difference of 26.15%. ESG companies in the property & construction, agro & food, and financial industry provided about 12%–17% higher volatility than the other companies in the industries. The investment in ESG in the resource and industrial industries has approximately 8% higher volatility than the average. The ESG companies in the consumer products sector are quite different from the other industries as they provided a negative return but with higher volatility than the industry.
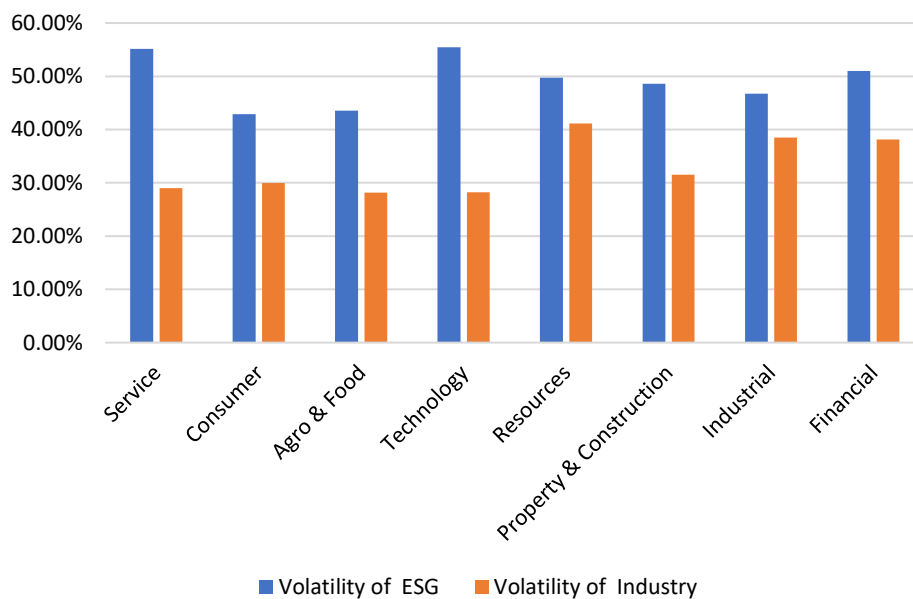

Figure 2. Comparison of annualized volatility between ESG companies and their industry.

5.2. Reward to Volatility Ratio of ESG Stocks Compared to Industry

Most ESG stocks generated a higher annualized return with higher volatility, so it is worth considering the risk-adjusted returns for the performance analysis. The popular measurement of reward to volatility or "Sharpe ratio" is applied here. This is the measurement of return per unit of risk, or risk-adjusted return. The Sharpe ratio is useful in the comparison of the efficiency of investments. The integration of risk and returns of ESG and industry during the COVID-19 outbreak in 2020–2021 is revealed in Table 3.

Table 3. Summary of return, volatility, and Sharpe ratio.

Industry	Return		Volatility		Sharpe Ratio	
	ESG	**Industry**	**ESG**	**Industry**	**ESG**	**Industry**
Service	10.100%	-10.880%	55.170%	29.020%	0.170	-0.400
Consumer	-7.410%	7.020%	42.880%	29.960%	-0.190	0.210
Agro & Food	25.530%	5.340%	43.520%	28.160%	0.570	0.170
Technology	74.240%	22.810%	55.460%	28.250%	1.330	0.780
Resources	3.290%	-3.870%	49.760%	41.110%	0.050	-0.110
Property & Construction	2.580%	-9.000%	48.610%	31.530%	0.040	-0.310
Industrial	19.170%	16.490%	46.730%	38.480%	0.400	0.410
Financial	1.750%	-4.670%	51.020%	38.110%	0.020	-0.140

As shown in Table 3, the risk-adjusted return of ESG stocks in every industry except the consumer products industry is greater than the other companies' stocks in the same industry. ESG companies in the technology industry provided the highest risk-adjusted return of 1.33, meaning that investors received 1.33 units of return to compensate for one unit of risk, while the other companies in the industry provided 0.78 units of return per unit of risk. The Sharpe ratio of ESG companies in the agro & food industry is second, with a ranking of 0.17 compared to the industry's negative ratio of -0.17. The risk-adjusted returns of ESG companies in the service, resources, property & construction, and financial industries is positive, while that of the other companies in the same industry is negative. The Sharpe ratio of ESG stocks in the industrial industry is as same as the industry's. ESG stocks in the consumer goods industry provided a negative return of -0.19 per one unit of risk, while the other companies generated 0.21 units of return per unit of risk. The Sharpe ratio results confirm more efficient investment in ESG companies in seven out of the eight industries in comparison with its industry during the COVID-19 outbreak. Investors can generate higher risk-adjusted returns from ESG-adopted companies' stocks.

6. IMPACT OF ESG RATING ON RETURN

This section discusses the empirical results, the descriptive analysis, the correlation matrix, and the time series and regression analyses. Forty one companies out of 98 ESG companies with the complete data set of ESG scores in data streaming are included in the analysis of the impact of ESG scores on stock performance.

Table 4. Summary of descriptive statistics (2015–2021).

Variables	N	Minimum	Maximum	Mean	Std. Deviation
Return	3110	-41.004	119.537	0.943	9.291
1M lagged return	3110	-41.004	119.537	0.907	9.200
Mkt Cap	3110	7160.000	1620949.000	252966.682	240041.157
Value	3110	-20.172	87.871	10.989	11.217
B/M	3110	0.054	2.857	0.568	0.445
Profitability	3110	-362.410	55.010	12.037	30.230
Investment	3110	-84.900	580.270	11.976	42.881
Share Turnover	3110	0.0220	85.265	7.577	7.859
E Score	3110	2.000	97.110	47.514	24.548
S Score	3110	1.390	88.460	52.193	27.662
G Score	3110	4.070	97.120	64.669	21.708
ESG Score	3110	2.520	87.760	56.359	18.649

6.1. Descriptive Analysis

Table 4 shows the descriptive analysis of the variables. The average monthly return of 41 companies' stocks is 0.943% per month. Many stocks generated negative returns during 2020 and 2021 as a result of the COVID-19 pandemic in Thailand. The average market value of stocks is 252,966 million baht. The book-to-market ratio of these ESG stocks is 0.568 on average. The averages of the operating profit margin and asset growth rate are positive at 12.037% and 11.976%, respectively. A high standard deviation for each of these two variables can be observed as the

proportion of companies that have reported a loss and lower investment in assets since 2020 due to the severe impact of COVID-19. The average ESG score is 56.359 with a maximum score of 87.760 during the 2015–2021 period. The average score of environmental, social, and governance are 47.524, 52.193, and 64.669, respectively. Social pillar has the highest standard deviation of 27.662.

Figure 3 shows the trend of ESG composite scores and scores for each pillar of the 41 ESG companies from 2015–2021. The ESG composite scores increased continuously from 57 in 2017 to 67 in 2020. Environmental pillar scores were relatively stable from 2019–2021. Social pillar scores showed an increasing trend from an average of 63 in 2016 to 75 in 2021. Governance scores remained fairly stable from 2015–2018 and increased from 2019–2021. Overall, these 41 companies listed on the SET have earned better sustainable performance since 2015, even though they have been impacted by the COVID-19 pandemic. Sustainability management and development are still at a strategic focal point.
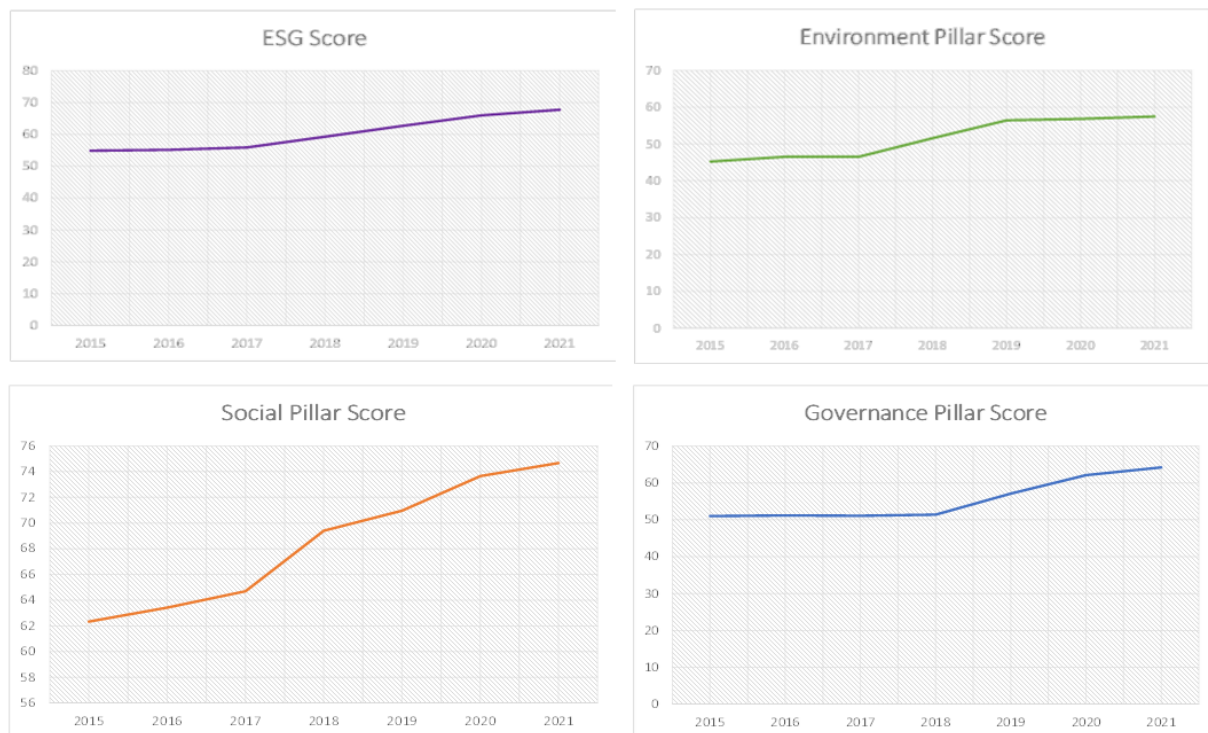

Figure 3. ESG scores and individual pillar scores (2016–2020).

The correlations between variables are presented in Table 5. The correlation between the scores of each pillar and ESG composite scores are high, but the correlation between ESG composite scores and the pillar scores for the other variables are not higher than 0.70. Thus, there is no multicollinearity for the regression analysis.

6.2. Results from Regression Models

Different regression models are analyzed to explore the impact of ESG and its pillar on stock returns. The first regression models examined the impact of a one-month time-lagged return, company size, book-to-market ratio, profitability, investment, and ESG composite scores on stock return. The role of company/stock characteristics together with the individual scores of environmental pillar, social pillar, and good governance pillar are identified in the second, third, and fourth models, respectively.

Table 5. Correlation Metrix.

Variables	Return	Lagged return	Mkt Cap	Value	B/M	Profit	Invest	Share Turn	E_Score	S_Score	G_Score	ESG Score
Return	1.000	0.073	-0.063	0.024	0.037	0.039	0.050	0.015	-0.002	-0.005	-0.021	-0.013
Lagged return		1.000	0.035	-0.052	-0.086	0.018	0.059	0.139	-0.010	-0.014	-0.026	-0.022
Mkt Cap			1.000	0.175	-0.069	0.160	0.026	-0.282	0.319	-0.056	0.402	0.299
Value				1.000	0.528	0.031	-0.133	0.045	0.316	-0.026	0.374	0.323
B/M					1.000	-0.096	-0.071	0.138	0.279	-0.027	0.335	0.290
Profit						1.000	-0.008	-0.118	-0.250	-0.072	-0.203	-0.211
Invest							1.000	0.030	-0.072	0.010	-0.055	-0.066
Share Turn								1.000	0.028	0.201	0.036	0.095
E_Score									1.000	0.293	0.752	0.862
S_Score										1.000	0.286	0.608
G_Score											1.000	0.884
ESG Score												1.000

Table 6. Regression analysis.

Variables	Regression 1		Regression 2		Regression 3		Regression 4	
	Coeff.	t-Stat.	Coeff.	t-Stat.	Coeff.	t-Stat.	Coeff.	t-Stat.
Intercept	15.032	7.103***	7.935	4.105***	8.130	5.100***	8.037	4.112***
Lagged return	0.079	3.682***	0.079	3.669***	0.079	3.662***	0.079	3.675***
Market Capitalization	-0.090	-3.651***	-0.097	-3.926***	-0.085	-3.681***	-0.090	-3.435***
Value	0.030	1.152	0.027	1.043	0.033	1.257	0.031	1.170
Book Value to Market Value Ratio	0.029	1.120	0.026	0.988	.032	1.248	0.029	1.115
Profitability	0.055**	2.448**	0.061	2.682***	0.051	2.366**	0.054	2.383**
Asset Investment	0.056	2.629***	0.057	2.680***	0.056	2.599***	0.056	2.613***
Share Turnover	-0.023	-1.013	-0.023	-1.031	-0.021	-0.912	-0.022	-0.970
ESG Score	0.048	2.013**					0.011	0.404
Environmental Score			0.054	2.267**				
Social Score					0.031	1.586		
Governance Score							0.043	2.009**
Adjusted R²	0.33		0.30		0.22		0.28	

Note: The dependent variable is the monthly return. There are 8,810 observations in every model.
*** $p < 0.01$, ** $p < 0.05$.

The first regression in Table 6 shows that the return of the current month is positively influenced by the previous month's return. Small companies tend to provide higher monthly returns for investors, confirming the size anomaly in the equity market in Fama and French (1992); Fama and French (2015). Companies with higher operating profit margins tends to also have better stock performance, gernerating higher returns for investors. The result also confirms the study by Hou et al. (2015), who stated that there is a significant positive impact of a company's investment in assets on higher stock return. Importantly, the result identifies the significant positive impact of ESG scores on stock returns with a beta coefficient of 0.048 and a t-statistic of 2.013. Companies that earn a higher ESG score can generate a 0.048% higher monthly stock return for investors.

The second regression model exibits the effects of company/stock characteristics and environmental pillar scores for the stock returns. The direction of the impacts of one-month time-lagged returns, company size, profitability, and asset investment on stock returns are as same as in Model 1. From the sustainability perspective, companies implementing environmentally friendly practices in their operations generate significantly better stock returns for investors. This model identifies a larger impact of the environmental pillar score on stock returns compared to the impact of the ESG composite score in Model 1 with a coefficient of 0.054 and a t-statistic of 2.267. The results are similar to the study by Al-Tuwaijri, Christensen, and Hughes Ii (2004).

The third regression model concerns the relationship between the social pillar score and the generation of stock returns. The impacts of the one-month time-lagged return, company size, profitability, and asset investment behave in the same direction as regression Models 1 and 2. Interestingly, there is no statistical effect of the social pillar on stock returns, which is similar to the result found in the study on the Korean financial market by Han, Kim, and Yu (2016).

The role of the good goverance pillar is displayed in regression Model 4. The results confirm the strong infuence of the one-month time-lagged return on the current monthly return. Also, there is a statistically significant relationship between company size and the monthly stock return. Higher profitability and asset growth positively infuence a company's stock return. Considering the role of the good governance pillar, it shows a statistically significant and direct impact on the monthly return with a coefficient of 0.043 and a t-statistic of 2.009. One unit of good governance score brings a 0.043% higher stock return for investors. The influence of the good governance pillar on stock returns is less than that of the environmental pillar.

7. CONCLUSION

This study demonstrates that ESG factors were linked to stock performance during the COVID-19 pandemic in Thailand from 2020–2021. Companies that invested in ESG in seven out of eight industries generated superior returns compared to companies that did not. ESG-adopted companies in six industries provided greater risk-adjusted returns compared to its industry. ESG in the technology and agro & foods industries can gain higher returns and higher risk-adjusted returns than other companies in the same industry. ESG stocks in service, resources, property & construction, and financial industries provided positive returns, while stocks of other companies in the industry had negative returns. The results confirm the importance of incorporating ESG in the company strategy to cope with emerging risks. Sustainability management is the key success factor for businesses and nations for long-term opportunities and growth. The analysis of each industry classification can be used by individual investors as well as institutional investors in terms of re-balancing portfolio management in sustainable investment. This will also encourage more companies to involve and improve their ESG strategies to qualify as a THSI constituent.

Regarding the ESG perspective and stock returns, the results exhibit a significant positive impact of the ESG scores on stock returns. The study covers the period from 2015–2021, which includes the time when COVID-19 spread in Thailand.

Companies with higher environmental and governance scores tend to generate the higher stock performance for investors. Good governance and environmental concerns have been implemented and integrated into public companies' strategies in Thailand for more than three decades. Corporate social responsibility (CSR) in Thailand is also widely understood and has been implemented by most companies in Thailand. CSR activity scoring is categorized in Refinitiv's governance scoring, and this leads to a significant impact of governance on stock returns.

The social pillar does not have a significant impact on stock returns. The social score data shows a higher standard deviation compared to the environmental and governance pillars. The social pillar perspective is still quite new for Thailand's equity market, which may cause the insignificant results. A longer time span of data will offer a better view of the results in future research. Sustainability development is a focal point for investors in terms of capital allocation, growth, and preservation of capital to build a sustainable investment in the long run. Companies without ESG or a low ESG score are unlikely to provide long-run returns for investors. The attention from investors regarding ESG issues is growing, especially since the occurrence of the COVID-19 pandemic. The uncertainty has highlighted the importance of building sustainable and resilient business models for all stakeholders. With sustainable investing being a trend, sustainability looks to continue in the foreseeable future. The promotion of ESG information disclosure should be continuously and actively promoted to the companies listed on the SET and also released to the public regularly. The SET identified four principles of ESG information including: 1) Materiality: concisely disclose key sustainability issues; 2) Modernity: regularly disclose up-to-date information; 3) Value Chain: comprehensively disclose the information covering upstream and downstream business operations; 4) Continuous Improvement: disclose the results based on the systematic establishment of qualitative and quantitative indicators.

The integration of ESG into company's long-term strategies together with the systematic information disclosure are the importance mechanism for institutional and individual investors to develop their sustainable investment to capture with the upcoming opportunities and minimize the uncertainty level from risk factors.

Further research can expand the current study to examine ESG performance beyond Thailand's Sustainability Index, such as the MSCI or DJSI, and carry out a deeper analysis in terms of the impact of ESG scores on the international standard. A comparison of ESG performance between different countries should be also carried out.

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