

CHAPTER I

INTRODUCTION

1.1 Background

Market has become increasingly interconnected due to technological advancements, regulatory changes, global economic uncertainty, and unpredictable events (Naeem, 2024; Dhingra et al., 2024). A prime example occurred on August 5, 2024, when economic uncertainty and global tensions such as fears of deeper US economic slowdown, a prolonged rout in Japanese shares, and heightened geopolitical tensions in the Middle East, caused significant turbulence in Asian equities. On this day, MSCI Asia Pacific Index plunged as much as 6.7%. Similarly, South Korea's stock market, represented by Korea Composite Stock Price Index (KOSPI), faced a sharp 8.8% decline, marking the largest percentage drop since the Global Financial Crisis of 2008 (Vishnoi et al., 2024). In response to this condition, many investors engage in panic selling, which exacerbates volatility.

Volatility is a key measure of risk in financial markets (Merton, 1980). The level of volatility an investor is willing to tolerate often correlates with their risk tolerance. Investor are seeking long-term returns, must be prepared to accept short-term volatility (CFI Team, 2024). Harry Markowitz, the American economist and pioneer of modern portfolio theory (MPT), argues that investors can achieve optimal outcomes by selecting a diversified combination of assets that aligns with their risk tolerance (Markowitz, 1952). As a result, the concept of risk-adjusted return becomes particularly valuable when investors face the risk-return trade-off like that phenomenon in pursuit of optimal outcomes.

Risk-adjusted return is a financial measurement used to assess an investment's return relative to its risk, providing a better understanding of fund performance (Hasnaoui, 2025). It enables investors to compare the risk levels of different investments (CFI Team, 2024). For instance, when two investments have the same expected return but different risk levels, the risk-adjusted return can help investors make more informed decisions. The concept is also used to evaluate the returns of different investments, each carrying various levels of risk, against a benchmark. If an asset demonstrates lower risk compared to the broader market, any return above the risk-adjusted return will be considered a gain.

The most commonly employed methods for measuring risk-adjusted returns are Sharpe Ratio, Jensen's Alpha, and Treynor Ratio. However, for the purpose of this study, Sharpe Ratio has been selected due to its widespread use as a reliable tool for assessing risk-adjusted return performance (Pushpalatha, 2024). Additionally, this metric evaluates return and risk, differentiates between cautious investments and taking on more risk for higher returns, rather than focusing only on absolute returns (Valadkhani & O'Mahony, 2025).

According to William F. Sharpe (1966), Sharpe Ratio calculates the expected return produced by an investment per risk unit. A higher Sharpe Ratio shows risk-adjusted performance is better, implying that the investment generates greater returns per risk unit (Valadkhani & O'Mahony, 2025). If investors can maximize their Sharpe Ratio and make effective comparisons between different investments, they will be better positioned to achieve long-term success.

While traditional financial metrics remain critical in investment analysis, investors increasingly prioritize Environmental, Social, Governance (ESG) factors to assess long-term sustainability (Mounir, 2025). ESG is a set of environmental, social, and governance factors that are taken into account during investment decision-making (Trahan et al., 2023). ESG comprises three key dimensions: environmental, social, and governance factor.

The environment factor evaluates a company's policies and activities that related to environmental issue (Saldi et al., 2023), such as renewable fuels, greenhouse gas emissions (GHG), energy efficiency, climate risk, water management, recycling process, and emergency preparedness (Løge et al., 2022). The social criterion measures the company's relationship with employee, communities, and stakeholders (Saldi et al., 2023), including working conditions, human rights, stakeholders' relations, health and safety of workers, employee relations, diversity and inclusion, and community impact (Løge et al., 2022). Finally, governance assess company's management practice to ensure the successful implementation of sustainability process. Key consideration by investor in this criterion is the company's governance management (Saldi et al., 2023), such as board diversity, ethical standards, stakeholder engagement, board independence, conflicts of interest, and pay for performance (Løge et al., 2022).

The growing emphasis on ESG is reflected in global investment trends. According to the sixth edition of Global Sustainable Investment Report 2022, the latest publication by Global Sustainable Investment Alliance (GSIA), global sustainable investment grew across most regions (Europe, New Zealand, Australia,

and Japan) from USD 18.2 to USD 21.9 trillion, representing 20% increase in the percentage of sustainable investment (GSIA, 2023). However, according to Morningstar Sustainalytics (2025) global sustainable fund assets saw a slight dip 4% in the last quarter of 2024, falling to nearly USD 3.2 trillion, primarily due to market price depreciation.

The recent activity in the global sustainable fund and details regional flow, launches, and assets for the fourth quarter of 2024 is summarized in table below.

Table 1. Global Sustainable Fund in 2024

Region	Flow Q4 2024	Flows Q3 2024	Assets		Funds	
	USD Billion	USD Billion	USD Billion	% Total	#	% Total
Europe	18.5	8.9	2,679	84	5,502	73
United States	-4.3	-2.0	344	11	612	8
Asia ex-Japan	2.7	2.4	74	2	632	8
Canada	-0.1	-0.1	36	1	267	4
Australia/New Zealand	0.4	0.6	31	1	261	3
Japan	-1.1	-0.6	22	1	236	3
Total	16.0	9.2	3,186		7,510	

Source: Morningstar Sustainability Report 2024

Global sustainable fund ended 2024 with the highest quarterly inflows of the year, with subscriptions amounting to USD 16 billion in the fourth quarter. In terms of regional growth, Europe continues to dominate the global sustainable fund landscape, accounting for 84% of the market share. In Asia, Japan led a biggest level of sustainable fund assets with a market share of 1% rather than other countries that included in Asia ex-Japan remained small at 2%. Asia ex-Japan consists of China, Taiwan, Hong Kong, South Korea, Singapore, Thailand, Indonesia, Malaysia, and India because they have relatively low levels of assets.

By growing the global sustainable funds, particularly in regions like Europe and Asia, reflects the increasing demands from stakeholders for companies to prioritize ESG principles. Stakeholders are increasingly holding companies accountable for their environmental and social impact, pushing firms to adopt sustainable practices to remain competitive and attractive (Alkurdi et al., 2024). This shift aligns with stakeholder theory of Freeman R. Edward (1984), organizations should maintain positive relationships with various stakeholder group, including employees, managers, communities, and regulators (Naseer et al., 2024). By adopting ESG principles, companies can meet the evolving needs of these stakeholders (Cong & Freedman, 2011) and enhance their legitimacy in public (Liao et al., 2015).

Ignoring ESG principles can lead to severe consequences, such as reputational damage, missed business opportunities, declining profitability due to shifting consumer preferences, and higher regulatory compliance cost (Bukreeva & Grishunin, 2024). These risks increase a company's overall risk profile, negatively impacting its risk-adjusted return, and making less attractive. Therefore, integrating ESG principles is essential for companies to enhance performance and ensure long-term sustainability.

Several previous studies have observed correlation between ESG and risk-adjusted return. For instance, Gupta & Chaudhary (2023) assess of ESG performance in both developed markets and emerging nations on risk-adjusted returns and volatility. The results show over a one-year rolling, ESG provide superior risk-adjusted returns for all countries except Brazil. Similarity, Naseer et

al. (2024) examine the relationship between ESG on firm risk and stock market return in Chinese energy sector. The findings result effective practice ESG can affect to risk reduction and increase return.

In another study, Hasnaoui (2025) evaluate connection between ESG ratings and the investment performance, specifically on risk-adjusted return, within the technology sector of Eurozone mutual funds. His study found technology fund with higher ESG ratings yielded better value of risk-adjusted return and were more resilient to market volatility. Additionally, Bermejo Climent et al. (2021) investigate the impact of ESG disclosure of European corporate equity. The findings show governance and environmental factors have a significant positive effect on portfolio return growth and a negative effect on portfolio volatility. A similar negative impact on volatility was also observe for the global ESG measure, while the social score negative effect on returns but positive influence volatility.

While existing studies provide valuable insights into the overall relationship between ESG performance and risk-adjusted returns, they predominantly focus on the aggregate effect of ESG as a whole. This approach presents a limitation, as highlight by Shanaev & Ghimire (2022), who underscoring the need to examine the individual ESG dimensions (E, S, G) separately. Consequently, the simultaneous impact of ESG sub-categories on risk-adjusted returns remains underexplored. A disaggregated approach is essential to identify which ESG factors drivers truly enhance risk-adjusted returns and which may be negligible (Berg et al., 2022).

Given the need for a more granular ESG analysis, this study focuses on four key sub-categories: climate commitment (E), health and safety training and

employee with disabilities (S), and board gender diversity (G) in Korean stock market. South Korea's ESG landscape is uniquely shaped by the dominance of family-owned business conglomerates, namely Chaebols, which differentiate its approach from other markets.

These conglomerates leverage their centralized decision-making structures to rapidly adopt high-profile ESG initiatives, often in alignment with government policies (J. H. Cho & Lee, 2022). For example, Samsung Electronics has partnered with Carbon Trust to develop strategies for measuring the emissions. This initiative is a part of Samsung's broader participation in Decarbonizing the Use-Phase of Connected Devices (DUCD) initiative, further highlighting the role of South Korea companies in addressing environmental concerns (Samsung Newsroom, 2024).

Beyond corporates initiatives, the total size of South Korea's ESG finance market demonstrates strong growth by 39.7%, rising from KRW 785.6 trillion in 2021 to 1,097.5 trillion in 2022 (Park et al., 2023). To support this expansion, the government has introduced regulatory measures such as K-ESG Guidelines and Korea Sustainability Standards Board (KSSB) ESG Disclosure Standards, which aim to standardize ESG reporting (KPMG, 2024). These frameworks streamline corporate ESG disclosure, ensuring compliance with global standards while enabling investors to evaluate ESG related risks and opportunities. This highlights South Korea's proactive response to shifting market dynamics and sustainability trend in shaping investment decision.

First, climate commitment is the first ESG sub-category from environmental dimension, which assesses whether companies have concrete policies to address

climate change. According to 2019 survey by Center for Financial Innovation's Study, climate change emerged as a significant risk factor, ranking as the second most major concern for insurance sectors and the third for non-insurance companies. This finding underscores the critical need for global preparedness to tackle the impacts of climate change.

Failure to mitigate climate change risks could be worsen economic losses and social disruptions in coming years, with business also facing significant risks (Venturini, 2022). For instance, PG&E in United States recorded its first instance of a corporate bankruptcy directly attributed to climate change in 2018 (Gold, 2019). These real-world examples highlight why climate change has become a central topic and need for genuine climate commitment from companies to reduce the impact of climate change and adapt to the associated risk (Dahmen & Chouaibi, 2024).

In line with Paris Agreement, South Korea has pledged to reduce its greenhouse gas (GHG) emissions by 40% in 2030 (Ji et al., 2022) within a long-term goal of achieving net zero emissions by 2050 (S. Cho et al., 2024). These efforts are reinforced by the country's National GHG Reduction Plan and are in alignment with the broader global goal of limiting global temperature rise to well below 2°C, and preferably to 1.5°C (UNFCCC, 2015). South Korea's emissions as a share of global totals have already shown a decrease from 1.35% in 2022 to 1.23% in 2023, specifically around 730.84 Mton CO₂eq to 653.85 Mton CO₂eq (Crippa et al., 2024) demonstrating its commitment to climate action.

Second, in focus on social dimensions, there are health and safety training and employee with disabilities in this study. South Korea's government has demonstrated a proactive approach to occupational health and safety through initiatives Roadmap to Zero Fatality at Work (MOEL, 2021). This strategy highlights the long-term value of workplace health and safety, not only for business but for society as a whole. Over the past two decades, South Korea has successfully reduced its fatality rate from 1.23 to 0.43 per 10,000 workers (MOEL, 2021). Companies like Hyundai Motor Company have mirrored this commitment by investing in health, safety, and welfare system and training, reducing risks associated with workplace accidents, litigation, and reputational harm (Hyundai, 2024).

Further supporting social inclusivity, South Korea promotes social equity through the Act on Welfare of Persons with Disabilities, Article 3, which guarantee equal opportunity to engage in political, social, economic, and cultural activities as full members of society (KLRI, 2021). Korea Employment Agency for Persons with Disabilities mandates hiring quotas at least 3.8% of their workforce consists of people with disabilities in public sectors and 3.1% in the private sector. These regulations fostering inclusivity while enriching corporate decision making with diverse perspective impact positively on company performance.

Finally, board gender diversity (G) reflects the growing emphasis on stakeholders' concerns, offering transparency information and embracing more sustainable business strategies (Masi et al., 2021). Female directors bring unique perspectives, ethical values, and strategic insights that strengthen a company's

capacity to tackle complex ESG issue. Furthermore, board gender diversity increases transparency and accountability, both essential for ESG performance and aligning corporate strategies with the stakeholders' expectation (Atalay et al., 2025). South Korea companies lacking female representation on boards of directors have made notable strides, dropping from 65% in 2020 to 21% in 2022. This reflects a major shift towards greater gender equality in corporate governance (MCSI, 2023).

To gain more comprehensive understanding of the relationship between ESG sub-categories and risk-adjusted return of Korean stocks, this study will incorporate moderating and control variables. The moderating variable in this case is industrial type, specifically whether the company belongs to industrial technology or not. According to Hasnaoui (2025), incorporating ESG criteria within the technology sector, results in a more advantageous risk-return balance, which means technology sector can strength impact factor of ESG on risk-adjusted return.

As noted by Egorova (2022), IT companies have potential to develop their ESG initiatives while they are not leaders in ESG rating. Additionally, South Korea, recognized as a global leader in information and communication technology (ICT), serves as an ideal setting for this study. The country is renowned for having the fastest internet speeds in the world, a highly tech-savvy population, and being home to major global players such as Samsung Electronics, SK Hynix, LG Electronics, and Naver (ITA, 2023). Given these findings, this study specifically examines the moderating role of the technology industry on relationship between ESG sub-categories and risk-adjusted return.

Furthermore, the control variable is used in this study is market capitalization and leverage. The selection of appropriate control variables for this research is based on previous study related to risk-adjusted return for example conducted by (Akala, 2022; Naseer et al., 2024; Randombage & Fernando, 2024; Scharrenburg, 2024). Market capitalization is the first control variable used in this research. Market capitalization is the result of multiplying the share price by the total number of shares available in the company (Parameswaran, 2022). This research uses a natural logarithmic transformation, which helps minimize high standard deviation and skewness, ensuring a normalized and valid dataset for analysis (Akala, 2022). Additionally, the log-market cap as size of the company could influence the risk-return profiles (Scharrenburg, 2024). According to Randombage & Fernando (2024), market capitalization has a significant positive relationship with risk-adjusted return.

The second control variable used is leverage. Leverage refers to company's ability to utilize assets and funding sources through both short-term and long-term costs and expenses to boost its profits and enhance shareholder gains (Shofira, 2022). As noted by Naseer et al. (2024) leverage helps consider the impact of capital structure on risk and return. High levels of leverage tend to have a negative impact on a company's risk-adjusted return. Leverage measurement in this research was carried out using the debt-to-equity ratio (DER). The debt-to-equity (DER) ratio is obtained by dividing total debt by total equity (Arora & Sharma, 2022).

As discussed above, corporate sustainability has become a potential impact on financial performance, particularly risk-adjusted return. Positive sustainability

practices are often associated to reduce non-financial risks and enhance corporate reputation, which can lead to more stable and attractive returns. However, this raises important questions regarding how these sustainability factors such as climate commitment, health and safety training, employee with disabilities, and board gender diversity influence risk-adjusted return of Korean stocks. Moreover, the role of industry type as moderating variable introduces further complexity, as different sectors may exhibit varying levels of sensitivity to sustainability practices. Consequently, this study title **“The Impact of ESG Sub-Categories on Risk-Adjusted Returns: Moderating Role of Industry Type in Korean Stock Markets,”** aims to examine the influence of these sustainability factors on financial performance, with particular emphasis on the moderating effect of industry type.

1.2 Research Problem

The problem formulation for this research is outlined as follows:

1. What is the impact of climate commitment on risk-adjusted return of Korean stocks?
2. What is the impact of health and safety training on risk-adjusted return of Korean stocks?
3. What is the impact of employee with disabilities on risk-adjusted return of Korean stocks?
4. What is the impact of board gender diversity on risk-adjusted return of Korean stocks?
5. Does industry type moderate the relationship between climate commitment and risk-adjusted return of Korean stocks?

6. Does industry type moderate the relationship between employee with disabilities and risk-adjusted return of Korean stocks?
7. Does industry type moderate the relationship between board gender diversity and risk-adjusted return of Korean stocks?

1.3 Research Objectives

Drawing from the previously stated research problem, the objectives of this study are outlined as follows:

1. To evaluate the impact of climate commitment on risk-adjusted return of Korean stocks.
2. To assess the impact of health and safety training on risk-adjusted return of Korean stocks.
3. To analyze the impact of employee with disabilities on risk-adjusted return of Korean stocks.
4. To determine the impact of board gender diversity on risk-adjusted return of Korean stocks.
5. To evaluate the moderating effect of industry type on the relationship between climate commitment and risk-adjusted return of Korean stocks.
6. To investigate the moderating effect of industry type on the relationship between employee with disabilities and risk-adjusted return of Korean stocks.
7. To analyze the moderating effect of industry type on the relationship between board gender diversity and risk-adjusted return of Korean stocks.



1.4 Research Benefits

1.4.1 Theoretical Benefits

This research contributes to the academic literature by examining the relationship between Environmental, Social, Governance (ESG) sub-categories especially on climate commitment, health and safety training, employee with disabilities, and board gender diversity influence risk-adjusted return of Korean stocks. This research can enrich understanding of how ESG performance affects stock performance and offer insights into finance, investment, and risk management. This study also serves as a reference for future research on ESG specifically on its sub-categories: climate commitment, health and safety training, employee with disabilities, and board gender diversity.

1.4.2 Practical Benefits

This research presents practical benefits for investors, companies, and policymakers. For investors, it offers critical insights into how climate commitment, health and safety training, employee with disabilities, and board gender diversity influence risk-adjusted return within Korean stock market, facilitating the integration of ESG criteria into investment strategies to achieve more stable and sustainable returns. For companies listed on the Korean stocks market, the study underscores the impact of climate commitment, health and safety training, employee with disabilities, and board gender diversity on investor perception of risk and return, providing a foundation for the development of ESG sub-categories strategies that enhance long-term financial performance and attract ESG-conscious investors. Additionally, for policymakers, the findings contribute to the formulation

of regulation and policies that encourage sustainable business practices, thereby promoting a greater responsible financial ecosystem.

1.5 Scope of Research

This study is constrained by specific samples and variables to minimize potential confusion in interpreting the research findings. The research, title “ESG Sustainability Trends and Their Impact on Risk-Adjusted Return: Exploring the Moderating Role of Industry Type in Korean Stock Markets,” incorporates several key variables. The primary independent variable (X) is Climate Commitment, Health and Safety Training, Employee with Disabilities, and Board Gender Diversity while the dependent variable (Y) is the Risk-Adjusted Return. Furthermore, the study includes Industry Type as a moderating variable and incorporates Market Capitalization and Leverage as control variables. The samples for this research consist of companies listed on the Korean Stock Exchange between 2019 until 2023.

1.6 Writing Systematics

This research consists of five chapters with a writing systematic as follows:

CHAPTER I INTRODUCTION

This chapter consists of background, problem research, research objectives, research benefits, scope of research, and writing systematics.

CHAPTER II LITERATURE REVIEW

This chapter consists of the theoretical basis of research, previous research, research hypothesis development, and a framework of thought.

CHAPTER III RESEARCH METHOD

This chapter consists of research design, population and research samples, types and sources of data, data collection methods, operational definitions of variables, and data analysis methods.

CHAPTER IV DATA ANALYSIS AND DISCUSSION

This chapter contains the results of the research and its discussion. In addition, this chapter will explain the analysis of the results and see the comparison with the criteria used to prove the conjectures of the research hypothesis.

CHAPTER V CLOSING

This chapter contains conclusions from the results of the research conducted, research implications, limitations, and suggestions given for further research.

